



The High Cost of Low- Priced Drugs to California:

Lost Investment, Lost Jobs, & Lost R&D

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Contents

The <i>Healthy California</i> Series	1
Executive Summary	3
Introduction	5
The Context for the Drug Parallel Trade Debate	7
The Economic Importance of California’s Biomedical Sector	9
Pharmaceuticals’ Role in Health Outcomes and Medical Cost Containment	11
Recent Trends	12
Parallel Trade Scenarios	12
Economic Benefits of Parallel Trade	15
Economic Costs of Parallel Trade	17
Net Economic Costs	20
Conclusion	21
Endnotes	23
Acknowledgments	25
About the Author	25
About the Pacific Research Institute	26

The Healthy California Series

This is a briefing paper in the Pacific Research Institute's *Healthy California* series. *Healthy California* is a line of health policy research that addresses issues of immediate concern to Californians. These occasional papers look at the effects of government intervention in Californians' health care, and propose reforms based on individual choice and competitive markets.



Executive Summary

With the defeat of two competing prescription drug discount proposals in the November 8, 2005 special election, politicians and interest groups who want to lower drug prices are likely to revisit a notion that has already been pursued unsuccessfully by California state legislators: the “parallel trade” of medicines from Canada and other countries with lower-priced prescription drugs.

This study estimates the benefits to Californian patients of acquiring lower-priced prescription drugs from Canada through “parallel trade”, as well as the potential costs to California-based companies and the resulting impact on the California economy.

A number of states, and federal legislators, are considering laws that will force drug makers to sell their medicines at artificially low prices set by the foreign governments. States without a significant biotech or pharmaceutical sector can impose the costs of this change on those that do. No state would lose more than California.

Considering these benefits and costs, drug parallel trade would cost the state economy at least \$670 million and 23,900 jobs, and as much as \$3 billion and 105,600 jobs. The higher figure would be the result of most large private sector purchasers, and half of all individual American consumers, shifting from U.S. to Canadian wholesale suppliers. This is a significantly worse outcome than estimated in my previous report, published in September 2004. That report estimated losses in a range from \$410 million to \$1.8 billion, and between 4,800 and 21,800 jobs.¹

If other states, as would be likely, followed California’s example, the pharmaceutical and biotech industries would lose revenue in the California market and in other states. (Total domestic U.S. sales by California firms are about \$56 billion, compared to \$20.9 billion in the California market.) Under this scenario, California would lose between 70,000 and 316,000 jobs—equivalent to between three months and a full year of the state’s total job growth.

California policymakers should be concerned about these economic effects because pharmaceutical and biotech research are heavily concentrated in California. Six of the nation’s top twelve clusters of biotech activity are located in California, according to the Milken Institute’s June 2004 report, *America’s Biotech and Life Science Clusters*. The biomedical sector in California receives as much venture capital as that in all other states. Because it is among the state’s most innovative industries, spending a higher percentage of its sales on R&D than any other, it will have a disproportionate effect on the state’s future economy, as it has for the past twenty years.

Biomedical exports from California in 2003 were \$7.1 billion, or about one of every twelve dollars' of California exports, the state's third largest product export (after computers and machinery).

The total sector payroll exceeds \$14 billion, with average wages per worker in excess of \$66,000 per year – 60% more than the average Californian salary.

Introduction

Fast-rising prescription drug costs have engendered a wide range of “reform” proposals, most of them counterproductive. On November 8, Californians rejected two competing initiatives, Props. 78 and 79, which sought to reduce prescription drug prices for many residents. Lurking in the background is a much more extensive “reform” proposal that also purports to impose significant discounts: allowing (or even encouraging) American consumers to use parallel traded drugs from other countries, particularly Canada. This notion has superficial attractions, especially for those who wrongly believe that this is a type of free trade. It was embodied in several recent California bills, and has been attempted in several other jurisdictions (not surprisingly, mostly those without significant pharmaceutical industries.)

This report assesses the consequences for California’s economy of such proposals, including the parallel trade from Canada of prescription drugs, currently banned under federal law². Their purpose, as well as those of similar bills pending or recently passed in roughly a dozen other states and in Congress, is to reduce the price paid by government health programs or private citizens, essentially obliging manufacturers to supply the U.S. at prices prevailing in foreign countries.

Drug importation is a popular proposal in many states. However, politicians from states with a substantial pharmaceutical or biotech sector could well lose more than they would gain. No state stands to lose more than California.

The Context For the Drug Parallel Trade Debate

Pharmaceuticals are products with enormous fixed costs and near-zero marginal costs (the cost to produce one more unit). Consequently, manufacturers price their product quite expensively in the primary market in order to cover those up-front costs. If necessary, they charge a much lower price in secondary markets that can't or won't pay the original price. The U.S., at 72% of worldwide sales, is virtually the only market in the world without price controls, so most pharmaceutical companies are committed to cover a large share of their costs here. Because many other countries, including those with higher incomes than the U.S., refuse to pay market prices, American consumers bear a very disproportionate burden to support pharmaceutical innovation.

Essentially, other nations are free riding on the American consumer. This is hardly unprecedented: for 50 years European countries have spent far less on defense than their American protector; and today, many Asian countries turn a blind eye to piracy of copyrighted or trademarked products, which results in American consumers disproportionately funding innovation in those markets.

Furthermore, under the WTO TRIPS agreement, nations have the right to “compulsory licensing,” that is, declaring an emergency and nullifying a drug's patent, thereby allowing local firms to copy American drugs. This is essentially government-sanctioned piracy. This provision applies primarily to pharmaceuticals³. It was intended to show compassion to poor countries with public health crises and little means to pay for expensive treatments (e.g., AIDS in Africa), but it provides a potent threat available to any nation, rich or poor, to coerce American firms to continue selling drugs in their countries at below-market prices.

These conditions mean that American pharmaceutical companies can earn significant profits in only one market: the U.S. They create a tremendous opportunity to arbitrage across borders (buying artificially-reduced price drugs in Country X and selling them in the U.S. at higher American prices), which further reduces the effective size of the primary (American) market and therefore leads to a vicious downward spiral in which fewer American consumers pay ever-higher prices.

America's ban on parallel trade, passed under the federal Prescription Drug Marketing Act of 1987, is a very crude attempt to prevent the aforementioned cross-border drug arbitrage. Some outspoken proponents of free trade consider the ban an abomination—and advocates of the ban's removal often cloak their arguments in free trade rhetoric.

Unfortunately, ban on parallel trade is a necessary response to the free-rider problem. Unless and until other rich nations allow pharmaceutical companies to compete freely in their markets by negotiating prices and terms of sale with buyers of prescription drugs, American law must allow drug makers to reassert ownership of their property when it returns to our shores.

Contrary to the assertions of many of its opponents, the ban on parallel trade does not violate the principles of free trade. It does not prevent foreign, research-based drug makers, such as AstraZeneca, GlaxoSmithKline, or Novartis, from competing against U.S. drug makers such as Merck, Eli Lilly, or Pfizer. Instead, it allows all pharmaceutical firms, both domestic and foreign, to compete on an even playing field in the U.S. by preventing governments from interfering in their freedom to control their international distribution.

Therefore, the purpose of laws preventing parallel trade is not to artificially protect pharmaceutical firms' profits. Rather, it is to protect their property rights and incentives to invest in their businesses. This is important for two reasons:

- The industry has a remarkable record of producing life-saving and life-enhancing products that, notwithstanding their costs, have actually moderated medical inflation.
- Pharmaceutical and biotech research and development is very heavily concentrated in the U.S. (and specifically in California), creating a dynamism that pays great economic dividends.

Both the drug pipeline, and the high-paying jobs associated with it, would be jeopardized if foreign price controls were imported onto domestic pharmaceutical sales.

Although only an international agreement to remove foreign price controls or to manage cross-border pharmaceutical trade flows can effectively correct these market distortions, that subject is beyond the scope of this paper. It is also exclusively a federal matter. This report also does not address safety and liability concerns, nor the effects of parallel trade in aggravating shortages in smaller foreign markets (e.g., Canada, whose national market is roughly the size of California's), nor the legal implications of a state law that violates federal law. It is restricted to an examination of the specific effects on the California economy if importation becomes widespread.

The Economic Importance of California's Biomedical Sector

California is not traditionally considered a center of pharmaceutical manufacturing, but that conventional wisdom has been rendered obsolete by the biotechnology revolution. Companies that perform research and produce new drugs have been essential to the evolution of California's economy for the past two decades. For example, a June 2004 Milken Institute report⁴ found that six of the nation's top twelve clusters of biotech activity are located in California (in San Francisco, Oakland, San Jose, Los Angeles, Orange County, and San Diego). More than half of all U.S. biotech employees work in California. The combined pharmaceutical and biotech industries have a total California employment of 77,400, according to the California Healthcare Institute⁵. When combined with related industries like academic medical research and medical instruments, the overall biomedical sector employs over 230,000 workers: more than the computer, telecommunications, motion picture, or aerospace industries.

The sector relies on very high levels of R&D expenditures to maintain a growing pipeline of new products. Estimates of R&D as a percentage of total revenues vary, but as an illustration, the *Wall Street Journal* noted that pharmaceutical R&D at 17.1% of sales invests nearly three times that of the next most R&D-intensive high-tech industry (electronics, at 6%)⁶. Estimates for the biotech segment of the overall biomedical manufacturing sector run much higher. According to a recent industry survey by the California Healthcare Institute, the typical biomedical company reinvested 48% of revenues in R&D (\$15.5 billion out of \$32.3 billion in sales)⁷. Life sciences (mainly biotech) investment in California is about three times that of the next highest state (Massachusetts), and nearly equal to all other states combined. The sector receives more venture capital than any other California industry, including computer software, hardware and telecommunications. The constant, and accelerating, pipeline of new innovations is essential to maintaining the industry's competitive advantage that secures employment for its workers.

Because the skills required for biomedical R&D are so advanced, salaries are correspondingly high. Total sector payroll exceeds \$14 billion, with average wages per worker in excess of \$66,000 per year—60% more than the average California salary. (Biotech salaries are even higher: \$77,600, according to the Franchise Tax Board.) Furthermore, it is a young industry: nearly seven of every eight of California's 2,600 biomedical companies were founded in the last 25 years. It is, therefore, a young, dynamic, and growing industry, and has among the greatest growth potentials of any in California's economy⁸.

Finally and not surprisingly (in light of its high innovation and productivity), the industry sells much of its output outside of the state. Biomedical exports in 2003 were \$7.1 billion, or about one out of

every twelve dollars of California exports. They were the state's third largest product export after computers and machinery.

Policymakers concerned about the future of California's economy will wish to pay particular attention to such a large industry that pays high wages; reinvests heavily in new products to remain competitive; and competes successfully in global markets.

A disproportionate part of California's future growth and prosperity will depend on the success of this industry.

Pharmaceuticals' Role In Health Outcomes and Medical Cost Containment

At 4.2% per year in the late 1990s, pharmaceutical price inflation was less than half of overall U.S. medical inflation. (Total expenditures on pharmaceuticals are rising much faster—roughly 15% per year—with the balance due to increased utilization, although expenditure growth decelerated in 2003, to 8.6% per year for California⁹. This has roughly doubled drugs' share of total health care expenditures since the early 1990s.)¹⁰ About 10.5% of total medical expenditures are for pharmaceuticals, with two-thirds going to brand-name drugs¹¹. Despite these costs, all evidence suggests that consumers have benefited, both in terms of cost containment and life extension.

According to the 2003-04 annual report of the Pharmaceutical Research and Manufacturers of America, the return on investment (in terms of reduced medical expenditures) for new medicines is more than 400%. Each additional dollar spent purchasing medicines reduces hospitalization expenditures by \$4.44. Frank Lichtenberg of the National Bureau of Economic Research believes the benefit to cost ratio is even higher: \$7.17 saved per dollar of pharmaceutical purchases in the U.S.¹²

Life spans in most of the world lengthened in the latter part of the 20th century, by an average of two years between 1986 and 2000 alone. This achievement is partly due to new drugs. According to a 2003 NBER paper by Lichtenberg, about 40% of this life extension in 52 countries was due to pharmaceuticals¹³. For example, in the U.S. there are three million more cancer survivors than a decade ago, and the chance of surviving five years after a cancer diagnosis has risen by ten percentage points (from 52% to 62%) since the early 1980s.

Even considering the cost of medical care, these achievements are very cost-effective: Though each year of life expectancy added since 1970 has cost \$11,000 per person (of which \$1,345 is due to pharmaceuticals), economists estimate the value of each added life-year at about \$150,000 based on the choices individuals make. This implies a benefit to cost ratio of 13.6. As Lichtenberg notes, the “social return” (return on investment to society) is quite high¹⁴.

Recent Trends

Two trends are pertinent to this paper:

- U.S. pharmaceutical and biotech R&D has accelerated in recent years, up fourfold since 1990. It has risen from 9% growth per year in the late 1990s to 13% per year in the early years of this decade¹⁵.
- Local constraints in other countries' industries—price controls and restrictive labor regulations—have caused some European firms to move their R&D to the U.S. These firms' R&D spending in Europe has dropped from three-fourths of their total worldwide R&D in 1990 to less than two-thirds in 1999. Overall, R&D conducted in the U.S. now accounts for 53% of global pharmaceutical R&D and 83% of nongovernmental R&D¹⁶. Eight of the world's ten top-selling drugs originated in the U.S., versus two in Europe.

In sum, the U.S. competitive advantage in pharmaceuticals is growing, and California firms have been exploiting that advantage by expanding their R&D operations. They currently have 643 drugs in the approval pipeline¹⁷.

Parallel Trade Scenarios

The California legislature has considered various bills that direct or permit parallel trade for different segments of the overall California pharmaceutical market: from specific state government programs at the low end of the spectrum, to all consumers (individuals, institutions, and government) at the most sweeping.

The projected reduction (due to lower Canadian prices) in expenditures for brand name drugs is generally assumed to be 36%¹⁸. (This assumes no change in the type or volume of drugs purchased, an assumption that will be slightly modified below. Also, Canadian prices for generic drugs are often higher than in the U.S., and will be ignored in this analysis.) Because brand-name drugs represent 91% of the \$20.9 billion (as of June 2005) California market, our scenarios will assume that 32.8% (that is, 91% of 36%) of \$20.9 billion, or \$6.85 billion, of domestic revenues could be transferred from producers to consumers if parallel trade was enforced for all Californian prescriptions¹⁹.

Low scenario: Only some government programs are permitted to use parallel traded medicines. Because public funds purchase 20% of prescriptions, the low scenario assumes 20% of \$6.85 billion, or \$1.37 billion, in reduced revenues. (This is broadly consistent with the Congressional Budget Office's 2003 estimate of the effects of parallel trade on American drug sales.)

Midrange scenario: Most pharmaceutical benefit managers, who purchase for about 60% of the market, also engage in parallel trade. So, revenues are reduced by 80% (20% plus 60%) of \$6.85 billion, or \$5.48 billion.

High scenario: To the midrange scenario is added one-half of the 20% of consumers who purchase pharmaceuticals out-of-pocket. One-half is an arbitrary parameter, to account for those consumers who must, or choose to, purchase drugs locally. In this scenario, revenues decline by 90% (80% plus 10%) of \$6.85 billion, or \$6.17 billion.

Scenario modifications

Each of the above scenarios is probably modestly inflated. High drug costs already lead some consumers to economize (e.g., skipping doses or cutting pills in half). Some of these patients would buy if prices were reduced by parallel trade. Estimates of the price elasticity of demand for pharmaceuticals are rare, and those extant are controversial. But experts generally agree demand elasticity is low, especially for critically needed pharmaceuticals (as opposed to “lifestyle” drugs). We will arbitrarily assume that drug usage would increase 5% as a result of lower prices. Therefore revenue reductions under the three scenarios are assumed to be 95% of the estimates given above, or:

Low:	\$1.30 billion;
Midrange:	\$2.21 billion;
High:	\$5.86 billion.

The “bellwether” excursions (scenarios 4, 5, and 6). In addition, I consider less-likely possibilities as excursion scenarios. First, enactment of California legislation could embolden other states to do the same, which would magnify the effect by roughly a factor of three, for each of the three scenarios. Because changes in California public policy are often imitated by other states, enactment of parallel trade legislation will likely lead to similar legislation across the country. In this instance the reduction in industry revenues will be based not only on California sales, but on national sales, and will be roughly 1.7 times the figures noted in the above scenarios. (Total domestic U.S. sales by California firms are about \$56 billion, vs. \$20.9 billion within the state alone²⁰.) Therefore, bellwether excursions are shown below for the same low, midrange, and high scenarios as in the base case.

The “cluster tipping point” excursion (scenario 7). Reduced revenues will likely prompt firms to relocate expensive facilities (e.g. R&D laboratories) to other locales in order to achieve economies of scale or lower labor costs. If more than some threshold number of jobs migrates, the state’s cluster will reach a “tipping point” where the disadvantages of a California location are no longer ameliorated by proximity to concentrated scientific talent. Past this point, most of the cluster is assumed to disperse

to other locations out-of-state, leaving only 10% of original employment in California, by assumption. It is also assumed that, as a result of the collapse of the biomedical cluster, other R&D-intensive industries would find California less attractive, and 5% of them are also assumed to emigrate. This excursion seems less likely, but is included because its effects would be so sweeping.

Price controls would reduce returns on investment in biotech ventures, which cause substantial reductions in available investment capital, prompting industry participants to engage in severe cost reduction in order to preserve as much R&D as possible. Some costly labor-intensive activities, especially R&D, relocate to lower-cost environments (even if corporate headquarters remain in California), or disappear entirely.

Such an extreme scenario is not likely, but because the effects would be so severe if it occurred, this contingency is included in the report. Based on historical experience of cluster formation and collapse in other economies, this report assumes that if 50% of the California biotech/pharmaceutical cluster's high value added jobs migrated away (or evaporated entirely), the cluster would reach a "tipping point" after which the rest would follow, and taking portions of other high-tech industries with them.

Economic Benefits of Parallel Trade

The purpose of parallel trade is, of course, to lower pharmaceutical prices. A small fraction of the benefit will redound to pharmaceutical companies in the form of increased sales through the so-called “price elasticity of demand” (the change in quantity demanded as prices change). The remainder will spread to the rest of the economy as consumers have more discretionary income to spend on other goods and services.

As noted above, widely accepted estimates of the price elasticity of demand for pharmaceuticals do not exist, but industry experts consider it quite low. (Most drugs are not discretionary purchases, but are considered necessities, and must be purchased almost regardless of price.) This paper will assume it is 0.1 (i.e., every 1% reduction in pharmaceutical prices increases consumption by 0.1%.)²¹ For our three scenarios, therefore, California consumption will increase as follows:

Low: \$130 million;
Midrange: \$520 million;
High: \$585 million;

Note that these are gross effects; net effects combine gross increases and gross decreases in industry revenues. For the excursions, we will ignore elasticity effects, since any further benefits will be enjoyed by consumers outside of California, and should not affect the California economy.

In addition to the benefit of this feedback to drug companies, the remainder (90%, assuming a 0.1 elasticity) of the price reduction benefits California households who had previously paid higher prices for medicines. The effect of their increased discretionary income to the rest of the economy is reflected in the “household” multiplier.

The generous assumption is made here that California consumers will enjoy all of any reduction of prices made available by re-importing price-controlled drugs, through either added discretionary income or added pharmaceutical purchases. In practice, this is most unlikely; intermediaries will likely capture much of the arbitrage benefits. In Europe’s experience, 90% of potential savings from parallel trade was captured by middlemen²². In addition, the California market is very large in comparison to the price control-limited Canadian supply: California’s population is roughly the size of Canada’s. It is very likely that a 100% increase in the demand for Canadian drugs would bid their prices up substantially. Nevertheless, to be generous to parallel trade, we will ignore these effects.

Because parallel trade increases Californians’ discretionary income, jobs and output in other areas of the economy will increase. A common way to capture these indirect effects is to use “multipliers”, an economic tool usually derived from input/output (I/O) models of the economy. The definitive I/O

model is the U.S. Department of Commerce Bureau of Economic Analysis' regional Input/Output model, RIMS II²³. Each multiplier captures the total effect on the economy (represented in output, personal income, or employment) of a one-dollar change in demand to an industry. The estimates in Table 1 are calculated using multipliers from the RIMS II model of the U.S. economy.

Table 1: Gross Economic Benefits of Pharmaceutical Parallel Trade in California – Author's Estimates				
Scenario	Direct Effects		Total Effects (including indirect)	
	Jobs Gain	Output Gain \$Billion	Jobs Gain	Output Gain \$Billion
(1) Low	650	0.130	2,602	1.934
(2) Midrange	2,602	0.520	10,407	7.738
(3) High	2,927	0.585	11,708	8.705

Economic Costs of Parallel Trade

The RIMS II model implicitly makes a reasonable but erroneous simplifying assumption: *That a change to a major sector of the California economy (pharmaceuticals and biotech) can occur without in turn affecting the structure of the remainder of the economy.* In other words, “all other things” are presumed to remain “equal.” Any workers furloughed from biotech are presumed to remain unemployed, at least as far as California is concerned (i.e., they remain unemployed or relocate to another jurisdiction). In reality, some of such surplus human capital is likely to be reemployed, perhaps in California, perhaps elsewhere. So an “other things equal” analysis such as this probably modestly overestimates the long-run effects of importation.

Regardless of this caveat, the economic impact of importation will still be very significant, because it would fall on one of the state’s most dynamic industries. Very few of the workers who lose their jobs due to importation will be reemployed in occupations as productive as those they gave up.

Effect on California economic activity

Reduced company revenues will result in lower company purchases of labor, goods, and services. This will reduce revenue to pharmaceutical firms’ suppliers and workers, who will have less to spend. Therefore, the total effect on the economy will include indirect and direct effects. The multiplier will thus be high. Generally, high value added industries (i.e., industries whose products are sold for prices far above the cost of their raw materials) have higher multipliers than other industries.

For pharmaceuticals and related products (North American Industry Code Classification System number 325400), the model uses an output multiplier of 2.18, a total jobs multiplier (jobs per million dollars change in output) of 9.29 (which is almost certainly too low), and a job-to-job multiplier (total jobs lost per direct job) of 6.0. These can be interpreted as follows: The overall economy will suffer a \$2.18 million reduction in output and lose 9.29 jobs per \$1 million reduction in pharmaceutical revenues. Six jobs will be lost in the overall economy per pharmaceutical job lost.

In each scenario, it is assumed that the industry’s economic output and employment would fall proportionate to the reduction in revenues, or invested capital for those companies with no revenues. It is difficult to estimate how long it will take firms to adjust to lower revenues by laying off workers, but it can reasonably be assumed to happen quite rapidly, since major customers (government and PBMs) could respond to price changes very quickly, and pharmaceutical firms would be obliged to reduce their operations rapidly to remain financially viable. These effects would probably unfold over the course of no more than two to three years, and reach the magnitudes estimated in 2007 or 2008.

For the three scenarios, the economic impact on the state of reduced sales due to price controls is shown in Table 2. These estimates assume that firms allocate reductions of their operations in the same proportions as their current expenditures. In fact, it is more likely that reductions would be disproportionately concentrated in R&D, because this is the largest cost component with the most expensive (i.e., highest-paid) labor. Since higher-paid industry segments have higher multipliers, the multipliers used here almost certainly underestimate likely economic losses.

Scenario	Direct Effects			Total Effects (including indirect)		
	Jobs Lost	Output Lost \$Billion	Per Family of 4	Jobs Lost	Output Lost \$Billion	Per Family of 4
(1) Low	6,500	\$1.30	\$148	26,000	\$2.60	\$296
(2) Midrange	26,000	\$5.20	\$592	104,100	\$10.41	\$1,184
(3) High	29,300	\$5.85	\$666	117,100	\$11.71	\$1,332
Bellweather Excursions (if parallel trade occurs throughout U.S., not just California):						
Scenario	Direct Effects			Total Effects (including indirect)		
	Jobs Lost	Output Lost \$Billion	Per Family of 4	Jobs Lost	Output Lost \$Billion	Per Family of 4
(4) Low	17,600	\$3.51	399.673	70,200	\$7.02	\$799
(5) Midrange	70,300	\$14.05	1598.69	281,000	\$28.10	\$3,197
(6) High	79,000	\$15.81	1798.53	316,100	\$31.61	\$3,597
(7) Tipping point	94,100	\$18.81	2140.36	376,200	\$37.62	\$4,281

- “Tipping point” excursion assumes that biomedical cluster collapses to 10% of former size, and leads 5% of other high-tech industry employment to also emigrate from California. Effects include 5% reduction in activity in electronics and aerospace industries
- Note: Jobs estimates have been rounded to the nearest 100.

To put these estimates in perspective, total employment in California is roughly 16,300,000, adding about 250,000 jobs per year (long-term average); and gross state product is about \$1.4 trillion, growing at about \$85 billion per year in nominal dollars (unadjusted for inflation). Therefore, the overall effect of parallel trade in California alone would suppress economic activity by up to one month’s worth of growth per year, or \$296 to \$1,332 per family of four. If parallel trade catches on nationally, the effects would be 2.7 times as severe, cutting California’s economic growth rate by as much as one fourth, and reducing income per family from \$799 to \$3,597 per year.

In a less likely, but most extreme case (if the California industry cluster collapses and takes small parts of electronic and aerospace manufacturing with it), four months of growth and \$4,281 per family of four would be suppressed. For comparison, the median monthly family income in California is \$3,931.

Effect on Biomedical Research and Development

Though these economic costs happen in the present (or near-present), the greatest costs of parallel trade occur in the future. Assuming that R&D is reduced proportionally to industry sales, the pipeline of future drugs will decline by at least 16% (and more if any of the excursions come to pass). As noted earlier, this is probably an overly conservative assumption: R&D, the most expensive component of drug companies' cost structures, would in reality bear the brunt of reductions. Other studies have estimated higher R&D reductions; for example, John Vernon of the University of Connecticut projected that R&D would decline by 24 to 33% under federal parallel trade legislation, while John R. Graham, formerly of the Fraser Institute, estimated R&D reductions of between approximately 17% and 50%²⁴.

Critics sometimes claim that pharmaceutical companies spend inordinate sums on marketing and promotion, and could absorb revenue losses by cutbacks in these areas. In fact, across the industry nationally, R&D expenses exceed total promotional expenses by a 3:2 ratio²⁵. It simply would not be possible to absorb reductions of any magnitude without affecting R&D substantially²⁶.

A reduced pipeline of new drugs would unquestionably magnify medical cost inflation, including the cost of government health programs. The effect of a drastically curtailed volume of medical innovation on Californians' health and longevity is difficult to predict. Suffice it to say that it would cause epochal social changes, as the constant medical progress our society has come to expect in the past two generations would be dramatically slowed.

Net Economic Costs

Combining the gross benefit and cost estimates in the prior two sections yields Table 3:

Table 3: Net Economic Costs of Pharmaceutical Parallel Trade in California – Author’s Estimates
(Note: figures from prior tables may not net exactly due to rounding.)

Net Effects				
Scenario	Direct Effects		Total Effects	
	Jobs Lost	Output Lost \$Billion	Jobs Lost	Output Lost \$Billion
(1) Low	5,900	1.17	23,400	0.67
(2) Midrange	23,400	4.68	93,700	2.67
(3) High	26,400	5.27	105,400	3.00

Bellweather Excursions (% national sales if reimportation occurs throughout U.S.):				
Scenario	Direct Effects		Total Effects	
	Jobs Lost	Output Lost \$Billion	Jobs Lost	Output Lost \$Billion
(4) Low	17,600	3.51	70,200	7.02
(5) Midrange	70,300	14.05	281,000	28.10
(6) High	79,000	15.81	316,100	31.61
(7) Tipping Point	94,100	18.81	376,200	37.62

For the main California-only scenarios (1 through 3), combining the benefit of lower prices with the cost of lower sales reduces the overall (net) economic cost by only few percent.

To put it differently, whether one uses jobs or economic activity for a metric, the costs of parallel trade vastly outweigh the benefits – by at least ten times, and possibly much more.

If parallel trade were somehow restricted to the California market, job losses would amount to about one-tenth of California’s annual trend employment growth. However, if parallel trade went national as a result of California’s example (as seems highly plausible), job growth would be essentially eliminated.

Conclusion

Consumers' concerns about pharmaceutical prices are legitimate, and in California they have provoked two initiatives to limit them. But imitating one of the worst elements of other nations' health policies—pharmaceutical price controls—will produce a false economy.

This study examines the economic effect of pharmaceutical parallel trade in California, depending on whether it affects only some government programs or all of the state's consumers. It also considers the added consequences if other states and the federal government imitated California's example, as well as the possible collapse of California's biomedical sector if reduced sales due to parallel trade prompted enough R&D jobs to emigrate elsewhere.

Considering the cost to the industry of reduced revenue through lower prices and some increased sales through price elasticity, "narrow" parallel trade (the low scenario) would cost the state economy \$670 million. The broadest version of parallel trade would cost \$3 billion and over 100,000 jobs. If parallel trade spread nationally—as would be very likely—the effects would be magnified roughly threefold (because of higher California costs without correspondingly higher benefits). This corresponds to over \$3,000 in lost income per family of four.

In the unlikely but plausible case where these losses obliged many biotech and pharmaceutical firms to relocate to less expensive states and countries, in large enough numbers to bring on the collapse of one of California's most successful industry clusters, job losses sufficient to cut California's growth by about one-fourth would occur.

These estimates are based on a series of assumptions *favorable* to parallel trade:

- Including the benefits (in increased sales and increased disposable income) of lower prices through the price elasticity of demand for drugs.
- Deducting from the estimate of lost sales some that have already been lost because consumers economize.
- Assuming that middlemen do not capture any of the consumer savings, contrary to Europe's experience.
- Ignoring almost certain increases in Canadian prices and/or shortages due to scarcity resulting from more American importation.

- Assuming that reductions in pharmaceutical activity are distributed proportional to current expenditures, which likely underestimates the effects on R&D.
- Using multipliers (to translate industry effects to the broader economy) from BEA's RIMS II model, which for employment I consider to be low.

Therefore, these estimates are almost certainly conservative, and that the net costs to California's economy of drug parallel trade are likely to be greater than reported here.

To preserve the remarkable achievements of the biotech and pharmaceutical industries, it is imperative that the government not interfere with the freedom of pharmaceutical suppliers and buyers to determine prices. Although many countries interfere with this right, their errors should not encourage American politicians to do the same. For California or the federal government to make it illegal to profit from medical innovation would be catastrophic not only to patients, but to the scientists and investors who have invested capital and commitment to one of the world's most innovative industries.

Politicians from states without a significant biotech or pharmaceutical sector can demagogue this issue without economic consequence, since any expansion of foreign price controls would be exported to those states in which the industry concentrates. The lion's share of any losses will be borne by California.

Furthermore, a fundamental issue every decision maker must consider regarding parallel trade legislation is whether lowering prices for consumers in the present is worth the cost in slowing medical progress in the *future*.

It is common for politicians to try to placate today's consumers' complaints. But the members of the next generation whose health--or very lives--may be jeopardized because drugs are not discovered that could have been; or whose economic futures are impaired because one of California economy's best engines of innovation will become less dynamic, do not have a voice in today's debate. It will require leadership to stand up for their futures.

Endnotes

- ¹ Romero, Philip. *The Economic Impact of California Drug Reimportation and Price Control Legislation*, September 13, 2004. Sacramento, CA: The CURES Coalition.
- ² Importation legislation has been regularly introduced at the federal level as well as in many states. For example, in California in 2004, four bills passed by the legislature allowed or encouraged importation, to include purchase or imported pharmaceuticals by state health programs.
- ³ Pilon, Roger, *Drug Parallel trade: the Free Market Solution*, Cato Institute, Aug. 4, 2004.
- ⁴ DeVol, Ross, et al, *America's Biotech and Life Science Clusters*, Milken Institute, June 2004.
- ⁵ California Healthcare Institute, *California's Biotech Industry*, 2004, p. 7.
- ⁶ Henry Miller, "Fighting Disease is Half the Battle", *Wall Street Journal*, Aug. 20, 2004, p. D10.
- ⁷ California Healthcare Institute, op cit, p. 14.
- ⁸ Estimates from California Healthcare Institute, *California's Biomedical Industry*, 2004, p 11.
- ⁹ Kaiser Family Foundation, op cit.
- ¹⁰ PhRMA annual report, op cit.
- ¹¹ Congressional Budget Office, *Would Prescription Drug Importation Reduce U.S. Drug Spending?*, May 2004, p. 1.
- ¹² Lichtenberg, Frank. "Benefits and Costs of New Drugs: Evidence from the Medical Expenditure Panel Survey," *Health Affairs*, September/October 2001, 20(5):241-251.
- ¹³ Lichtenberg, Frank, *The impact of new drug launches on longevity: evidence from longitudinal disease-level data from 52 countries, 1982-2001*, NBER Working Paper # W9754, 2003.
- ¹⁴ Lichtenberg, *Sources of U.S. Longevity Increase, 1960-1997*, NBER Working paper # w8755, 2002.
- ¹⁵ Pharmaceutical Manufacturers' Association of America (PhRMA), 2003-04 annual report.
- ¹⁶ Ibid.
- ¹⁷ Ibid. California pipeline figure from Advance PCS, *Prescription Drug Use and Expenditures in California*, April 2001.
- ¹⁸ Smith, Dean, *Prescription Drug Importation, Investment and Employment in Michigan*, School of Public Health, University of Michigan, Aug. 2004, and references that estimate potential savings between 33% and 40%.
- ¹⁹ July 2005 sales figures from IMS Health, IMS National Sales Perspective, 8/2005; and Kaiser Family Foundation, www.statehealthfacts.org. I am grateful to John R. Graham for directing me to these data sources.
- ²⁰ Advance PCS, *Prescription Drug Use and Expenditures in California*, April 2001.
- ²¹ This guesstimate comes from interviews with pharmaceutical company analysts.
- ²² Congressional Budget Office, op cit, p. 3.
- ²³ U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Input-Output Multiplier System (RIMS II)*, 2004.

- ²⁴ Vernon, John, *The Potential Economic Costs of Drug Parallel trade*. Testimony before the U.S. Senate Committee on Health, Education, Labor, and Pensions, May 20, 2004. Graham, John R. *Prescription Drug Prices in Canada and the United States – Part 4: Canadian Prescriptions for American Patients Are Not the Solution*, Public Policy Source No. 70, September 2003, Vancouver: BC, The Fraser Institute.
- ²⁵ \$32 billion vs. \$21 billion in 2003, according to the PhRMA trade association's 2003-04 annual report.
- ²⁶ In addition, promotional expenses are not valueless to society. They provide a source of information for consumers. Much of promotional expense relates to the provision of free samples to physicians, many of which are in turn passed on to patients without health insurance.
- ²⁷ Some total effects are lower than direct effects because benefits have been deducted.

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Professor Romero is a generalist economist, not a pharmaceutical or health care specialist, with no connection to the biotech or pharmaceutical industries prior to the previous paper examining this question, published by the CURES Coalition in September 2004. The CURES Coalition counts patient advocates, pharmacists, venture capitalists, as well as pharmaceutical and biotech companies amongst its members.

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The views expressed are solely the author's and should not be attributed to others associated with PRI, the CURES Coalition, or the University of Oregon.

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