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Federal Taxation of the Drug Industry: 1990 to 1999

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Summary

A critical consideration in the current debate in Congress over expanding access to prescription drugs is the key forces driving the discovery and development of new medicines. Obviously, one such force is federal policy in areas related to pharmaceutical innovation. This report examines a small slice of the assortment of federal policies that affect the incentive to invest in pharmaceutical innovation: the federal tax burden on the pharmaceutical industry from 1990 to 1999.

Most industries have distinctive traits, and the pharmaceutical industry clearly is no exception. In the minds of most analysts, what distinguishes firms that develop, produce, and sell patented or branded medicines is their singular combination of heavy investment in research and development and advertising, concentration in specific market segments, relatively high dependence on patents to generate revenue and profit growth, and extensive web of foreign operations. Some of these traits have important implications for the industry's federal tax burden.

Public finance economists define a firm's or an industry's federal tax burden as the share of its pre-tax economic income paid in federal income taxes. One commonly used measure of an industry's federal tax burden is its average effective tax rate, which is the ratio of its federal tax liability after all credits (except the foreign tax credit) to its pre-tax income expressed as a percentage. This measure is not without shortcomings. A principal problem is that average effective rates do not consider the influence of tax provisions that accelerate the timing of deductions or delay the recognition of income. Moreover, the concept of income used in the calculations here is taxable income, which may differ considerably from economic income or pre-tax income defined according to financial accounting principles.

A comparison of the average effective federal tax rates for the drug industry and major U.S. industries suggests that the drug industry had a relatively light federal tax burden in much of the 1990s. This finding reflected the substantial tax savings that drug firms derived from three tax credits: (1) the possessions tax credit; (2) the research tax credit; and (3) the orphan drug tax credit. These credits were available to all firms. On the whole, it appeared that pharmaceutical firms extracted greater benefit from them – especially the possessions tax credit – than most other firms. If it were possible to compute marginal effective tax rates for the same industries, it is likely that the drug industry still would have the lowest rate. This is because pharmaceutical firms are likely to benefit disproportionately from three tax preferences: (1) the deferral of federal income tax on the retained earnings of foreign subsidiaries of U.S.-chartered corporations, (2) the expensing of R&D outlays, and(3) the expensing of advertising outlays.

Pharmaceutical firms have sought to maximize after-tax profits by taking advantage of certain provisions in the tax code whose purpose is to promote specific policy goals of the federal government. Most of these provisions have nothing to do with the advancement of pharmaceutical innovation.

This report will be updated when more recent data become available.

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The pharmaceutical industry is no stranger to controversy. On the one hand, pharmaceutical firms are lauded for their huge and growing investments in the development of safer or more effective medicines and new medicines that advance the treatment of a variety of serious illnesses.[1] On the other hand, the same firms are castigated for their pricing of branded or patented drugs, their efforts to thwart competition from cheaper generic drugs, their relatively strong profitability, and their large and rising outlays for direct advertising to consumers and product promotion among physicians, who serve as the central players in the decision to use prescription drugs.[2] Framing these contrary sentiments is a contentious debate in Congress over how to improve access to prescription drugs among Americans of all ages – especially Medicare beneficiaries – without incurring massive future federal budget deficits or undermining incentives for pharmaceutical innovation.

A critical component of this debate is the chief forces driving the discovery and development of new medicines, one of which is federal policies affecting new drug development. The federal government plays a far-reaching role in pharmaceutical innovation. This role encompasses a variety of discrete activities, including federal funding of pharmaceutical research and development (R&D), federal approval of new patented and generic drugs, federal patent policy toward prescription drugs, federal support of biomedical research and education in universities, federal financing of drug purchases through Medicaid and Medicare, and federal tax subsidies for R&D and employer-provided health insurance. While it is difficult to estimate the proportion of pharmaceutical R&D affected by these activities, one thing seems certain: the domestic climate for pharmaceutical innovation would be radically different in their absence.

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[1]In 2001, companies that were members of the Pharmaceutical Research and Manufacturers of America, the principal trade association for the U.S. pharmaceutical industry, spent an estimated $23.9 billion on domestic pharmaceutical research and development (R&D), up from $6.8 billion in 1990. At the same time, 98 new drugs were either awaiting regulatory approval by the U.S. Food and Drug Administration (FDA) or undergoing human clinical trials. See Pharmaceutical Research and Manufacturers of America, *Pharmaceutical Industry Profile* (Washington: 2002), pp. 12 and IX.

[2]Between 1998 and 2000, the Consumer Price Index (CPI) for brand-name prescription drugs rose at an average annual rate of 10.5%, compared to a rate of 2.8% for the overall CPI. According to recent data for Fortune 500 companies, the median ratio of after-tax income to revenues for pharmaceutical manufacturers in 2000 was 18.6%, compared to a median ratio for all Fortune 500 companies of 4.5%. And total promotional spending by the pharmaceutical industry rose from $9.2 billion in 1996 to $15.7 billion in 2000. See The Henry J. Kaiser Family Foundation, *Prescription Drug Trends: A Chartbook Update* (Washington: Nov. 2001), pp. 28, 46, and 31.

This report examines a small slice of the assortment of federal policies influencing pharmaceutical innovation: federal taxation of the pharmaceutical industry. The federal tax code directly and indirectly affects private investment in new drug discovery and development. The direct effect comes from tax subsidies for R&D investment; federal tax policy indirectly affects industry spending on pharmaceutical R&D through its impact on the cost of capital for this purpose. The report looks at the industry's federal tax burden from 1990 to 1999, highlighting the provisions in the federal tax code that appear to generate significant tax benefits or penalties for pharmaceutical firms. It begins with a description of the distinguishing traits of the pharmaceutical industry, many of which play a prominent role in its tax treatment.

Distinguishing Characteristics of the U.S. Pharmaceutical Industry

Most industries have distinctive traits, and the pharmaceutical industry is no exception. In the minds of many analysts, what distinguishes firms that develop, produce, and sell patented or branded prescription drugs is their singular combination of heavy investment in R&D and advertising, concentration in specific market segments, relatively high dependence on patents to generate sustained revenue and profit growth and to bolster competitiveness, and extensive network of foreign operations.

Heavy Investment in R&D

The pharmaceutical industry is one of the most research-intensive U.S. industries, even though pharmaceutical firms receive little in the way of direct funding from federal government agencies for their innovative activities. According to estimates by the National Science Board, U.S. makers of drugs and medicines spent 10.5% of their net sales on R&D in 1997, compared to ratios of 2.9% for all industries and 3.3% for manufacturing.[3] In the same year, U.S. makers of drugs and medicines spent $11.6 billion on R&D, while federal spending on pharmaceutical R&D amounted to only $3 million.[4] The principal trade association for the U.S. pharmaceutical industry, the Pharmaceutical Research and Manufacturers of America (or PhRMA), estimates that in 2001, domestic spending on pharmaceutical R&D by member firms totaled $23.9 billion (or 17.7% of their domestic sales), compared with $6.8 billion (or 16.2% of domestic sales) in 1990.[5]

Pharmaceutical firms pour substantial resources into R&D mainly because it is a powerful engine of long-term survival and growth in the prescription drug business. On the one hand, discovering and developing a new innovative drug is a lengthy,

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[3]National Science Board, *Science & Engineering Indicators – 2000* (Arlington, VA: National Science Foundation, 2000), appendix table 2-57, p. A-102.

[4]Ibid., appendix tables 2-54 and 2-55, pp. A-97 and A-99.

[5]Pharmaceutical Research and Manufacturers of America, *2002 Industry Profile* (Washington: PhRMA, 2002), pp. 12-13.

risky, and costly process.[6] On the other hand, firms launching new innovative drugs that eventually gain wide acceptance in the marketplace can reap huge profits from them until their patents expire or rival patented drugs gain regulatory approval.[7] Significant advances in the technology for new drug development over the past 25 years have greatly increased the number of drug compounds with therapeutic potential being discovered. Nonetheless, there is growing concern among analysts that the flow of new breakthrough drugs through the developmental pipeline is slowing to the point where some major firms might be forced to merge. A recent study by the National Institute for Health Care Management Foundation found that only 15% of the 1,035 new drug applications approved by the FDA from 1989 to 2000, contained new chemical ingredients that offered significant therapeutic improvements over existing drugs.[8] A spate of mergers could affect the future amount and composition of domestic pharmaceutical R&D by lessening competition in key segments of the market for prescription drugs.[9]

Heavy Investment in Product Promotion

In light of the enormous investments in R&D made by pharmaceutical firms and small likelihood of delivering highly profitable drugs to the marketplace, it is no surprise that these firms spend large sums annually on promoting their branded products to physicians and consumers. In fact, one could argue that major pharmaceutical firms deem advertising nearly as important as R&D in their competitive strategies. According to one estimate, domestic promotional spending by pharmaceutical firms totaled $15.7 billion in 2000, up from $9.1 billion in 1996.[10] More than half of the 2000 expenditures went to the distribution of free drug samples to physicians; another 30% covered the cost of making direct sales pitches to physicians; and nearly 16% were funneled into direct advertising to consumers. The strong focus on informing and encouraging brand loyalty among physicians reflects a distinctive feature of the U.S. market for prescription drugs: consumers rely on the judgment and consent of third parties – namely, doctors – in deciding which prescription drugs to use in treating illness.

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[6]According to research findings summarized by PhRMA, the average period from synthesis of a new compound to approval by the U.S. Food and Drug Administration (FDA) was over 14 years in the 1990s; only one out of every 5,000 compounds synthesized in a laboratory gains FDA approval; the cost of developing a new drug (including the cost of failures) rose from $54 million in 1976 to $802 million in 2000; and as few as three out of ten newly approved drugs earn enough revenues to cover their R&D cost. See Ibid., pp. 18-22.

[7]For example, U.S. retail sales of Lipitor, a patented cholesterol-lowering drug sold by Pfizer, totaled $4.5 billion in 2001, up from $3.7 billion in 2000. See National Institute for Health Care Management Foundation, *Prescription Drug Expenditures in 2001: Another Year of Escalating Costs* (Washington: April 2002), table 3, p. 13.

[8]National Institute for Health Care Management Foundation, *Changing Patterns of Pharmaceutical Innovation* (Washington: May 2002), p. 3.

[9]Andrew Pollack, "Despite Billions for Discoveries, Pipeline of Drugs is Far From Full," *New York Times*, Apr. 19, 2002, pp. C1 and C7.

[10]Henry J. Kaiser Family Foundation, *Prescription Drug Trends*, p. 31.

Competitive Structure

Another distinguishing characteristic of the pharmaceutical industry is its fragmented competitive structure. No single firm or small cluster of firms seems to dominate the U.S. market for branded prescription drugs. The U.S. Census Bureau has determined that in 1997, the four largest producers accounted for 32% of the value of domestic shipments of medicines, the eight largest for 48%, and the 20 largest for 67%.[11] Ten years earlier, the four largest accounted for 22% of shipments and the 20 largest for 65%. Yet, owing in part to the competitive advantages arising from being among the first to bring new innovative drugs to the marketplace, some firms are able to establish at least a temporary supremacy in certain key segments of the market. For example, in October 2001, five companies held 70% of the U.S. market for anti-ulcer drugs; three companies accounted for 83% of U.S. prescriptions for anti-psychotic drugs; and three companies laid claim to 81% of the U.S. market for cholesterol-lowering drugs.[12]

Dependence on Patent Protection

In addition, U.S. pharmaceutical firms exhibit a heavy reliance on patents to generate revenue and profit growth and augment their competitiveness. Patents give holders a temporary legal monopoly over the commercial use of an invention. They are widely viewed as an indispensable policy instrument for fostering innovation in that in the absence of patent protection, the cost of imitating a new invention might be so low as to discourage investment in innovation. In the United States and most other advanced industrialized nations, the life of a patent is 20 years from the date of application. A patent holder may license other firms to exploit the invention, but it would assess them royalties as compensation for the waiver of its exclusive control. Pharmaceutical firms claim patents for the design of drug compounds, their formulation as drug therapies, their uses in treating illnesses, and their methods of manufacture.[13] Thus it comes as no surprise that pharmaceutical industry executives regard patents as one of the most effective means of protecting the competitive advantages that flow from investing in innovation.[14]

The industry's reliance on patents partly explains why drug firms have long been among the most profitable of all firms. From 1960 to 1991, the reported rate of return on stockholders' equity for pharmaceutical firms included in the annual ranking of the top 500 industrial corporations by *Fortune* magazine averaged 18.4%,

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[11]U.S. Census Bureau, *1997 Economic Census: Concentration Ratios in Manufacturing* (Washington: June 2001), table 2, p. 11.

[12]Standard & Poor's, *Industry Surveys, Healthcare: Pharmaceuticals* (New York, Dec. 27, 2001), pp. 10-13.

[13]U.S. Congress, Office of Technology Assessment, *Pharmaceutical R&D: Costs, Risks, and Rewards* (Washington: U.S. Govt. Print. Off., Feb. 1993), pp. 290-293.

[14]F. M. Scherer, *Industry Structure, Strategy, and Public Policy* (New York: Harper-Collins, 1996), pp. 360-362.

compared to 11.9% for all 500 firms.[15] More recently, pharmaceuticals ranked first in return on shareholders' equity (33.2%) among the 48 industries represented in the *Fortune* 500 in 2001.[16] Proof that patents are critical to the profitability of pharmaceutical firms can be found in the differences in selling prices between branded drugs and their generic counterparts. Innovative medicines protected by patents typically command far higher prices than competing generic drugs, which lack patent protection.[17]

Extensive Foreign Operations

Finally, no account of the distinctive traits of U.S. pharmaceutical firms – especially those having a bearing on their federal tax treatment – would be complete without a brief description of their extensive foreign operations, including Puerto Rico. Most major U.S. pharmaceutical firms own foreign subsidiaries that manufacture and sell drugs and conduct R&D – especially in Europe and Japan, the two largest regional markets (measured in U.S. dollars) for patented medicines after North America.[18] Like U.S. automobile producers, major pharmaceutical firms recognized three or four decades ago that in order to become serious long-term players in key foreign markets, they needed to establish a manufacturing presence there.[19]

As the following figures testify, the industry has done so in a big way. In 2000, U.S. exports by PhRMA member companies came to $399 million, whereas foreign sales through their subsidiaries and branches totaled $39.5 billion, or 34% of domestic sales by these companies.[20] In the same year, foreign R&D spending for drugs for human consumption by PhRMA member companies amounted to $6.3 billion, or 27% of their spending on domestic R&D.[21] According to estimates by the U.S. Bureau of Economic Analysis, in 2000, assets held by foreign affiliates of U.S. producers of drugs had a book value of $32.3 billion; foreign direct investment by these producers amounted to $1.8 billion; and they received $4.1 billion in income from foreign affiliates.[22] Some of this foreign income represents a return on past U.S. R&D investments because it is in the form of royalty payments. According to figures

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[15]Ibid., p. 342.

[16]2002 Fortune 500, "Top Performing Companies and Industries," [http://www.fortune.com/lists/F500/topperf_ind_mostproft_equit.html], visited Apr. 23, 2002.

[17]Once a prescription drug's patent expires, generic drugs, which are chemical equivalents of branded drugs, usually appear immediately, and prices begin to fall. The price of a new generic drug is typically 25% to 50% lower than that of the branded version. See Standard & Poor's, *Healthcare: Pharmaceuticals*, p. 15.

[18]Ibid., p. 6.

[19]Scherer, *Industry Structure, Strategy, and Public Policy*, p. 342.

[20]Pharmaceutical Research and Manufacturers of America, *2002 Industry Profile*, p. 85.

[21]Ibid., p. 77.

[22]U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, Sept. 2001, table 17, p. 108.

collected by the U.S. Commerce Department, majority-owned foreign affiliates of U.S.-based multinational pharmaceutical firms made $1.3 billion in royalty payments to their U.S. parents in 1994, the most recent year for which data are available.

Federal Income Taxes Paid by the Drug Industry Between 1990 and 1999

Federal income taxes paid by the drug industry from 1990 to 1999 – the most recent year for which corporate tax return data are available – are shown in table 1. The figures on tax liability include any alternative minimum taxes owed by drug corporations.

Table 1. Federal Income Tax Liability for the Drug Industry, 1990 to 1999

(millions of dollars)

Year	Taxable Income	Federal Income Tax Before Credits	Tax Credits Claimed (Except the Foreign Tax Credit)	Income Tax After Credits (Except the Foreign Tax Credit)
1990	15,934	5,482	1,825	3,657
1991	17,452	6,026	2,070	3,956
1992	19,920	6,920	2,238	4,682
1993	19,997	7,092	2,441	4,651
1994	24,837	8,752	2,479	6,273
1995	23,963	8,502	1,880	6,622
1996	24,810	8,816	1,948	6,868
1997	27,627	9,729	1,983	7,746
1998	29,218	10,240	2,204	8,216
1999	30,912	10,851	1,138	9,713

Source: Internal Revenue Service, Statistics of Income Division, *Corporation Source Book* (Washington: U.S. Govt. Print. Off., 1990 to 1999).

The industry's taxable income in Table 1 represents a blend of domestic income earned by U.S.-based corporations and U.S. affiliates of foreign-based firms and income earned abroad by foreign branches and subsidiaries of U.S.-based corporations. Such a blend results from the fact that the United States taxes corporate income on the basis of residence and not source. Consequently, corporations chartered in the United States owe taxes to the federal government on their worldwide income, whether it is earned inside or outside the country. U.S.-based firms also owe foreign income taxes on much of the foreign-source income

they report on their federal corporate income tax returns. To avoid double taxation of this income, U.S. tax law grants U.S.-based multinational corporations a credit for foreign income tax payments up to their U.S. tax liability on the income. In addition, U.S. affiliates of corporations chartered in other countries are required to pay federal income taxes on income earned in the United States.

It can be inferred from the nearly twofold increase in its tax liability before credits between 1990 and 1999 that the 1990s was a period of vigorous growth for the drug industry. It is also evident from the figures in the table that the industry derives considerable benefit from available tax credits: from 1990 to 1999, its average tax liability after credits (except the foreign tax credit) was 71% of its average tax liability before credits.

The main tax credits claimed by the drug industry are shown in Table 2. Four points regarding their implications for the industry's federal tax burden are noteworthy.

Foreign Tax Credit

First, unlike the other tax credits shown in the table, the foreign tax credit should not be viewed as conferring a tax benefit on pharmaceutical firms. Under section 901 of the Internal Revenue Code (IRC), a corporation chartered in the United States and paying income and related taxes to foreign governments may claim a limited tax credit for those tax payments. This provision is intended to avoid the double taxation of income earned by foreign branches of U.S.-based corporations or income earned by foreign subsidiaries of such corporations and repatriated to their U.S. parents. The credit is limited to the tentative federal income tax owed on foreign-source income and may not offset any federal tax owed on domestic-source income. In addition, the U.S. Treasury does not give a refund when foreign income taxes exceed the tentative federal tax. In this case, the excess results in an excess foreign tax credit which may be carried back up to two years or carried forward up to five years, subject to the same limitations.

Orphan Drug Tax Credit

Second, only one of the credits shown in Table 2 is targeted at drugs, the primary product of the pharmaceutical industry, and that is the orphan drug tax credit. The other credits are much more likely to be claimed by firms in other industries – although this is not to suggest that they are claimed with equal frequency by pharmaceutical firms and most other firms. Under IRC section 45C a firm may claim a tax credit equal to 50% of the cost of human clinical trials for drugs intended to treat rare diseases. The credit is commonly referred to as the orphan drug credit. Such a credit has the potential to sharply reduce the after-tax cost of pharmaceutical R&D because human clinical trials, which are conducted in three phases, are the most time-consuming and costly step in the new drug development process.[23] A rare disease or condition is defined as one that is likely to affect fewer than 200,000 individuals residing in the United States, or one that may affect more than 200,000

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[23]Pharmaceutical Research and Manufacturers of America, *2002 Industry Profile*, pp. 19-22.

such individuals but for which there is little or no realistic hope of recouping R&D costs from U.S. sales alone. The credit applies to the cost of supplies and the wages and salaries of researchers used in clinical trials for orphan drugs only. Moreover, it is a component of the general business credit and thus subject to its limitations.

Table 2. Main Federal Tax Credits Claimed by the Drug Industry From 1990 to 1999

(millions of dollars, unless otherwise noted)

Year	Foreign Tax Credit	Possessions Tax Credit	General Business Tax Credit[a]	Orphan Drug Tax Credit
1990	1,205	1,666	142	15
1991	1,367	1,883	150	18
1992	1,613	2,033	180	17
1993	1,886	2,150	208	19
1994	1,960	2,116	271	19
1995	2,633	1,611	214	NA[b]
1996	2,628	1,651	219	NA
1997	2,204	1,591	329	NA
1998	2,677	1,459	514	NA
1999	2,938	866	222	NA

Source: Internal Revenue Service, Statistics of Income Division, *Corporation Source Book* (Washington, 1990 to 1998), and Henry J. Kaiser Family Foundation, *Prescription Drug Trends: A Chartbook Update* (Washington: Nov. 2001).

Notes: [a] Under IRC section 38, the general business credit is a limited, non-refundable credit against income tax that is claimed after all other non-refundable credits, except for the credit for the alternative minimum tax. The general business credit is the sum of the rehabilitation credit, the energy credit, the reforestation credit, the work opportunity credit, the welfare-to-work credit, the alcohol fuels credit, the research credit, the low-income housing credit, the enhanced oil recovery credit, the disabled access credit, the renewable resources electricity production credit, the empowerment zone employment credit, the Indian employment credit, the employer social security credit, the orphan drug credit, the new markets credit, small employer pension plan start-up costs credit, and the employer-provided child care credit. There is a limit on the general business credit that a corporate taxpayer may claim in a given tax year: it may not exceed its tax liability less the greater of (a) the tentative alternative minimum tax or (b) 25% of regular tax liability above $25,000. If the general business credit claimed in the current year exceeds this limitation, the excess or unused credit may be carried back one year or forward 20 years.

[b] The orphan drug tax credit was suspended from January 1, 1995 to June 30, 1996. Under the Small Business Job Protection Act of 1996 (P.L. 104-188), the credit was reinstated from July 1, 1996 to May 31, 1997 and made part of the general business credit. The credit has yet to be reinstated retroactively for the period from January 1, 1995 to June 30, 1996. As a result, data on the aggregate amount of the credit claimed since 1995 are not available.

Since the credit was enacted in 1983 as part of a package of measures aimed at stimulating increased investment in the development of new orphan drugs, over 180 such drugs have gained regulatory approval in the United States. Ironically, some of them went on to become major sources of revenue for their producers, including Glaxo Wellcome's anti-AIDS drug Retrovir AZT, Amgen's anti-anemia drug Epogen, and Genentech's human growth hormone Protropin.[24] In 1994, firms classified in the drug industry accounted for 91% of the total value of claims for the credit.

Possessions and Puerto Rican Economic Activity Tax Credit

Third, the pharmaceutical industry has been a major beneficiary of what was known until 1996 as the possessions tax credit available under IRC section 936 and is now labeled the Puerto Rican Economic Activity Credit (PREAC) available under IRC section 30A. In 1999, the industry was able to reduce its federal income tax liability by 8% by claiming the credit, and accounted for 58% of the total value of claims for it. Corporations chartered in the United States may be able to exempt from federal income tax as much as 40% of their income from business operations they own in Puerto Rico, the U.S. Virgin Islands, and other U.S. territorial possessions. To be eligible for such tax treatment, a firm must derive 80% of its gross income from business operations in one or more of these possessions and 75% of its overall gross income from the active conduct of a business.

The PREAC is equal to a firm's tax liability on possession-source income, subject to one of two alternative caps enacted in 1993. Under one cap – known as the "economic-activity limitation"– the credit is restricted to specified portions of wage and depreciation costs; and under the second cap – known as the "percentage limitation"– the credit is limited to 40% of the unlimited credit a firm could claim under rules in effect before 1993. As a result of the Small Business Job Protection Act of 1996, the credit is scheduled to phase out by 2005 for firms already claiming it and was repealed immediately for all other firms.[25] In addition, the act contained phase-out rules that differ between firms subject to the percentage limitation and those subject to the economic-activity limitation. To take advantage of the credit, the pharmaceutical industry has established a substantial manufacturing base in Puerto Rico. According to a 1992 report by the General Accounting Office, as of 1990, 26 pharmaceutical firms had manufacturing operations there; they realized an estimated tax savings of $10.1 billion from these operations; and the operations had the approval of the FDA to produce 17 of the 21 most commonly prescribed drugs in the United States.[26]

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[24]Standard & Poor's, *Healthcare: Pharmaceuticals,* p. 19.

[25]For further details on the design of the credit and congressional proposals to extend it, see CRS Report RS20695, *The Puerto Rican Economic Activity Tax Credit: Current Proposals and Scheduled Phase Out,* by David L. Brumbaugh.

[26]U.S. General Accounting Office, *Pharmaceutical Industry: Tax Benefits of operating in Puerto Rico,* GAO report GGD-92-72BR (Washington: May 1992), pp. 4-7.

Research and Experimentation Tax Credit

Finally, while the general business credit is composed of 18 separate and distinct tax credits, the vast share of the drug industry's claims for the credit in the 1990s probably related to a single credit: that for increasing research expenditures under IRC section 41. From 1991 to 1998, the amount of the research tax credit claimed by the industry exceeded its general business tax credit in every year except 1995. And during that period, the cumulative value of claims for the research credit by the industry exceeded the cumulative value of its claims for the general business credit by $621 million, suggesting that many drug firms emerged from the 1990s with excess general business credits. The research tax credit is equal to 20% of a firm's qualified spending on research in the United States above a base amount.[27] Its rate structure is incremental rather than flat in order to avoid rewarding firms for undertaking R&D that they probably would have done in the absence of the credit.

Various rules governing the use of the credit make its marginal effective rate much lower than its statutory rate for many firms. Firms have the option of claiming an alternative incremental research credit with a maximum rate considerably below the statutory rate of the regular credit. Besides the regular and alternative research credits, firms may claim a basic research tax credit that is equal to 20% of payments for contract basic research above a base amount. The following expenses are eligible for the regular and alternative credits: wages and salaries of researchers, supplies and materials used in qualified research, leased computer time for qualified research, and either 65% or 75% of payments for contract research.

Although the drug industry benefits from the research tax credit, it does not appear to be a major beneficiary among R&D-performing industries: in 1997, drug industry claims for the credit totaled $630 million, or 14% of the total value of claims for the credit. It also appears doubtful that the credit serves as a major incentive for major pharmaceutical firms to raise their R&D spending from one year to the next. In 1999, the total value of drug industry claims for the credit came to $714 million, or about 4% of domestic R&D spending by PhRMA member companies. CRS estimated in a recent report that under current law, the major U.S.-based pharmaceutical company Merck was unable to claim the regular research tax credit in 1998 despite spending $1.8 billion on R&D.[28]

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[27]For more details on the design of the credit and initiatives in the 107th Congress to modify it, see CRS Report RL31181, *Research Tax Credit: Policy Issues for the 107th Congress*, by Gary Guenther.

[28]CRS Report RL30479, *The Research and Experimentation Tax Credit: Current Law and Selected Policy Issues for the 106th Congress*, by Gary Guenther, pp. 33-35.

Federal Tax Burden on the Drug Industry and Major U.S. Industries from 1994 to 1999

The federal tax code affects an industry's return on investment through the laws and regulations defining taxable income, adjustments to taxable income (e.g., deductions and exemptions), tax rates, and adjustments to tax liability (e.g., tax credits and minimum tax payments). These provisions serve the dual purpose of raising the revenue needed to fund government operations and programs and giving firms an incentive to engage in certain favored activities. The federal tax credit for increasing research expenditures exemplifies this second purpose.

Public finance economists define a firm's tax burden as its share of real pre-tax economic income paid in taxes. In practice, however, it is difficult to determine a firm's economic income from tax return data because of allowable exclusions, deductions, and deferrals of taxable income. So alternative approaches often must be taken to measure tax burdens, such as substituting taxable income as determined by the federal tax code for pre-tax economic income. Such an approach is taken here. A common measure of an industry's federal tax burden is its average effective tax rate, which is the ratio of its federal income taxes paid to its income subject to tax, expressed as a percentage. As such, the ratio combines most of the provisions in the federal tax code affecting an industry's returns on past investments. Some of these provisions have the effect of imposing tax penalties, while others may confer tax benefits.

There are some serious shortcomings with using average effective tax rates to measure an industry's federal tax burden, shortcomings that limit the rates' usefulness in evaluating the impact of tax policy on business enterprises. Because these rates are an average, they obscure differences in the marginal effective tax rates that apply to the mix of assets held by an industry and to the different firms in that industry. Furthermore, average effective tax rates do not accurately measure the federal tax burden for an industry because the rates exclude the influence of provisions that accelerate the timing of tax deductions or delay the recognition of income for tax purposes. A better measure is the marginal effective tax rate for an industry, which captures the net effect of such provisions on the return on new investment by an industry. Unfortunately, it is impossible to compute such a rate for most industries because the value of some important tax benefits (e.g., expensing of R&D costs) cannot be calculated using available corporate financial or tax return data. Nonetheless, if average effective tax rates are applied consistently across industries, they can shed some light on how their federal tax burdens differ.

Table 3 shows the average effective federal tax rates for the drug industry and major U.S. industries from 1994 to 1999. The rates are based on a comparison of the industries' federal income tax liability after all credits (except for the foreign tax credit) with their worldwide taxable income. As such, they indicate neither the domestic tax burden on domestic income nor the worldwide tax burden on worldwide income for the industries. Instead, the rates represent something of a hybrid of the two measures, showing the federal tax burden on domestic income plus foreign income that has been recognized for federal tax purposes. To the extent that the rates in the table exclude foreign-source income retained by foreign subsidiaries of U.S.-

based corporations and thus exempt from federal taxation, they understate the federal tax burden on the industries. As noted earlier, the foreign tax credit is excluded from the determination of net tax liability because it serves as a mechanism for precluding the double taxation of foreign-source income. Including it would further understate the federal tax burden on the industries.

Table 3. Average Effective Tax Rates for the Drug Industry and Major U.S. Industries from 1994 to 1999 (%)

Industry	1994	1995	1996	1997	1998	1999	Average for 1994-1999	Average for 1990-1999
All Industries	33	33	33	33	33	33	33	33
Agriculture, Forestry & Fishing	28.5	27	28	26	28	28	28	27
Mining	36	35	33	34	33	35	34	35
Construction	29	29.5	30	29.5	30	30	30	29
Manufacturing	32	33	33	33	32.5	33	33	32
Drugs	25	28	28	28	28	31	28	26
Transportation & Public Utilities	34	33	33	32	32	33	33	33
Wholesale & Retail Trade	33	32	33	33	33	33	33	33
Finance, Insurance & Real Estate	33	34	34	34	34	34	34	33
Services	32	32	32	28	33	33	32	32

Source: Calculated by CRS from figures taken from Internal Revenue Service, Statistics of Income Division, *Corporation Source Book* (Washington: U.S. Govt. Print. Off., 1993 to 1998).

Note: As calculated here, the average effective tax rate for an industry is the ratio of its federal income tax liability after all credits **except the foreign tax credit** to its worldwide taxable income, expressed as a percentage.

With these caveats in mind, one can see from the table that in the second half of the 1990s, the average effective federal income tax rate for the drug industry was lower – much lower in some cases – than that of every major industry except agriculture, forestry & fishing. Further analysis reveals that most of this difference in federal tax burdens can be ascribed to drug industry claims for the possessions tax credit. If the credit had been unavailable in 1998 and 1999, the drug industry's average effective tax rate would have been almost identical to that of all industries: 33.6% compared to 33.5%.

Enough is known about the structural features of the pharmaceutical industry and their interaction with the federal tax code to carry this comparative analysis a step or two further. If marginal effective federal tax rates could be computed for the industries shown in table 3, it is likely that the drug industry would still have the lowest rate. The reason lies in certain tax preferences not reflected in the average effective tax rates that tend to disproportionately benefit pharmaceutical firms. These preferences encompass deferred income taxes and accelerated tax deductions. Three tax preferences in particular seem to yield significant tax savings for U.S.-based pharmaceutical firms and thus deserve further exploration: (1) the deferral of federal income taxes on net income retained by foreign subsidiaries of U.S.-based corporations; (2) the expensing (or immediate deduction) of most R&D costs; and (3) the expensing of promotional costs.

Deferral of Federal Income Taxes on Foreign-Source Income

As was discussed earlier, the federal government taxes corporations based or chartered in the United States on their worldwide income and grants them tax credits for foreign income tax payments up to their federal tax liability on foreign-source income. However, not all foreign-source income is treated equally for tax purposes. Foreign-source income earned by foreign branches of U.S.-based corporations is taxed at the applicable federal rates in the year when it is earned, regardless of whether the income is repatriated. But foreign-source income earned by foreign subsidiaries of these corporations is taxed only when it is repatriated to parent firms as dividends, royalty payments, or other income. Any income retained by these subsidiaries is exempt from federal income taxation.

This exemption constitutes a significant tax benefit because it defers the payment of federal income taxes. The value of tax deferral to a taxpayer stems from the timing of tax payments: because a dollar received today is worth more than one dollar received in the future, the longer a taxpayer can defer a tax payment, the better off it is.[29] The deferral of federal taxes on income retained by foreign subsidiaries provides an incentive for U.S.-based firms to establish active business operations in countries with lower corporate income tax rates than the United States.[30] There is some evidence that U.S.-based pharmaceutical firms are major beneficiaries of this tax treatment. At the end of 2001, five major U.S.-based pharmaceutical firms that are among the leading sellers of prescription drugs in the United States reported a total of $36.6 billion in retained earnings held by their foreign subsidiaries for future investment.[31] Considering that each firm is subject to the maximum federal corporate

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[29]To some analysts, the deferral of tax payments is analogous to receiving an interest-free loan from the federal government. For more details on the benefits of tax deferral, see Emil M. Sunley, "Deferral of Tax,"in *The Encyclopedia of Taxation and Tax Policy*, Joseph J. Cordes, Robert D. Ebel, and Jane G. Gravelle, eds. (Washington: Urban Institute Press, 1999), pp. 70-73.

[30]U.S. Congress, Senate Committee on the Budget, *Tax Expenditures: A Compendium of Background Material on Individual Provisions*, committee print, 106th Cong., 2d sess. (Washington: GPO, Dec. 2000), p. 32.

[31]The five companies are Pfizer, Merck, Bristol-Myers Squibb, Pharmacia, and Wyeth (continued...)

income tax rate of 35%, these earnings might yield as much as $13 billion in federal tax revenue before credits (including the foreign tax credit) if they were to be repatriated immediately. In addition, the controlled foreign subsidiaries of U.S.-based pharmaceutical firms exhibit a relatively strong propensity to retain earnings. At the end of 1996, the most recent year for which data are available, drug industry subsidiaries had retained earnings equal in value to 40.3% of their assets; by contrast, the ratio for controlled foreign subsidiaries in all industries was 11.4%, and the two highest industry ratios after drugs were 23.2% for manufacturing and 16.0% for finance, insurance and real estate.[32]

Expensing of R&D Spending

Another federal tax provision that appears to confer disproportionate benefits on pharmaceutical firms is the expensing of qualified research expenditures under IRC section 174. Under this provision, firms are permitted to deduct a substantial proportion of their R&D costs in the year in which they are incurred. Such treatment is a significant tax subsidy for investment in R&D relative to assets whose costs are recovered more slowly under current depreciation rules.

For most firms, spending on industrial R&D eventually creates intangible assets such as patents that generate revenues over a number of years, implying that the economic life of these assets exceeds one year. In principle, under the federal income tax, a firm's stock of R&D capital should be depreciated rather than expensed in determining its taxable income, in an effort to match income with the expenses incurred in generating it. There are varying estimates of the economic life of this capital.[33] The expensing of R&D costs has the effect of imposing a marginal effective tax rate of zero on the returns to R&D investment; by contrast, the returns to investment in plant and equipment are taxed at much higher marginal effective rates.[34] This means that the user cost of capital for R&D investment is lower than for many alternative investments a firm could make.

To be eligible for expensing, R&D expenditures must be related to a firm's trade or business, cannot be considered capital costs, and must relate to "the development of an experimental or pilot model, a plant process, a product, a formula, an invention,

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[31](...continued)
(formerly known as American Home Products). The data on retained earnings by foreign subsidiaries come from the companies' annual reports to shareholders for 2001.

[32]The calculations are based on data received via e-mail from John Miller of the Statistics of Income Division of IRS on May 15, 2002.

[33]Estimates of the rate of depreciation for R&D capital range from 15% to 30% per year. See James R. Hines, Jr., "No Place Like Home: Tax Incentives and the Location of R&D by American Multinationals," Working Paper 4574 (Cambridge, MA: National Bureau of Economic Research, Dec. 1993), p. 7; and Bronwyn H. Hall and John van Reenen, "How Effective Are Fiscal Incentives for R&D? A Review of the Evidence," Working Paper 7098 (Cambridge, MA: National Bureau of Economic Research, April 1999), p. 6.

[34]Because of the availability of a research tax credit, the marginal effective rate on a portion of business R&D investment is actually negative.

or similar property and the improvement of an already existing property." In practice, only the wages and salaries of research personnel and cost of supplies and materials used in qualified research and related overhead costs may be expensed. The cost of structures and equipment used in this research must be recovered over 15 years and three years, respectively, using allowable depreciation methods. Pharmaceutical firms are likely to benefit more from the tax preference for R&D expenditures than most other firms because of their relatively strong propensity to invest in R&D. In 1999, according to estimates by the National Science Foundation, pharmaceutical firms spent 10.5% of their domestic sales on domestic R&D, compared to R&D-to-sales ratios of 2.7% for all firms, 3.2% for manufacturing firms, and 2.2% for non-manufacturing firms.[35]

Expensing of Advertising Spending

The tax treatment of business advertising is another likely source of comparative advantage for pharmaceutical firms. Under current law, advertising expenses are deductible if they are reasonable in amount and related to a firm's lines of business. These expenses can be for the purpose of developing goodwill among customers or soliciting immediate sales. Outlays for advertising, like those for R&D, are expensed, imposing a marginal effective tax rate of zero on any income generated through advertising.

Yet there is reason to think that investment in advertising can be equivalent to purchasing a durable asset that yields a stream of income in some future period. In certain markets, advertising generates intangible assets such as brand recognition and consumer loyalty which help boost a firm's sales to levels they otherwise would be unlikely to attain. For instance, Ernst R. Berndt and three colleagues found in a 1994 study of the U.S. market for anti-ulcer drugs that the efforts by leading sellers to market H_2-antagonists prescription drugs to physicians through detailing and medical journal advertising had "substantial effects" on the growth of domestic demand for the drugs and the sellers' market shares from 1977 to 1993.[36] In coming to this conclusion, they divided these marketing efforts into those aimed at expanding overall demand for H_2 antagonist drugs and those aimed at expanding the market shares of the leading sellers. They then estimated that the cumulative value of the marketing intended to expand overall demand depreciated at a rate of zero, but that the cumulative value of the marketing intended to expand market shares depreciated

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[35]National Science Foundation, Division of Science Resources Statistics, *Research and Development in Industry: 1999*, NSF 02-312 (Arlington, VA: March 2002), table A-18. The NSF definition of R&D covers compensation for researchers and the cost of materials, supplies, and overhead.

[36]Ernst R. Berndt, Linda Bui, David Reiley, and Glen Urban, "The Roles of Marketing, Product Quality and Price Competition in the Growth and Composition of the U.S. Anti-Ulcer Drug Industry," Working Paper 4904 (Cambridge, MA: National Bureau of Economic Research, Oct. 1994), pp. 35. Detailing is the widespread industry practice of promoting drugs directly to physicians by sending marketing representatives to doctor offices and hospitals.

at an annual rate of close to 40%.[37] Other analysts have estimated the depreciation rate for the intangible assets created by commercial advertising in general to fall in the range of 20% to 30%.[38]

To the extent that advertising creates a durable asset, the immediate deduction permitted by current tax law favors such investments over investments in many other durable assets. What is uncertain, however, is the actual rate at which advertising depreciates. There is conflicting evidence about the economic life of advertising, and the same evidence suggests that the depreciation rate may differ considerably by type of advertising (e.g., television advertising, magazine advertising, radio advertising).[39] Nonetheless, it appears reasonable to view the expensing of advertising outlays as a tax preference of uncertain magnitude. Pharmaceutical firms are likely to benefit more from this tax treatment than most other firms because of their relatively strong propensity to invest in advertising. In 1999, the pharmaceutical industry had a ratio of deductions for advertising to business receipts of 5.3%, compared to 1.3% for all industries.[40]

Conclusions

Tax policy is one of numerous channels through which the federal government influences the domestic climate for pharmaceutical innovation. The analysis presented here suggests that its impact is significant. In essence, the federal tax code affects a pharmaceutical firm's user cost of capital and supply of internal funds, two important factors in how much it invests in R&D.

The user cost of capital is the cost a firm incurs as a result of owning a tangible or intangible asset. As such, it embraces both the opportunity cost of forgoing other investments and the direct costs of ownership such as depreciation. In general, the user cost of capital indicates the rate of return an investment project must earn in order to be profitable. As a firm's user cost of capital declines, the number of investment projects it can profitably undertake increases, all other things being equal. There is evidence to support the view that business investment responds to changes in the user cost of capital, although the magnitude and variability of the response are subjects of ongoing debate and research.[41] One factor shaping the user cost of capital is the tax burden on the returns to the investments a firm makes. Generally, the lower

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[37]Ibid., p. 36.

[38]See Mark Hirschey, "Intangible Capital Aspects of Advertising and R&D Expenditures," *Journal of Industrial Economics*, vol. 30, no. 4, June 1982, pp. 375-389.

[39]U.S. Congressional Budget Office, *Reducing the Deficit: Spending and Revenue Options* (Washington: GPO, 1997), p. 377.

[40]Internal Revenue Service, Statistics of Income Division, *1999 Corporation Source Book*, Publication 1053 (Washington).

[41]Harvey S. Rosen, *Public Finance*, 6th edition (New York: McGraw-Hill/Irwin, 2002), p. 409.

this burden, the lower the cost of capital, all other things being equal.[42] A measure of this burden is the marginal effective tax rate on the income earned by an investment. This rate, which is calculated by subtracting the expected after-tax rate of return on a new investment from the expected pre-tax rate of return and dividing by the pretax rate of return, reflects the statutory corporate income tax rate faced by a firm and all the tax provisions that reward or penalize the firm for making a particular investment.

Under current law, the federal tax burden on R&D investment is relatively low. This is mainly because of two tax subsidies for such investment. One is a tax credit for increases in research spending above a base amount under IRC section 41, and the other the option to expense research spending under IRC section 174. In combination, they reduce the after-tax cost of performing R&D and raise the after-tax rate of return on R&D investment relative to other investments a firm could make, such as purchases of plant or equipment. Owing to their heavy investment in R&D relative to revenue, pharmaceutical firms probably benefit more from these tax incentives than many other firms – although it is difficult to estimate to what extent.

In addition, the tax code can affect a firm's cash flow or supply of internal funds, which in turn affects how much that firm can spend on R&D. Some firms base their annual investment budgets on the amount of money they expect to have on hand after paying all expenses in a given year. For them, the cost of internal funds may be lower than the cost of external funds, such as money raised through borrowing or issuing new stock. Small start-up firms caught in the throes of a sharp downturn in economic activity are especially likely to find themselves in this position because potential investors or lenders may lack critical information needed to evaluate their prospects for commercial success. A firm's supply of internal funds hinges in part on its tax burden as measured by the percentage of taxable income paid as income tax: the lower the tax burden, the greater its cash flow. Firms that rely heavily on retained earnings to finance new investment would have an increasing capacity to invest in R&D as their tax burdens fall, all other things being equal. Of course, there is no certainty that a reduction in tax burden would lead to an increase in R&D investment by firms that perform R&D, such as pharmaceutical firms. The increased cash flow could be used for many other purposes, including paying higher dividends to shareholders in the case of publicly held companies. Nonetheless, to the extent that cash flow or retained earnings play a significant role in domestic spending on pharmaceutical R&D, the tax burden of pharmaceutical firms could affect the domestic climate for the development of new medicines.[43]

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[42]For a discussion of the impact of taxes on the user cost of capital, see Jane G. Gravelle, "Cost of Capital," in *The Encyclopedia of Taxation and Tax Policy*, Joseph J. Cordes, Robert D. Ebel, and Jane G. Gravelle, eds. (Washington: Urban Institute Press, 1999), pp. 68-70.

[43]How influential cash flow is in patterns of pharmaceutical R&D investment over time is a matter of continuing research and debate among experts. See F. M. Scherer, "The Link Between Gross Profitability and Pharmaceutical R&D Spending," *Health Affairs*, vol. 20, no. 5, Sept./Oct. 2001, pp. 216-220; and Frank R. Lichtenberg, "Probing the Link Between Gross Profitability and R&D Spending," *Health Affairs*, vol. 20, no. 5, Sept./Oct. 2001, pp.

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Based on the estimate of its average effective tax rate presented here, it appears that the drug industry had a relatively light federal tax burden in the 1990s. From 1990 to 1999, its ratio of federal income tax liability after all credits (except the foreign tax credit) to worldwide income was 0.26; by contrast, the ratio for all industries was 0.33; only two major industries had ratios below 0.30: construction at 0.29 and agriculture, forestry & fishing at 0.27 (see table 3). The relatively light tax burden of the drug industry reflected the substantial tax savings pharmaceutical firms derived from three tax credits that are available to all firms: the possessions tax credit, the research tax credit, and the orphan drug tax credit – in descending order of importance. If it were possible to calculate marginal effective tax rates for a typical firm in the drug industry and in the major industries shown in table 3, the results might suggest that the gap in tax burden between the pharmaceutical industry and other industries was even greater. This is because pharmaceutical firms benefit disproportionately from the expensing of R&D and advertising spending and the opportunities for tax deferral created by the rules governing federal taxation of the foreign-source income of U.S. multinational corporations.

In assessing the federal tax burden of the pharmaceutical industry, it should also be kept in mind that pharmaceutical firms have sought to maximize after-tax profits by taking advantage of certain provisions in the tax code whose purpose is to promote specific policy goals of the federal government. Most of these provisions serve goals unrelated to the encouragement or advancement of pharmaceutical innovation. The expensing of research and advertising outlays is largely intended to simplify tax accounting for firms of all sizes; the research tax credit is intended to stimulate increased domestic R&D; and the possessions tax credit is intended to promote investment in U.S. territories. Only the orphan drug tax credit arguably is targeted at pharmaceutical innovation in that it is intended to spur increased domestic investment in the development of new and more effective medicines to treat rare diseases.

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[43](...continued)
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