

WHY POPCORN COSTS SO MUCH AT THE MOVIES

And Other Pricing Puzzles

Richard B. McKenzie

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Preface



HOW PRICES MATTER

Prices are ubiquitous, so much so that their importance to the smooth operation of a market economy (even one constrained by extensive political controls as is the case in China) can go unnoticed and unheralded. Prices are what all trades, whether at the local mall or across the globe, are built around. They facilitate trades among buyers and sellers who don't know each other, meaning they make less costly, or more socially beneficial, the allocation and redistribution of the planet's scarce resources. Indeed, as the late Friedrich Hayek is renowned for having observed, prices summarize a vast amount of information on the relative scarcity and, hence, the relative cost of resources (with much of the information subjective in nature) that can be known only by individuals scattered across markets and cannot be collected in centralized locations, except through market-determined prices.¹

Because they summarize, and largely hide from view of buyers, so much information spread among people throughout the world, prices can be puzzling. Why prices are what they are, and change for reasons that are obscured by a multitude of economic events that can extend backward in time and forward into the future, can be mysterious. Explaining many puzzling prices can be detective work that the modern-day Sherlock Holmes would surely find challenging.

But the national economic planners of the past failed to appreciate the mystery of prices. Instead, they saw prices as nothing more than tags on goods and services—\$1.99 or \$599—that could be dictated or declared with the stroke of administrative pens. All they thought they had to do was write out a few numbers. Voila! A Price. Professor Hayek received a Nobel Prize in economics in part for pointing out the fundamental error in national economic planning, that knowledge of what people want and are capable of producing in all of its various forms is nowhere known to anyone or any small group of planners. Once more, the myriad knowledge needed by planners to do their jobs is so enormous that

it cannot all be absorbed by the planners themselves, even with the help of the most powerful computers (which economic planners in the former Soviet Union did not have).

So much relevant knowledge to the efficient operation of an economy is highly detailed, is local in nature, and is subjective, which means so much production and consumption-relevant knowledge cannot be known to outsiders, no matter how hard they try. To Hayek,

The economic problem is thus not merely a problem of how to allocate “given” resources—if “given” is taken to mean given to a single mind which deliberately solves the problem set by these “data.” It is rather a problem of how to secure the best use of resources to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it differently, it is a problem of the utilization of knowledge not given to anyone in its totality.²

The only way this vast knowledge can be revealed is to give the people who possess knowledge the right incentives to make use of what they know and to communicate what they know to all relevant others through the pricing system.

Fundamentally, in a system where the knowledge of the relevant facts is dispersed among many people, prices can act to coordinate the separate actions of different people in the same way as subjective values help the individual to coordinate the parts of his plan... The mere fact that there is one price for any commodity—or rather that local prices are connected in a manner determined by the cost of transport, etc.—brings about the solution which... might have been arrived at by one single mind possessing all the information which is in fact dispersed among all the people involved in the process.³

Buyers need not know the relative scarcities of myriad resources or the considerable intricacies of producing goods as simple as a pencil or as complex as a computer. The late journalist and market advocate Leonard Read penned a wonderfully brief but insightful essay, “I, A Pencil,” on how unexpectedly complicated the production of pencils is.⁴ As a consequence, Read argued that no one in the world knows how to make a pencil, at least not totally from scratch. Yet, tens of millions of pencils are produced each year for world consumption. The miracle of pencil production is guided by the forces of market competition—and market-determined prices.

To determine what they want, all buyers have to do is compare prices, along with the features, of alternative goods. Prices, in other words, economize on the knowledge buyers need to have to make tolerably informed purchases. Again, in Hayek's words,

The most significant fact about this [pricing] system is the economy of knowledge with which it operates, or how little the individual participants need to know in order to be able to take the right action. In abbreviated form, by a kind of symbol, only the most essential information is passed on, and passed on only to those concerned. It is more than a metaphor to describe the price system as a kind of machinery for registering change, or a system of telecommunications which enables individual producers to watch merely the movement of a few pointers, as an engineer might watch the hands of a few dials, in order to adjust their activities to changes of which they may never know more than is reflected in the price movement.⁵

In facilitating trades, prices can extend the scope of markets. In doing that, prices allow people to move away from self-sufficiency and narrow the scope of things they do, thus enabling people everywhere to reap the benefits of specialization. And an expansion of markets can result in greater competitive pressures for producers to become ever more cost-effective in production.

Most people intuitively grasp that product innovations, largely unfettered by government controls, can improve human welfare. Apart from the products to which they are associated, prices, too, can be innovative (as shown throughout this book) and can contribute to the growth in human welfare—until someone takes a page from the training manuals of economic planners of the past or gets the not-so-bright idea that they know better than markets what prices should be and that prices should be controlled by governments.

Back in August, 1973 President Richard Milhouse Nixon realized that the federal government could no longer control the price of gold at \$35 an ounce. So he freed gold, leaving its price to be determined by unfettered market forces. Then what did he do? Something inexplicable, given his admission that the government could no longer control the price of a single commodity. He froze the prices of everything else—gazillions of goods and services—in the economy. Why? Because the inflation rate had reached a staggering (for the times) 3.76% for the previous seven-plus months of 1973. The result was an economic mess, and a recession—caused partially by people wasting time sitting in their cars in notoriously long lines at gas stations and by people having to adhere to silly rules only bureaucrats could love when people could fill their gas tanks. Several years

later, President Gerald Ford thought he could beat back the upward price spiral of the 1970s by passing out (what else?) “WIN” buttons (for “whip inflation now”). Readers who lived through the WIN program understand that the buttons constituted a waste of valuable resources. The button’s only effect on prices was to drive up the price of the metal used in them. Sloganeering will never cure inflation, or the high price of anything. The market forces behind prices are simply too powerful.

Perhaps the inflationary spiral and the price-control debacles of the 1970s brought home lessons that were grudgingly learned by the public, Congress, and succeeding presidents. Inflation is mainly a monetary phenomenon, meaning that it can only be contained in the long run by controlling the growth of money. If the flow of new dollars is curbed, then the upward pressure of prices will be abated. Price controls can only mask, for a time, upward pressure on prices that growth in the number of dollars in circulation can bring. Broadly applied (or even narrowly focused) price controls can do only economic damage in the long run.

Perhaps because in part of lessons learned from the inflationary spiral of the 1960s and 1970s that gave rise to price controls and revealed their follies and because a growing array of studies that showed how misguided government regulatory efforts had been, prices in a variety of industries—most notably airlines, trucking, natural gas, and electricity—were deregulated in the 1970s and 1980s. However, as will be seen in this volume, the lessons from price control debacles in the 1970s have not always been remembered by contemporary policy makers. They continue to employ price controls that have, often in unrecognized ways, perverse consequences. Will we ever learn? Maybe this volume will help drive home the lesson again.

For decades, I have taught my students the basics of microeconomic theory, mainly revolving around how prices in competitive markets are determined by the forces of supply and demand and how monopolies can, by restricting market supply, charge higher-than-competitive prices and reap higher-than-competitive profits. The lessons learned from those lines of analysis are important, and should always be taught and never forgotten. But those lines of argument elevate in largely unrecognized ways and leave unaddressed a host of interesting pricing puzzles, a number of which are addressed in this volume. The world is literally abuzz with interesting, but deceptively unsophisticated, pricing issues that standard “price theory” within economics never comes close to addressing—unfortunately. This book seeks to remedy that deficiency.

On passing through theater turnstiles, moviegoers are often astounded at the price of a large tub of popcorn, which can, in some parts of the country, rival the prices of whole meals at casual restaurants. No doubt, many moviegoers mutter

under their breath a seemingly innocuous question, “Why does movie popcorn cost so much?” Most are convinced they have an explanation: Theaters are greedy monopolists that unabashedly turn the price screw as much as they can on trapped theater patrons. Nonetheless, their presumed answer to the popcorn-pricing puzzle has an ounce of truth, but only an ounce (since almost all firms in the USA, and for that matter, world economy) have some control over the prices they charge. But as we will see, that pat answer is, for the most part, as wrong as it is appealing and widely believed.

Popcorn is hardly the only pricing puzzle associated with the movie business. Have you not noticed that all movies—whether an expected mega-blockbuster film like *Spider-Man* or *Harry Potter* or a recognized niche film like *Miss Potter*—carry the same ticket prices? Astounding, to say the least. Don’t movie studios and theaters know to charge more when the demand for a movie is high than when the demand is low or when the production costs run into hundreds of millions than when production costs are tens of millions? Venues for rock concerts know to do that. They vary their ticket prices radically, depending on the popularity of the stars on stage. Tickets for concerts by Paul McCartney carry much higher prices than tickets for concerts by Lorena McKennitt. What’s so different about the movie market?

Why Popcorn Costs So Much at the Movies, and Other Pricing Puzzles seeks to unravel an array of pricing puzzles from the one captured in the book’s title to why so many prices end with “9” (as in \$2.99 or \$179) to why ink cartridges can cost as much as printers to why stores use sales, coupons, and rebates. Along the way, I explain how the 9/11 terrorists have killed—through the effects of their heinous acts on the relative prices of various modes of travel—more Americans since 9/11 than they killed that fateful day, and the terrorists have been dead since 9/11.

Moreover, I detail how the Transportation Security Administration can cause, via the pricing effects of its policy decisions, the deaths of Americans simply by elevating the security alert status at the nations’ airports. I also explain how well-meaning efforts to spur the use of alternative, supposedly environmentally friendly fuels—ethanol and biofuels, in particular—have caused, through the effects on grain prices, malnourishment and starvation among millions of desperately poor people around the world—and have given rise to the deforestation of rainforests in Malaysia and Indonesia. How can this be? If you think you already have an answer, read on. The solutions to this and other such puzzles are more sophisticated and surprising than you likely now think.

We end with unraveling a conundrum that has bedeviled societies for a long time, why men earn more on average than women everywhere—around globe,

across industries and cultures. Can the male/female wage gap be summarily dismissed, as many are inclined to do, by chalking up the differential to rank male chauvinistic discrimination, all organized to hold the economic lot of women *everywhere* down? No doubt, rank discrimination does explain *some* of the wage gap, but, as we will see, far from *all* of the gap. As we will also see, some of the wage gap can be attributed to evolutionary forces in our distant past that are not likely to subside completely anytime and anywhere in the near term, or, for that matter, long term. And in case you are concerned, this is not a line of argument I relish. Indeed, I wish it were possible to expect the wage gap to evaporate, and the sooner, the better, but I have to follow the logic and evidence on this issue. That's the only way to understand why things—from pay gaps to queues—are the way they are.

Our inquiries will be mainly economic in the sense that the economic way of thinking about prices, and all other related matters, will be front and center in the discussions of all puzzles. At the same time, I insist that satisfactory explanations for various pricing strategies necessarily requires a multidisciplinary approach, and so I draw freely on the findings from the disciplines of psychology, sociology, demography, evolutionary biology, and evolutionary psychology, as well as behavioral economics (which stands astride economics and psychology) and neuroeconomics (which stands astride neurobiology and economics).

The respected nineteenth-century economic journalist and satirist Frédéric Bastiat (1801–1850) observed with his customary poignancy, “There is only one difference between a bad economist and a good one: the bad economist confines himself to the visible effect; the good economist takes into account both the effect that can be seen and those effects that must be foreseen.”⁶ In no small way, this volume is dedicated to uncovering the unheralded explanations for why prices are what they are and the unseen effects of prices, as well as explaining how firm and government policies affect prices and, therefore, people's behavior often in unrecognized and unanticipated ways. The “law of unintended consequences” stalks the pages of every chapter in the book. I seek to pique your interest in the various pricing puzzles considered by confronting you with twists and turns in arguments that are novel and unsuspected. Indeed, the puzzles covered were selected for inclusion in this book because their solutions are counterintuitive and go against conventional wisdom. While I cite a mountain of evidence for the many logical deductions drawn, I must confess to being partial to the economic *logic* embedded in the arguments, as distinct from the economic and other data used to test claims in the arguments. Both logic and references to real world happenings are needed for a proper, complete analysis, but I also suspect that it will be the economic logic, and the many demonstrations of

how it can be used to unravel and solve puzzles, that will most likely impress you (and other readers), and stay with you after this book has long been closed.

To some (especially young readers and reviewers), this book might appear to emerge only *because* of the success of other economists who have sought to apply economic reasoning broadly, as Steven Levitt, an economist, with wordsmithing help of journalist Stephen Dubner, has done in the wildly successful book, *Freakonomics*.⁷ I salute Levitt and Dubner and others for reaching a broad audience for economics as a way of thinking. I have recommended their book to my classes.⁸

However, readers should understand that *this* book emerges from a career of applying economic reasoning to an unchecked range of topics outside the proverbial disciplinary box (whatever the “box” is conceived to be). If this book has antecedents, it is in the work of George Stigler, James Buchanan, Gordon Tullock, and Gary Becker (especially Gary Becker) whose work, one or two generations removed, inspired, albeit unknowingly and indirectly, the work of Levitt and his followers. My own first effort in treating economics as a discipline unbounded by the topics considered, undertaken with Gordon Tullock, a distinguished economist, was in a book that was widely adopted and translated precisely because it broke ranks with the then stodgy view of what the discipline of economics could be. The book was *The New World of Economics*, first published in 1975.⁹ In *The New World*, Tullock and I applied economic reasoning to an array of topics considered at the time “unusual,” and for some critics, beyond the pale: riots and panics, presidential elections, dying, marriage and divorce, exploitation, education, lying and cheating, *and* sex (not prostitution but the normal kind). Over the five editions that book went through in its thirty-year run, Tullock and I, along with the economists I mentioned above, probably helped to convince any number of budding economists that economics is not so much defined by *the* core problem—scarcity—that economists had long held dear as by the methods of analysis used to think through issues. The only limit we imposed on ourselves was whether or not the economic methods yielded insights that might have gone unnoticed if other analytical methods were used.

I would like to think this book is a natural and improved extension of *The New World*, informed by advancements in economic reasoning since that book was last published in the early 1990s. I am indebted to my mentors, both those whose classes I took and those whom I knew by their written works, for the motivating mantra they left with me, that economics can be very interesting, and at times exciting and energizing, if not fun. Perhaps this book will have similar effects on others.

PREFACE

I am more immediately indebted to several key people who read and commented on the book when it was in manuscript form: Dwight Lee, George Selgin, Otto Reyer, Robert Daley, and Kathryn McKenzie. Their criticisms and suggestions for improvement helped me improve the substance and organization of the book. My wife Karen did her usual excellent job of editing preliminary drafts of the book.

Irvine, California
September 2007

Richard McKenzie

NOTES

- ¹ Hayek (1945).
- ² Hayek (1945, pp. 519–520).
- ³ Hayek (1945, p. 526).
- ⁴ Read (1958).
- ⁵ Hayek (1945, pp. 526–527).
- ⁶ Bastiat (1845).
- ⁷ Levitt and Dubner (2005).
- ⁸ See books that take an expansive view of the domain of economics by Landsburg (2006), Cowen (2007), and Frank (2007).
- ⁹ McKenzie and Tullock (1975 with the latest edition published in 1994).

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Chapter 1



PRICE AND THE “LAW OF UNINTENDED CONSEQUENCES”

Economics is as much a communicable disease as it is a discipline. Economics is a way of thinking about everything and coming to a sense of understanding life better. When you catch it, the way of thinking (by way of learning a few basic but powerful economic principles), it is hard not to see most of life’s large and small events as economic puzzles worthy of reflection and solution.

I admit it, I am an economist with this affliction: I am constantly puzzling over everything I read in the newspapers, watch on television, and hear others say, especially when the comments are about why prices are what they are (and not something else). But then I puzzle over observed prices when many others seem to miss their importance. I understand all too well that prices are the products of so-called market forces, but leaving the explanation at that superficial level of analysis is hardly satisfying, especially since my affliction is terminal. I feel a compulsion to understand exactly what market forces are at work on the prices I see. And when I see prices that don’t make sense, my compulsion goes into overdrive. I must understand why prices are what they are.

Chalking supposedly ill-conceived prices up to people’s stupidity (or to their unthinking or irrational behavior) is hardly satisfying, not that I don’t recognize that people—both buyers and sellers—do a lot of stupid things as they go about their daily business. Most ill-conceived prices are quickly corrected, mainly because ill-conceived prices imply that someone can make them better—*and profit by doing so*. The ill-conceived prices we often notice are ones that are systemic and have staying power, or else we would not have time to pay much attention to them, or need to explain them. I can’t help but search for explanations for persistent “ill-conceived prices”—that, to me, by their very persistence suggests that they are not nearly so ill-conceived as thought. Indeed, “ill-conceived prices”

often do have rational, albeit counterintuitive, explanations, as will be shown throughout this volume (with “rational” explanations being grounded with due consideration given to costs and benefits facing market participants). Finding explanations for observed prices is a form of economic detective work, which can be fun, especially when the sources of observed prices and their consequences are as unintended as they are unexpected.

Prices have been at the heart of economic inquiries for a very long time, but prices can still be mysterious. Satisfying explanations for the many prices we see all around us can be as surprising as they are elementary. Pricing strategies can also have consequences that are ...well, perverse—again, as will be shown time and again throughout this book. For a start, try to understand my professional affliction by considering a puzzle embedded in Apple’s price for the iPhone on its release in mid-2007 (and its one-third reduction in the price of the top model two months later), Audible’s announced clearance sale, and the proposed price control for brothel prostitution in post-war Japan.

Early in 2007, Steve Jobs, founder and CEO of Apple, announced that his company would enter the mobile phone business with the introduction of the iPhone by mid-2007. The iPhone would be a multipurpose device, one that could be used to make calls, to listen to music, to store pictures and videos, and to surf the web, all with the typically sleek Apple design touch.

In making his announcement, Jobs set off a worldwide media feeding frenzy about the iPhone that reached a crescendo in late June 2007. And sure enough, as the June 29 release date approached, Apple devotees around the world began forming lines outside of Apple stores.¹ To hold their places in line, many slept for several nights on the concrete sidewalks and put up bravely with the discomfort from rain.

Just before midnight on June 28, the queues outside of many Apple stores wound around several blocks—in spite of some technology reviewers’ warnings that the iPhone had problems (a not-so-user-friendly virtual keyboard and connection incompatibilities, for example) and in spite of iPhone’s high initial prices, \$499 for the model with 4 gigabytes of memory and \$599 with 8 gigabytes. The early less-than-stellar reviews of the iPhone notwithstanding, people in the long queues were convinced that the iPhone would be as cool as the phenomenally successful iPod, and would set the standard for the next generation of cell phones just as the iPod had set the standard for MP3 players a half-dozen years earlier.

When the doors of the Apple (and AT&T) stores swung open one minute after midnight on June 29, the throngs of “Appleholics” poured in to snatch up their iPhones. During the first weekend, Apple reportedly sold at least a half of a million, and maybe three quarters of a million, iPhones, several times Apple’s

and everyone else’s aggressive sales projections made earlier in the year from market research, but the company could have sold more.² Any number of Apple (and AT&T) stores quickly ran out of both iPhones models before 1:00 a.m., and surely before the sun came up.³

The iPhone’s introduction, and its immediate market mega-success, is surely puzzling to many economists, if not everyone else, for several reasons. Aren’t markets supposed to clear? If they are, then the long queues at the Apple stores for the iPhone’s release must have been an unintended consequence, or was it? When Jobs saw the media feeding frenzy build early in 2007, why didn’t he order an even higher price in anticipation of long queues on the release date to ensure that many people wouldn’t waste time camping out for days—and, not immaterially, Apple’s profits would rise? Immediately after that last weekend of June, reports surfaced that the 8-gig model, which was in especially short supply, began showing up on eBay at prices a third higher than the posted retail price at Apple stores. eBay reported that the highest bid for an iPhone that first weekend was a remarkable \$12,500.⁴ Why did Jobs leave money literally on the sidewalks for “technoscalpers” to pick up, or did he? Did Jobs know something that is not apparent to microeconomic textbook authors (who write glowingly about how price hikes can, and will, relieve market shortages)?

Then, I can’t help but wonder why Apple charged only 20% (or \$100) more for the iPhone with 8 gigabytes of memory than the 4-gigabyte model? Why not more, especially since the excess demand of the 8-gig model was greater? Does anyone really think that the price difference is really attributable to the cost difference in memory? If cost doesn’t explain the price difference, then what was behind Apple’s pricing strategy?

During the first week of September after the iPhone’s release, Jobs did what he had never done before: he lowered the price of the 8-gig iPhone by \$200, causing the price of Apple stock to fall immediately by 5%—because, according to media reports, the price reduction indicated that the iPhone was not selling as well as anticipated, as reported by the *Wall Street Journal*.⁵ Might it not be the case that the market got it wrong? Perhaps Apple hiked the price of the iPhone on its release in anticipation of the initial surge in demand—and in anticipation of the price reduction two months later and in anticipation of encouraging a “tipping” of the media player market even more in Apple’s favor.⁶

Even more perplexing, why did the prices for all iPhones end with “9”? For that matter, why have the prices of almost all Apple products, from iPods to iTunes songs, ended with “9”? Do Jobs and the obviously very smart marketing people at Apple really think that their buyers are so dumb that they can’t see that prices of \$499, \$599, or \$399 are just a dollar short of \$500, \$600, and \$400, es-

pecially since they were obviously smart enough to earn enough to pay the considerable purchase prices of their iPhones? If the \$1-off prices were intended to fool people, then it is hard to see how, since so many print and online news reports of the iPhone's release dispensed with the 9s, giving the prices of the two models at \$500 and \$600.

Shortly after the iPhone was released in the summer of 2007, I went to Audible.com to download additional audio books to my iPod, which I listen to while riding my bike (a modern form of multitasking that has increased both the books I have "read" and the amount of exercise I get, a true win-win). I was struck by the banner announcement on Audible's web page: "SUMMER CLEARANCE SALE ... 25% Extra Off ... Selections from Thousands of Titles." I couldn't help but wonder, "Audible is clearing out its inventory? How can that be? It *doesn't* have an inventory, other than the master copies of audio books from which it duplicates the copies its subscribers download (at a close to zero cost to Audible, I might add, since its "inventories" are non-material, or are nothing more than electrons in a server's hard drives). Surely Audible is not giving up its masters. There would be no need." If my mental muttering has merit, then why would Audible announce a "summer clearance sale"?

Only a marketing gimmick, you might be thinking? Maybe so, but maybe Audible's clearance sale suggests that similar sales conducted by brick-and-mortar retail stores may be motivated by some economic motive that is independent of the stores' interest in clearing out inventories that are, supposedly, unwanted because they represent mistakes in ordering. If inventory clearance doesn't explain many seasonal (winter, summer, or after-Christmas) inventory clearance sales, then what does? Might not after-Christmas sales be as planned as carefully as the before-Christmas non-sales, which suggests that "sales" may have a hidden logic beyond the obvious, that stores use them to move unwanted goods?

If you find such questions uninteresting, you probably bought the wrong book. If you find them intriguing and enticing, then read on, because addressing those kinds of questions is what this book is about—but also much more, as another puzzle dealing with ... (oh no!) *sex* reveals. By the time you finish this book, you should have a far deeper understanding of why Jobs and Apple chose the pricing strategy they did, without my ever providing an explanation—not directly, at least.

Rendigs Fels, an economist at Vanderbilt University, recalls in a puzzle he repeatedly gave his introductory economics classes during his long and heralded teaching career, how when he was stationed in Yokohama, Japan after World War II, he was put in charge of imposing and enforcing price controls throughout the Japanese economy. "One day the medical officer of our company came to see me,"

Professor Fels writes. “He was worried about the health of the American troops. They were picking up girls on the street instead of patronizing the brothels, where the girls were given a medical inspection once a week. The medical officer thought the soldiers were picking up girls on the street because the brothels’ prices were too high. Since I was in charge of price control, he wanted me to take action.”⁷

Professor Fels initially thought that it would be a good idea to require Yokohama brothel prostitutes to charge no more than their counterparts in the streets. He figured that if brothel prostitutes were “cleaner” than streetwalkers and brothel prices were lowered, more troops would substitute the services of brothel prostitutes for the services of streetwalkers. Accordingly, venereal disease among the troops would decline.

Professor Fels set aside his plan, but only because he worried that newspapers back in the States would report unfavorably that “a United States Army officer was reducing prices in brothels for the benefit of American troops.” He muses, “Years later, when I finally saw the light, I became shocked at the deficiency of my economics training” (in spite of having earned a Ph.D. in economics from Harvard before going to war). He concluded that medical officer’s proposal to control the prices of brothel prostitutes “would have had the exact opposite effect of the one he intended.”⁸

Talk about an unintended consequence... surely the professor would not have intended his price control to cause more American troops to come down with various venereal diseases.

How is it that the good professor could have possibly reasoned that lower brothel prices would have had a truly perverse and deadly effect, increasing the spread of VD among American troops?

If you don’t understand how that can be true, or find the good professor’s delayed insight as mysterious, know that this book (and especially this and the following chapters) is founded on the proposition that a little elementary economic reasoning can go a long way in unraveling such mysteries, and can help us understand how prices, especially ones intended to override market forces, can have unintended—but still fascinating, if not amusing—consequences. Again, read on. Unraveling the Fels puzzle should be a snap by the time you complete this book—with no (direct) help from me.

HYBRIDNOMICS: HOV-LANE ECONOMICS, CALIFORNIA STYLE

In order to encourage sales of fuel-efficient, environmentally friendly hybrid cars, Congress authorized a tax credit for hybrid automobiles (which use a com-

bination of gas and electric powered motors) of up to \$3,150, with the credit varying with the hybrid's EPA fuel efficiency and the year of production.⁹ The California legislature upped the ante for owning hybrids, authorizing the state's Department of Motor Vehicles to distribute 85,000 stickers to hybrid owners, but only to owners of cars that had an EPA fuel efficiency rating (given the rating methods in place at the time) of at least 45 miles per gallon. Hybrid owners with the stickers can drive alone in all of the state's High Occupancy Vehicle (HOV) lanes formerly restricted to cars with two or more passengers.

The tax credit and HOV-lane sticker privilege did what they were supposed to do. They drove up the demand for the Toyota Prius and Honda Civic hybrids (the only cars that qualified for stickers at the time), but the sticker privilege surely had market consequences that were unexpected and unintended. For example, because of the stickers, the small Prius in 2006 was selling for over \$30,000, and had waiting lists until early 2007. The Civic hybrid carried a dealer "added premium" to the manufacturer's suggested list price of as much as \$4,000 (with the hybrid Civic total price more than \$7,500 higher than the quoted price of a non-hybrid Civic).

No doubt, there were many hybrid buyers who did not have warm and fuzzy feelings for the environment. They saw in the tax credit and HOV-lane privilege reductions in the *effective price* (dealer price minus tax and commute savings) of the hybrid. The tax credit that accompanied the hybrid purchase lowered the after-tax purchase price of the hybrid. The reduction in buyers' time cost of their commutes to and from work also lowered the *effective price* commuters had to pay for their cars. Commuters' demand for hybrids, inflated by the tax credit and the lower commute times drove up the dealer prices for hybrids and drove out of the hybrid market many dedicated environmentalists (but not sufficiently dedicated or wealthy to pay the hybrid premiums commuters were willing to pay).

At the end of January 2007, the DMV ran out of stickers, leaving more than 800 new Prius and Civic hybrid owners, who had bought their hybrids at premium prices and who had applied for the stickers, with the tax credit but without the right to drive alone in the state's HOV lanes.¹⁰ They gambled and lost on the stickers, and we can feel their pain.

Now with no more stickers to distribute, what can be expected to happen in the California market for hybrids? No doubt some of the effects we can list were unanticipated and unintended.

First, we should expect a drop in the demand for new hybrids at dealers, along with a drop in their negotiated sale prices. Buying a new hybrid Civic instead of a non-hybrid Civic has been difficult for even warm-hearted environmentalists to justify, since the hybrid would very likely have to be driven over 500,000

miles (or driving the car for more than 42 years at 12,000 miles a year!) before the savings in gas could offset the added purchase price plus the cost of replacing the hybrid battery (most likely every 10 years) and the added interest and sales taxes on the added purchase price.¹¹ However, those added car costs can be easily justified by a commuter who earns \$40 an hour and who, with the stickers, can save an hour a day commuting to and from work. Such drivers can cover the added hybrid costs through lower commute costs within a year.

Since the HOV-lane stickers stay with the hybrids, the demand for used hybrids with stickers can be expected to rise, along with their prices, perhaps dramatically. Used hybrids with stickers can be expected to sell for more than hybrids comparably equipped with approximately the same miles on them but without the HOV-lane stickers. Hardly surprisingly, by spring 2007, *USA Today* reported that Kelly Blue Book had found a \$4,000 difference in used Priuses with and without stickers.¹² No doubt the hybrid/non-hybrid price differential will rise with the growth in California’s population and the count of cars on the state’s freeways and will fall as the expiration date for the HOV-lane stickers draws closer (now set for 2011)—and, of course, will rise with any extension in the expiration date for the stickers.

The growing number of drivers with long commutes and high opportunity costs, meaning high hourly earnings, can be expected to be lead bidders for used hybrids. They can be expected to buy hybrids from owners who bought their hybrids for environmental reasons and from owners who have lower cost savings from using the HOV lanes, because they have lower wage rates and/or shorter commutes.

As a consequence of the used hybrid sales, we should expect the HOV lanes to become more crowded since the lanes will be dominated to a greater extent by people with longer commutes (while all other lanes will become marginally less crowded), which will, of course, undercut (albeit marginally) the value of the stickers and the price of used hybrids. Given the market value of stickers (equal at least to the \$4,000 price differential between hybrids with and without stickers) and the fact that the DMV appears to have distributed stickers that are far from counterfeit proof (even though the stickers are designed, supposedly, to crumble if tampered with), no one should be surprised if a healthy black market for stickers emerges, with the counterfeit stickers dampening the rise in the prices of used hybrids. No one should be shocked if the theft rate for hybrids with stickers exceeds by a healthy margin the theft rate for hybrids without stickers. Indeed, by mid-2007, reports had surfaced that two to three dozen sets of California HOV-lane stickers were being stolen from hybrids each month.¹³

The impact of used hybrid sales on automobile pollution is more difficult to assess. On the one hand, the people who buy used hybrids to speed up their commutes will reduce pollution, since they will be driving the less-polluting hybrids and will spend less time on their commutes with their engines running. On the other hand, the more crowded HOV lanes will mean that other non-hybrid HOV-lane users will, because of the greater crowding, have longer commutes with their non-hybrid engines running all the while. The slowing of traffic in the HOV lanes can also lead to less carpooling (again, albeit marginally).

Should hybrid owners with stickers be allowed to sell their stickers as separate items, that is, without selling their cars? Of course so, *if* the goal of government is to make sure that the scarce HOV-lane slots are used by drivers with the most urgent need to travel faster, but pollution control might be the more important government goal.

On first thought, it might seem that pollution would remain unchanged, since the stock of stickers and hybrids will remain at 85,000. However, you can bet current hybrid owners with stickers would love to be able to sell their stickers separate from their cars, since they would not then have the hassle of buying another car and since the demand for and price of their HOV-lane sticker advantage would be heightened by the added value commuters with Hummers (and all other large and small cars) would put on the stickers. Hummer dealers could also see an advantage in independent sticker sales since people could buy Hummers with the intent of going into the “used sticker” market to reduce their commute times.

If stickers could be sold independently of the hybrids, we might see another marginal increase in the crowding of the HOV lanes because of the likelihood that some of the used sticker buyers would have cars larger than the relatively small Prius and Civic that would be replaced in the HOV lanes.

The impact of shifting to independent HOV-lane sticker sales on pollution is, again, problematic. If current Hummer owners move into the HOV lanes, they might pollute less, since they would have lower commute times; but, again, the added crowding could add to the pollution coming from all the non-hybrid cars using the HOV lanes for daily commutes. However, independent sticker sales could spur sales of cars and trucks larger than the current crop of hybrids. Such sticker sales could also cause large car buyers to move farther from work.

However, hybrid owners need to be aware that their cars resale prices will wane with time, given that the stickers are (according to current law) scheduled to expire in 2011. Hence, the stickers’ value to both commuters and environmentalists will decrease as the expiration date is approached. Of course, the California legislature can simply terminate the stickers at any time between now and

2011 or it can do away with HOV-lane privileges for everyone at any time, as one think tank has proposed.¹⁴ If such a proposal gains media attention and political support, you can bet that the price gap between hybrids with and without stickers will narrow. If the legislature extends the expiration date for the stickers, hybrid owners with stickers should expect an immediate increase in the resale prices of their cars.

Regardless, as I write this section, this is clearly a pretty good time for me to sell the new hybrid Civic I bought (a year before I wrote this section), mainly because, when I bought it, I was interested in experiencing the hybrid technology and because I expected to see the used price of my Civic jump once all authorized stickers were distributed. I only subsequently realized that the car was not a good deal for me (even though I bought it in North Carolina, which doesn't have HOV-lane stickers for hybrids, at \$4,200 below the best quoted price at California Honda dealers). It has the stickers, and I rarely use the HOV lanes, since I live less than a mile from my university office. Thank goodness for the restricted supply of HOV-lane stickers. I got a windfall from the restricted supply. Moreover, if I sell now (mid-2007), I can capture in the resale price of my hybrid almost 4 years of value of the stickers to car buyers who commute long distances to work. I also sense that the media and state legislators have begun to take seriously arguments that California's 1,200-plus miles of HOV lanes have done little to increase carpooling, and the HOV lanes would be better used to reduce highway congestion if they were opened to all drivers (at least during non-rush hours of the day). If HOV-rights are dissolved (or to the extent that their dissolution is seriously threatened by legislative action), you can bet that the premium I can get for my hybrid with stickers will dissipate.

AIR TRAVEL SAFETY FOR INFANTS AND TODDLERS

Historically, parents have been able to buy airline tickets for themselves and hold their infants and toddlers under 2 years of age on their laps during flights. Under the banner of saving children's lives, back in the late 1980s, the National Transportation Safety Board and Los Angeles Area Child Passenger Safety Association petitioned the Federal Aviation Administration to end the free ride for infants by requiring the use of child-restraint systems in paid seats for infants.¹⁵ James Kolstad, chairman of the NTSB, maintained that “the economic cost of the extra passenger seat ... [is] a very small price for preventing injuries and saving lives.”¹⁶

In case the FAA resisted changing its child-seating rules, then-Representative Jim Lightfoot (R-Iowa) and Senator Kit Bond (R-Missouri) introduced legisla-

tion to mandate the use of safety seats by infants and toddlers on airplanes.¹⁷ Congressman Lightfoot was spurred to introduce his bill by the death of two infants in the crash of United Airlines flight 232 in Sioux City, Iowa, in July 1989 (a fiery runway crash, with the plane somersaulting down the runway, that has been aired repeatedly around the world in the years since it happened because of how fiery it was). Lightfoot spoke for his supporters within policy circles and the general public when he reasoned that rules requiring the use of safety seats in automobiles should be extended to airlines because “the potential for injury in an aircraft flying at 550 miles per hour is much greater than the potential for injury in an automobile traveling at 50 miles per hour.”¹⁸

The FAA, the 50 or so members of Congress, the National Transportation Safety Board and everyone else who at the time supported the rule change were rightfully concerned with the safety of traveling children. However, what proponents of child-seat rules, both back then and since, have not considered is the prospect that the obvious effects from the rule change might not be all of the effects, and some effects might be unanticipated, unintended, and even perverse.

The more notable unanticipated and unintended effect was that the infant-seat requirement would increase the total price for families of travel by air, encouraging families to travel by automobile instead. The basic problem with that effect is that auto travel is far more dangerous than flying. At the time Lightfoot and Bond introduced their bill to regulate infant safety in the air, automobile transportation was at least thirty to forty times as hazardous in terms of the death-rate per mile traveled.¹⁹ In a study prepared for the FAA at the time the Lightfoot/Bond legislation was considered, Department of Transportation researchers concluded that mandatory infant safety seats could have prevented at most only one infant death since 1978. All other infant fatalities in airline crashes occurred in sections of planes where no one survived.²⁰ On the other hand, nearly 1,200 children under 5 years of age were killed in automobile accidents in 1988.²¹ That means that there were approximately one-quarter more automobile deaths of very young children in 1988 alone than there were total deaths of children and adults on scheduled airlines during the entire 1980–1988 period.²²

According to the FAA’s own (admittedly rough) calculations at the time of the congressional debate, mandated safety seats for infants could increase the average air travel cost of a family of four (two parents with one child over three and one infant) by at least 21%—assuming that airlines charged half fares for infants and do not raise their fares across the board because of rule-induced increased demand.²³ That cost increase could reduce the boardings of infants by about 18%, or 700,000, again according to FAA estimates. Nevertheless, the FAA figures that airlines would be able to sell 3.3 million additional seats each year to infants’ par-

ents at a cost of \$205 million (equal to about \$325 million in 2007 dollars), a handsome sum that explains the airlines’ interest in the proposed rule.²⁴

The precise effect on air travel safety of requiring seats for infants and toddlers has been debated ever since Congressman Lightfoot and Senator Bond introduced their legislation in 1990, and will probably be debated again. My own econometric research (undertaken with colleagues at the University of Mississippi and Clemson University) on the impact of airline deregulation documents a point that the FAA and Congress must keep in mind: air and highway travel are interchangeable modes of transportation for many families. Changes in airline fares significantly alter the amount of highway traffic, and highway accidents, injuries, and deaths are highly correlated with the amount of highway travel and congestion.²⁵ Our research suggests that there is every reason to believe that increases in air travel costs for families, as a result of the proposed safety seat requirement, should have the opposite effect of the one intended: The infant safety-seat proposal would have, on balance, increased infant travel deaths.²⁶

The FAA subsequently drew the same general conclusion—that an infant-seat requirement would cause more infant travel deaths than it would save, although its estimates of the infant lives lost was much more conservative than the estimates my colleagues and I developed.²⁷ In essence, the infant-seat proposal to save infant lives is probably a proposal to sacrifice lives of relatively less wealthy people who make their trips by car to save fewer lives of relatively more wealthy people who continue to fly, in spite of the added expense.

From time to time, a Lightfoot/Bond-type proposal has been tendered in the media (which has caused the FAA to make additional pronouncements against requiring infant seats as late as 2005²⁸). If such a proposal is ever adopted, an unknown number of the travel victims would surely be infants who would have traveled quite safely on their parents’ laps in airplanes. Many of the automobile victims will also be the infants’ parents, brothers, and sisters, but many will also be road travelers who may have never contemplated air travel as an alternative means of transportation. They just happened to be in the wrong place at the wrong time on the nation’s roads, made marginally more congested by an airline infant safety-seat requirement.

There is one good rule that comes out of this analysis that Congress and all government agencies should heed: do not create a travel-injury problem that is bigger than the one being addressed. The lesson learned is very straightforward: changes in policies that make for changes in prices, whether explicit or hidden, can prove deadly, which is a point fortified in the following discussion of anti-terrorism measures.

9/11 TERRORISTS AND AMERICAN DEATHS SINCE 9/11

The overarching lesson of the last section is straightforward: A change in the price of air travel can impact car travel and highway deaths. That lesson should never be forgotten when assessing the consequences of one of the most appalling acts of terrorism in human history committed on September 11, 2001. The nineteen 9/11 terrorists killed more than 2,700 Americans when they commandeered four planes and flew them into buildings and the ground on that surreal day. Such a loss of innocent lives is tragic enough. However, those terrorists have very likely killed (albeit indirectly) more Americans since that fateful day than they killed on that day.²⁹

How can that be? The terrorists have been dead since 9/11. The explanation is remarkably straightforward. On 9/11, the terrorists immediately increased the overall price of flying by increasing many potential air passengers' perceived risk of flying. After all, before 9/11, few Americans considered the prospects that a bunch of religious zealots would harbor so much hatred for Americans that they would be willing and able to take over planes only to use them as guided missiles. Since 9/11, most air travelers have understandably feared that copycat terrorists would strike again.

The terrorists, of course, forced the U.S. government to dramatically beef up security checks at airports, the result of which has been an increase in travel time for all passengers. The time spent in security lines at airports has translated into a greater overall cost—and effective price—of air travel relative to ground travel.

Hence, since 9/11, more Americans than otherwise have been more inclined to make their trips by car, leading to more miles driven and greater highway congestion. Since travel by car is far more deadly per mile than air travel, it should surprise no one that automobile accidents, injuries, and deaths have increased as a consequence of the greater cost of air travel imposed by the 9/11 terrorists (independent of other changes—for example, road conditions—that can be expected to affect car-travel deaths).

Garrick Blalock, Vrinda Kadiyali, and Daniel Simon, Cornell University economists, have reported in two working papers the econometric findings of the price tie-in between the 9/11 terrorists' actions and car-travel deaths.³⁰ They found that the 9/11 events and resulting security measures reduced air travel volume, independent of other forces, by about 5% across all of the nation's airports (and 8% from the nation's major airports). The resulting increase in car travel following 9/11 led to approximately 242 more automobile deaths per month than would otherwise have been predicted for the last quarter of 2001.

As Americans adjusted their travel behavior in subsequent months to accommodate the greater cost of air travel, the increase in the number of car deaths per month attributable to the 9/11 attacks began to taper off. Still, the Cornell researchers were able to surmise that at least 1,200 more Americans lost their lives on the nation’s roadways in the twelve months following 9/11 than would have otherwise been predicted.³¹ It is no stretch to think that the greater count of American road deaths over the past six-plus years attributable to greater flying risks and 9/11 security measures have surpassed the 9/11 deaths.

The economic tie between air and car travel means that the Transportation Security Administration (TSA) should be ever mindful of the prospects of unintended consequences, the most notable of which is that raising the security alert from, say, yellow to orange can spell greater road deaths, because the security measures can lengthen check-in lines and thus increase the total cost of flying and drive many would-be air travelers to the much deadlier highways. Indeed, the Cornell economists cited above have found that the tighter airport security measures instituted by the TSA after 9/11 also decreased air travel, increased road travel, and led to about a hundred more American road deaths in the twelve months following 9/11 than would have been projected.³²

The price tie between tighter airport security measures and road deaths means that the TSA has a life-and-death management issue on its hands that has no easy solution. Suppose the TSA has heard of a *potential* terrorist plot to take over a plane. The TSA considers the source reliable, but not perfectly reliable. Should it raise the alert status from, say, yellow to orange? Without the potential for its security measures affecting road deaths, the TSA’s decision is perhaps clear—raise the alert status because the only effect will be to inconvenience travelers who will have to stand in longer lines and to suffer more frequent searches. With the price tie of its alert pronouncements to road deaths, the TSA’s decision is far more serious, because its decision can lead to more highway deaths, perhaps more deaths than would be suffered if the alert status were not raised and the terrorist plot became a terrorist act, with deaths in the air.

Needless to say, the TSA might at times refuse to raise its alert status because by not doing so, it can save more American lives on the nation’s highways than might be lost from terrorists in the nation’s airways. But then, the TSA must also be ever-mindful that not raising the alert status can result in additional deadly terrorists’ acts on planes, which, again, can drive hordes of Americans to the nation’s roadways. Indeed, without an occasional elevation of the alert status, many Americans might drive with greater frequency to their destinations because they fear that the TSA is not doing its job, which is catching wind of terrorists’ plots to use planes as missiles.

Clearly, the line of argument developed here speaks to one policy issue: Any waste of scarce TSA manpower on screening aging grandmothers and infants, because of a prohibition on profiling, can be deadly. This is because the tighter security measures and waste of security resources can increase the time cost of air travel. The result can be more car travel—and more road accidents, injuries, and deaths.

Of course, terrorists may figure that they can effectively cause greater deaths of Americans even when they get caught trying to breach airport security defenses. Their failed efforts can keep the terrorist threat alive, and can cause more Americans than otherwise to take to the roads.

By the same token, efficiency improvements in screening passengers, which reduce the time spent in security lines, can save American lives. The price effect of shorter lines can lead to a reverse substitution of air travel for car travel—and fewer accidents, injuries, and deaths on American roads.

In short, the interplay between the full cost of air and road travel cannot—and should not—be overlooked, by homeland security agents or terrorists as they develop their respective defensive and offensive strategies. Regrettably, TSA officials understand all too well that they will catch hell from the media and policymakers if they allow terrorists to slip through and pull off another massacre on board a plane. Those same officials will not likely ever be held responsible for how their airport policies affect highway accidents and deaths. Accordingly, we should not be surprised if TSA officials will want to err on the side of being too cautious, which can translate into more deaths on the nation's roads than will likely be saved in the air.

WATER CRISES IN SOUTHERN CALIFORNIA

In my fully-employed and executive MBA classes in microeconomics at the University of California, Irvine (50 miles south of Los Angeles), I will usually ask at some point in the first lecture, “Why are there water crises in Southern California?” Students seem to draw back, somewhat puzzled, because on the surface the question seems silly. But then, why would I ask it if it were silly? Of course, in spite of their puzzlement, they think they *know* the answer, and more than one student will offer the “obvious” answer, “It doesn’t rain much in Southern California!” If I ask how many agree, I usually get a sea of raised hands.

Granted, the prompt answer contains an element of truth. Rainfall in Southern California averages 13 (or fewer) inches a year, making the area close to desert conditions.³³ I usually tell the students that their answer might be an espe-

cially good one—in a course in atmospheric physics. But then I remind them that they are in an economics class, and I expect them to offer an explanation that has some tie to the discipline they are studying, a retort that often leaves more of them stumped (as I want them to be).

After dealing with a variety of student efforts to amplify the point that Southern California’s intermittent water crises are caused by low rainfall, and at times require an elaborate system for water rationing, I stress, “True, it doesn’t rain *water* in Southern California, but it also doesn’t rain *Mercedes Benzes* in the area either, and neither does it rain Snickers candy bars, or any other good of value! Have we ever had a *Mercedes Benz* crisis in Southern California?”

The question answers itself and directs student attention (eventually) to a good-old fashioned reason why Southern California sometimes has water shortages (that, in the media, easily get elevated to dire “crises”) but never Mercedes Benz shortages. The streets are full of Mercedes Benzes, as are the lots of dealerships—all for a very good reason: The price of Mercedes Benzes is left to move with the forces of supply and demand. If the demand for Mercedes rises or their supply contracts, the price of the cars rises, cutting out any would-be shortage by curbing the number of Mercedes bought and averting anything approaching a shortage, much less a “crisis.”

On the other hand, the price of water is stuck at some subsidized level, determined by government officials who are reluctant to change the price of water to accommodate transient changes in the demand for and/or availability of water. If rainfall drops way below average, as it is bound to do from time to time (rainfall for the year when this section was being written was one-fifth the annual average), and the price is not hiked, people can be expected to continue using water as if nothing has happened. After all, the low price of water tells many consumers (especially a large percentage of the population that never pays attention to the news) that water is as abundant as ever. The continuing flow of water out of home faucets can convince uninformed and informed consumers that any shortfall in rainfall in Southern California could be offset by a greater snow pack in the mountains of Northern California where Southern California gets a third of its water.

Southern California water consumers can also reason (if they are aware of the drought) that if they alone curb their consumption, the water tables in the area’s reservoirs will not be noticeably affected. Even if a sizable bunch of consumers curb their water use, consumption would not likely be materially affected because other consumers can expand their use of water. And do understand that Southern Californians use water with little thought of how scarce water really is, mainly because its low price—.25 cents per gallon for residential use,³⁴ which is

one-third the price of water in Mississippi where the rainfall is over 50 inches a year—makes it seem abundant (which is the case, given the considerable federal, state, and local government subsidies to draw water from other parts of the state through aqueducts and from other parts of the country through tapping in aquifers that extend up into the upper Midwest). Accordingly, like so many other Southern Californians, my backyard looks for all the world as though I live in the tropics (without the heat and humidity). The water subsidies have actually increased the price of my house (because they have made living in the SoCal desert more affordable than it otherwise would be).

So, when rainfall falls off and people continue to use water without restraint, a “crisis” eventually raises its ugly head in public discussions, with public officials first appealing for voluntary cutbacks in water consumption, which typically have meager impacts.

Indeed, during the water crisis underway as this section was being finalized, the Orange County, California water authorities told everyone that the situation was “dire” (given the combination of little rainfall and the reconstruction of a major water main), pleading with everyone to conserve. What happened? Water consumption rose markedly, as many people washed their cars and watered their lawns, fearing that their faucets would soon run dry or they might soon be told that washing cars and watering lawns is prohibited.³⁵ All the while, the waterlines around the area’s reservoirs were sinking deeper and deeper. Understandably, appeals for voluntary curbs are usually followed by threats of “water police” prowling neighborhoods looking to give tickets to violators of water-use ordinances.

Of course, some state institutions pay lip service to water conservation, with some effect. In the midst of the growing water crisis as this section was being finalized, my university announced reductions in its sprinkling of the campus lawns. At the same time, it continued landscaping newly opened areas of the campus with thousands of water-thirsty shrubs, trees, and flowers.

The more general lesson to be learned from the water-crisis puzzle I pose to my classes is as simple as it is unheralded: Where shortages are evident, it is a good bet that prices have been held in check somehow, somehow. The coming water crisis at the time of this writing would all go away if the water authorities had the fortitude to do what businesses—Chevron, as well as Mercedes—do naturally: raise the price! And make no mistake about it, at the same time that a water crisis in Southern California was emerging, the price of gasoline was well above \$3 per gallon and rising rapidly (because of ongoing political/military problems in the Middle East and because refineries were being taken offline for repairs). But the price increase (even though it might be temporary) did its job. Even though the number of licensed drivers and the number of vehicles on Cali-