have very high asset turnover ratios, which means that they can earn handsome rates of returns on assets (ROAs) by earning only a few pennies per dollar of sales (profit margin). By contrast, capital-intensive industries have low asset turnover ratios, which means that to earn the same ROA that is achieved by supermarkets, they must earn much higher profit margins. In short, cross-industry comparisons of profit margins would be meaningful only for industries with similar asset turnover rates.

On the more meaningful ROA criterion, the drug industry also ranked at the top of Fortune's list in 1999—16.5 percent, compared with the 15.4 percent earned by the closest runner-up, the computer peripherals industry. Unfortunately, for research-based enterprises the ROA, too, is a tainted measure, as a result of the tax and accounting conventions that drive the R&D expenditures in a firm's financial reports. In principle, a firm's annual R&D spending should not be deducted as an expense on its income statement in the year that the R&D spending is incurred. It should be "capitalized," which means that it should be shown as an asset on the firm's balance sheet and depreciated (shown as an expense on the firm's income statement) gradually over time. Because the tax credits granted by Congress toward R&D spending by U.S. firms do not extend to capitalized expenses, however, virtually all drug firms now treat the year's total R&D outlay as an expense on their income statements. In an industry with rapidly growing R&D spending, this practice has an uncertain effect on the reported ROA of drug manufacturers. On the one hand, the practice of expensing R&D understates the firms' total assets, which, by itself, overstates the reported ROA. At the same time, the practice understates the firm's reported expenses and thereby understates the firm's reported accounting profits, which, by itself, understates the firm's reported ROA.25

**Pharmaceutical profits as a source of cost containment.**

These sundry caveats on the accounting profits of pharmaceutical companies notwithstanding, there is little doubt that, overall, American society has allowed that industry to earn handsome profits on its investment in R&D and manufacturing, although the return on investment varies widely across firms and across products within firms. The thought may occur, therefore, that at least some relief from rising health spending could be had by constraining the industry's profits. As it happens, there is less room for relief here than intuition might suggest.

According to the most recent CMS data, total national drug spending in 1999—presumably at retail prices—amounted to roughly $100 billion. According to data from the National Association of Chain Drug Stores, drug manufacturers receive an average of
seventy-four cents of every retail dollar spent on prescription drugs.\textsuperscript{6} If they earned 19 percent on those sales, their total profits would have been about $14 billion on the $100 billion total national spending on prescription drugs, or about 1.16 percent of total national health spending of $1.2 trillion in 1999. Thus, even if all of the profits on that year’s drug spending had been confiscated and rebated to American health care users, it would not have made much of a dent in total national health spending—only about $50 per person.

The Practice Of Price Discrimination

Research-based pharmaceutical firms have high fixed costs (costs unrelated to the annual volume of production) and low variable costs (those that vary roughly proportionately with the volume of production). Such a cost structure is a natural platform for price discrimination—that is, the practice of charging different classes of customers different prices for the same product. Hospitals, hotels, airlines, telecommunications companies, and pharmaceutical companies all exhibit this type of cost structure, and all are able to segment their customers into distinct groups with different sensitivities to prices. The price these industries charge a particular group is then set to be inversely related to that group’s price-sensitivity.

On its face, this pricing practice may appear unfair, especially when the prices charged vary less with customers’ ability to pay than with the market power customers can marshal. As every first-year student in economics learns, however, the imposition of a single-price policy on firms with high fixed costs and low variable costs typically results in an inefficiently low volume of production. The output rate would be inefficient, because a single price set so as to cover at least all of the firm’s fixed costs would price out of the market many highly price-sensitive customers who would be willing and able to cover at least the purely incremental production costs (and perhaps more) of additional output, but who are unwilling or unable to pay the higher single price with full-cost recovery. Clearly, serving such price-sensitive customers would yield added social benefits.\textsuperscript{37} It would be more efficient in that sense.

It follows that if society wishes pharmaceutical companies to be both solvent over the long run and efficient in the choice of their output levels, at least some price discrimination on their part must be countenanced. The problem is that the incidence of that practice can be highly regressive. Low-income families without insurance coverage (among them millions of elderly Americans without drug coverage) have little market power and therefore pay the highest prices for pharmaceutical products at the retail level. Once again,
however, the proper social response to this problem would be to provide these Americans with adequate prescription drug coverage rather than imposing on the industry a single-price structure.

**Shoring Up The Demand Side**

The current response of employers, health insurance executives, politicians, and the media to the ever escalating spending on prescription drugs amounts largely to a futile flailing at the supply side of this market. A more productive response would be to shore up the countervailing power of the demand side. Such a strategy might have two distinct prongs: more judicious cost sharing by patients, and better information on the pharmacoeconomic characteristics of prescription drugs.

- **Cost sharing by patients.** Three-tier copayments are now the most common form of cost sharing by U.S. patients with private health insurance. Under that system, patients make one of three distinct, staggered copayments per prescription, depending upon whether the product is a generic on the health plan’s formulary, a brand-name product on that formulary, or a brand-name drug not on the formulary. Either way, the patient neither knows nor experiences nor cares about the full price that the health plan must pay for the drug. In the insured patient’s mind, all drugs have one of only three relatively low prices.

A much more powerful method of cost sharing, recently proposed in this journal by Haiden Huskamp and colleagues for administering a drug benefit under fee-for-service Medicare, is a variant of the German reference-price system. Germany has used reference pricing since 1992 for its statutory health insurance system (the GKV), which covers close to 90 percent of the German population. Under this system, drugs are classified into therapeutically equivalent groups, not merely by compound but by therapeutic objective. This grouping is done on a nationwide basis. The sickness funds (health plans) then reimburse the insured only the “reference price” (Festbeträg) for a low-cost product in the group. That reference price, too, is set on nationwide basis. The insured person who wishes a particular brand-name drug is then left to pick up the entire difference between the reference price and the price charged by the pharmacy. About two-thirds of all prescriptions in the GKV are covered by this system.

An American version of reference pricing probably would not rely on nationwide groupings and reference prices but would leave these to the discretion of each health plan. Although that version of reference pricing would be a genuine market approach to setting drug prices, leaders of the U.S. drug industry nevertheless view it with
“A workable compromise between strict reference pricing and weaker three-tier copayments would be three-tier coinsurance.”

alarm, probably because in Germany it has tended to drive the prices of all drugs in a therapeutic class toward the reference price. Even under the more decentralized approach likely to emerge in the United States, the supply side of the market would be confronted with far more potent countervailing market power than is inherent in the current system of three-tier copayments.

A workable compromise between strict reference pricing and much weaker three-tier copayments would be three-tier coinsurance. Under that scheme, pharmaceutical products would still be categorized into therapeutically equivalent groups, just as under pure reference pricing. Within the same therapeutic group, the insured might be asked to pay only modest coinsurance (or none) for a generic product on the formulary, a higher coinsurance rate for a brand-name drug on the formulary, and a still higher rate for a brand-name product not on the formulary. The approach would be less severe than pure reference pricing, because the insured would not have to pay the full difference between the low reference price and the actual price of the chosen drug. On the other hand, the insured still would be apprised of the full price that the insurance carrier actually pays for that drug.

**Better pharmacoeconomic information.** Whatever means employers and government ultimately adopt to shift more of the rising cost of prescription drugs onto patients, one can expect much rancor over the practice—and possibly much litigation—unless the underlying formularies or therapeutic groupings can be explained to physicians, patients, and juries with appeal to scientifically sound cost-benefit analyses. As Patricia Danzon has observed on this point, “Efficient incentives for drug utilization and for...R&D require that prices for different drugs reflect their relative effectiveness.”

It is difficult to argue with Danzon’s proposition, although it leaves open the question of who should determine “relative effectiveness.” To be sure, patients will always be part of the team making that determination, but it is doubtful that they will ever have the competence to do it on their own.

Of course, pharmaceutical manufacturers are not obligated to provide these cost-benefit analyses, for no other suppliers of goods and services are required to do so for their offerings. Even if drug manufacturers did provide the analyses, however, their conclusions would be suspect from the outset. Such studies can easily be biased
strategically, because the measures of both “costs” and “benefits” can be variously defined, and the analysis itself is highly complex.\textsuperscript{31}

Employers, the insurance industry that functions as their agents, and public insurance programs on the demand side might be viewed as the proper sponsors of the required cost-benefit analyses. Unfortunately, their studies, too, would be viewed with suspicion by patients, physicians, and the pharmaceutical industry, on the grounds that payers are interested solely in reducing costs without proper regard to benefits.

To gain the respect of all parties, pharmacoeconomic intelligence must have a disinterested source. One workable solution might be the creation of pharmacoeconomic research institutes that would be completely fiscally independent of third-party payers and drug manufacturers after their initial endowments had been established, most likely with public funds. Even a 1 percent set-aside of one year’s total national spending on prescription drugs would yield an endowment of more than $1 billion. A mere 5 percent set-aside of the annual National Institutes of Health (NIH) appropriation would achieve the same objective. If $1 billion were insufficient, adequate endowments could be built up over several years.\textsuperscript{32}

In effect, the new research institutes would be able to function just like not-for-profit foundations. They could attract first-rate pharmacoeconomic researchers who would be able to make distinguished professional careers there. They would fund both intra- and extramural state-of-the-art research on the benefits and costs of new and existing drugs, starting with the most frequently prescribed and most expensive products and constantly updating the list as new products came to market.

The institutes would disseminate their work in the scholarly literature, as well as on easily accessible Web sites aimed at both physicians and patients. Their work would be subject to full peer review by any interested outside party, which means that they would be obliged to share with outsiders all of the raw and transformed data used in their analyses, as well as the statistical methods used to reach their conclusions. Full transparency is the sine qua non of any respectable research enterprise.

The findings disseminated by the institutes would not be legally binding upon any insurer. They merely would furnish a detached, sophisticated database on which third-party payers could structure their reimbursement policies and that could inform Web-enabled physicians and their patients as well. Specifically, such a research base should make it much easier to explain the clinical and economic decisions embodied in drug formularies to physicians and the insured. It might also be helpful in resolving malpractice claims.
Within the next two decades it will be discovered that the metabolism of individual patients for many drugs is strongly influenced by a patient's unique genetic factors. That, of course, will make the task of establishing one-drug-fits-all formularies or therapeutic groupings much more complicated. In many instances, it will call for more customized drug regimens, albeit on a superior pharmacogenomic knowledge base, rather than mere hunches or trial and error. The economics of efficient drug pricing and delivery in that brave new world poses entirely new challenges that go beyond the compass of this paper.

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NOTES
2. If prescription drugs currently absorb about 15 percent of a health plan's premium (a relatively high estimate), and if spending on prescription drugs per insured in that plan rose by 20 percent (a high estimate as well), then only three percentage points of the total annual increase in that health plan's premium could be attributed to prescription drugs. With premiums again at double-digit levels, that leaves much of these increases to be explained by cost drivers other than prescription drugs.
9. Kaiser Family Foundation, Prescription Drug Trends, Fig. 3.8.
14. U.S. Department of Health and Human Services, Report to the President on Prescription Drug Coverage, Spending, Utilization, and Prices (Washington: DHHS, April 2000), chap. 2, Fig. 2–10.
16. DHHS, Report to the President, 9, 34, 36.
17. Deutsche Banc Alex. Brown, Pharmaceutical Industry Outlook: Sobering Up on Drugs
18. Economists argue that a firm's "accounting profits" systematically overstate the true "economic profits" earned by the firm. To obtain a firm's "economic profits," one must deduct from its "accounting profits" the amount needed to cover the shareholders' opportunity cost of investing their money in the firm, rather than in the next best alternative investment vehicle.


20. In Germany, where since 1992 drug spending has been controlled with strict budget caps per physician and tough downward pressure on prices by the sickness funds, R&D spending is reported to have been 17.6 percent of total revenue in 1997, 16.4 percent in 1998, and 16.6 percent in 1999. See Verband Forschender Arzneimittelhersteller e.V., Statistics 2000: Die Arzneimittel in Deutschland (Annual Report of the Association of Research-Based Pharmaceutical Producers, 2000), 26.


24. Ibid.

25. In principle, interindustry comparisons of rates of returns to assets should be adjusted for the so-called business risk inherent in the firms' collection of assets. A consideration of this rather complex topic exceeds the space limit of this commentary. A brief discussion on this point, excised from an earlier draft, is available from the author upon request, <reinhard@princeton.edu>.

26. Cited in Kaiser Family Foundation, Prescription Drug Trends, Fig. 3.2.

27. The social benefit of price discrimination is most clearly demonstrated by the sale of drugs to low-income developing countries (for example, countries in sub-Saharan Africa) at low incremental costs that contribute nothing to the recovery of the seller's fixed costs.


30. Ibid., 25.
