

From the
Office of Tax Policy Research

WORKING PAPER SERIES

Excise Taxes

by

James R. Hines Jr.
University of Michigan and NBER

The Office of Tax Policy Research, established in 1987, promotes policy-oriented research in taxation, and serves as a liaison between the academic, business, and policy making communities. We are committed to using state-of-the-art methods to analyze tax policy issues, and to disseminate our findings, and those of a broader academic community, to people in the policy making community.

LEADING IN THOUGHT AND ACTION

Excise Taxes

James R. Hines Jr.
University of Michigan and NBER

May 2007

This is prepared as an entry for *The New Palgrave Dictionary of Economics*, 2nd ed., edited by Lawrence E. Blume and Steven N. Durlauf.

©2007 by James R. Hines Jr. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Excise Taxes

ABSTRACT

Excise taxes are selective taxes on the sale or use of specific goods and services, such as alcohol and gasoline. Over time, governments have relied less on excise taxes, though excise taxes still contribute 12 percent of total government revenues in OECD countries. In addition to generating needed revenue, excise taxes can be designed to control externalities and to impose tax burdens on those who benefit from government spending. Rather more controversially, excise taxes also can be used to discourage consumption of potentially harmful substances (such as tobacco and alcohol) that individuals might overconsume in the absence of taxation.

JEL Classifications: H21, H22, H25.

James R. Hines Jr.
Department of Economics
University of Michigan
343 Lorch Hall
611 Tappan Street
Ann Arbor, MI 48109-1220

jrhines@umich.edu

1. Introduction

Excise taxes are selective taxes on the sale or use of specific goods and services, such as alcohol and gasoline.

Excise taxes have existed for centuries and are widely used by governments today. The twentieth century spread of income taxation and value-added taxation reduced the significance of excise taxation as a source of government revenue, but most governments still collect sizable taxes on petroleum products, tobacco products, and alcohol. For example, in 2004 the U.S. federal government collected \$72 billion in excise taxes, representing four percent of its total tax revenues, of which petroleum taxes accounted for \$33 billion, or 45 percent of total excises. The United States relies the least on excise taxes of the 30 wealthy nations that are members of the Organization for Economic Cooperation and Development (OECD), whose excise tax collections in 2000 averaged 12 percent of total government revenues (Hines, 2007). As recently as 1969-1971, excise taxes contributed 23 percent of total tax collections of high income countries, and 27 percent of tax collections of developing countries (Cnossen, 1977). Among OECD countries in 2000, those with the lowest incomes, the most centralized governments, and the greatest openness to international trade had the highest ratios of excise tax collections to total government revenues (Hines, 2007).

Excise taxes take the form either of specific taxes or of ad valorem taxes. A specific tax (or unit tax) is defined per unit of the taxed good or service, whereas an ad valorem tax is defined per sales value. Thus, the current U.S. federal taxes of \$0.184 per gallon of gasoline and \$0.39 per pack of cigarettes are specific taxes, while the U.S. tax of 11 percent of the value of bows and arrows and three percent of the value of fish-finding sonar devices are ad valorem taxes. In competitive markets specific and ad valorem taxes have identical consequences, other than any

differences stemming from compliance and enforcement. In imperfectly competitive markets the difference is more consequential, since ad valorem taxes automatically impose higher per-unit tax rates as firms restrict quantities to drive up prices. Hence in imperfectly competitive markets ad valorem taxes produce lower consumer prices, and lower deadweight loss, than do specific taxes raising the same revenue (Suits and Musgrave, 1953 and Delipalla and Keen, 1992).

Four motivations underlie the use of most excise taxes. The first is revenue generation: excise taxes can produce significant government revenues, and may do so at lower political or economic cost than alternatives such as income taxation. The second motivation is application of the benefit principle of taxation: excise taxes can be tailored to impose tax burdens on those who benefit from government services financed by excise taxes. Gasoline taxes are often justified as user fees for government-provided roads, and the tax on sonar devices is justified by government expenditures to maintain lakes and fisheries. The third motivation is control of externalities, which is the goal of a number of excise taxes on polluting substances, such as taxes on ozone-depleting chemicals. And the fourth motivation is that excise taxes may discourage consumption of potentially harmful substances (such as alcohol and tobacco) that individuals might overconsume in the absence of taxation.

2. *Excise tax incidence*

It is customary to think of the burden of excise taxes as being borne by consumers of taxed goods and services in the form of higher after-tax prices, but there is considerable scope for shifting of tax burdens. In a simple competitive partial equilibrium setting, the burden of an excise tax depends on elasticities of demand and supply: if demand for a taxed good or service is elastic, and supply relatively inelastic, then the burden of an excise tax is borne by sellers,

whereas buyers bear the burden of a tax on a good or service with inelastic demand and elastic supply. Similar demand and supply elasticities imply equal sharing of excise tax burdens between buyers and sellers.

There are plausible circumstances in which consumers can bear more than 100 percent of the burden of an excise tax, or alternatively, might actually benefit from the introduction of a tax. If the market for a good or service is imperfectly competitive, then, depending on the nature of competition and cost conditions, consumers may well bear more than 100 percent of the burden of an excise tax (Delipalla and Keen, 1992). Even with perfect competition, the nature of demand and supply spillovers among multiple markets in general equilibrium can produce anomalous outcomes, such as consumer prices that rise by more than the amount of excise taxes, or (after-tax) prices that even fall with the introduction of excise taxes (Hotelling, 1932).

There is mixed evidence of excise tax incidence in practice. Poterba (1996) offers evidence that consumers bear the full burden of U.S. excise and sales taxes in the form of higher prices, but Besley and Rosen (1999) find that many consumer prices rise by more than 100 percent of excise and sales taxes imposed by U.S. states and localities.

One concern frequently expressed about excise taxation is the potential regressivity of the resulting tax burdens. Excise tax rates do not rise with consumption in the way that income tax rates rise with income; furthermore, since the poor spend higher fractions of their incomes than do the wealthy, taxes based on expenditure rather than income may put greater relative burdens on low-income individuals. This second consideration is considerably diminished by adopting a lifetime perspective, however, since individuals ultimately either spend or give away all of their incomes. Hence the distributional impact of excise taxes depends critically on the income elasticities of demand for goods and services subject to high rates of excise taxation. Poterba

(1991) analyzes U.S. gasoline taxes from the standpoint of lifetime incidence, finding that gasoline consumption rises more than proportionately with affluence over much of the range of total spending, suggesting that gasoline taxes are progressive, albeit less so than income taxes.

3. *Optimal excise taxation*

Ramsey (1927) initiated the modern theory of optimal taxation with his analysis of excise taxation in a model with identical consumers, finding that, far from being uniform, optimal excise tax rates vary inversely with elasticities of demand for taxed goods. Ramsey's setup restricts the government to raising a given amount of revenue exclusively with excise taxes, and the resulting optimal tax pattern reflects that the excess burden of a tax increases with its behavioral impact. Diamond (1975) generalized the Ramsey rule to settings with heterogeneous individuals, showing that the resulting modified optimal excise taxes reflect both efficiency (lower tax rates on elastically demanded goods) and distributional (higher tax rates on goods purchased by wealthy individuals) considerations. As noted by Corlett and Hague (1953-54), the government's inability to tax leisure is what prevents uniform excise taxes from being optimal in the Ramsey model; as a second-best correction, the optimal Ramsey tax configuration entails imposing heavier excise taxes on goods and services that are complementary with untaxed leisure.

Under what circumstances would a government with access to a full range of income tax instruments want to impose excise taxes at differentiated rates? Atkinson and Stiglitz (1976) showed that, if consumers have identical utility functions that are weakly separable in consumption and leisure, then there is nothing to be gained by supplementing an optimal nonlinear income tax with differentiated excise taxes. The reason is that, in such a setting,

patterns of commodity consumption fail to convey information to the government that is not already captured by income levels.

Excise taxes can nevertheless serve the function of controlling externalities, a consideration omitted from the Atkinson-Stiglitz framework. Pigou (1920) famously proposed the imposition of corrective excise taxes at rates equal to marginal external damages, noting that doing so restores economic efficiency, and Sandmo (1975) illustrates the optimal application of Pigouvian excise taxes when the government relies on excise taxes to raise revenue. In practice, governments impose heavy taxes on energy products, motor vehicles and other transportation, waste management, ozone-depleting substances, and other products and activities that arguably create externalities in degrading the environment. In 2000, OECD countries raised an average of 5.5 percent of their total tax revenues from these environmental taxes, with European Union members averaging 6.8 percent, and the United States the lowest in the OECD at 3.4 percent (Hines, 2007).

Excise taxes can also play a role in discouraging consumption of goods that may not have external effects, but are nonetheless harmful to the individuals who consume them. Examples of such goods include tobacco products, alcohol, and food with poor nutritional content. Irrational consumers may begin consuming these items without fully appreciating the regret they will experience years later, in which case there could be a role for optimal excise taxation to help consumers by making it more expensive, and therefore less likely, to start early on the path of overconsumption (O'Donoghue and Rabin, 2006).

Finally, excise taxes raise enforcement concerns, as do all taxes. In the United Kingdom, which boasts the highest cigarette taxes in Europe, one cigarette out of every five is purchased on

the black market (Cnossen and Smart, 2005). Hence the choice of excise tax policy needs to be sensitive to smuggling and other evasion opportunities.

References

- Atkinson, Anthony B. and Joseph E. Stiglitz. 1976. The design of tax structure: Direct versus indirect taxation. *Journal of Public Economics* 6, 55-75.
- Besley Timothy J. and Harvey S. Rosen. 1999. Sales taxes and prices: An empirical analysis. *National Tax Journal* 52, 157-178.
- Cnossen, Sijbren. 1977. *Excise Systems*. Baltimore: John Hopkins University Press.
- Cnossen, Sijbren and Michael Smart. 2005. Taxation of tobacco. In *Theory and practice of excise taxation*, ed. Sijbren Cnossen. Oxford, UK: Oxford University Press, 120-154.
- Corlett, W.J. and D.C. Hague. 1953-54. Complementarity and the excess burden of taxation. *Review of Economic Studies* 21, 21-30.
- Delipalla, Sofia and Michael Keen. 1992. The comparison between ad valorem and specific taxation under imperfect competition. *Journal of Public Economics* 49, 351-368.
- Diamond, Peter A. 1975. A many-person Ramsey rule. *Journal of Public Economics* 4, 335-342.
- Hines, James R., Jr. 2007. Taxing consumption and other sins. *Journal of Economic Perspectives* 21, 49-68.
- Hotelling, Harold. 1932. Edgeworth's taxation paradox and the nature of supply and demand functions. *Journal of Political Economy* 40, 577-616.
- O'Donoghue, Ted and Matthew Rabin. 2006. Optimal sin taxes. *Journal of Public Economics* 90, 1825-1849.
- Pigou, A.C. 1920. *The economics of welfare*. London: Macmillan.
- Poterba, James M. 1991. Is the gasoline tax regressive? In *Tax Policy and the Economy*, Vol. 5, ed. David F. Bradford. Cambridge, MA: MIT Press, 145-164.
- Poterba, James M. 1996. Retail price reactions to changes in state and local sales taxes. *National Tax Journal* 49, 165-176.
- Ramsey, Frank P. 1927. A contribution to the theory of taxation. *Economic Journal* 37, 47-61.
- Sandmo, Agnar. 1975. Optimal taxation in the presence of externalities. *Swedish Journal of Economics* 77, 86-98.
- Suits, Donald B. and Richard A. Musgrave. 1953. Ad valorem and unit taxes compared. *Quarterly Journal of Economics* 67, 598-604.