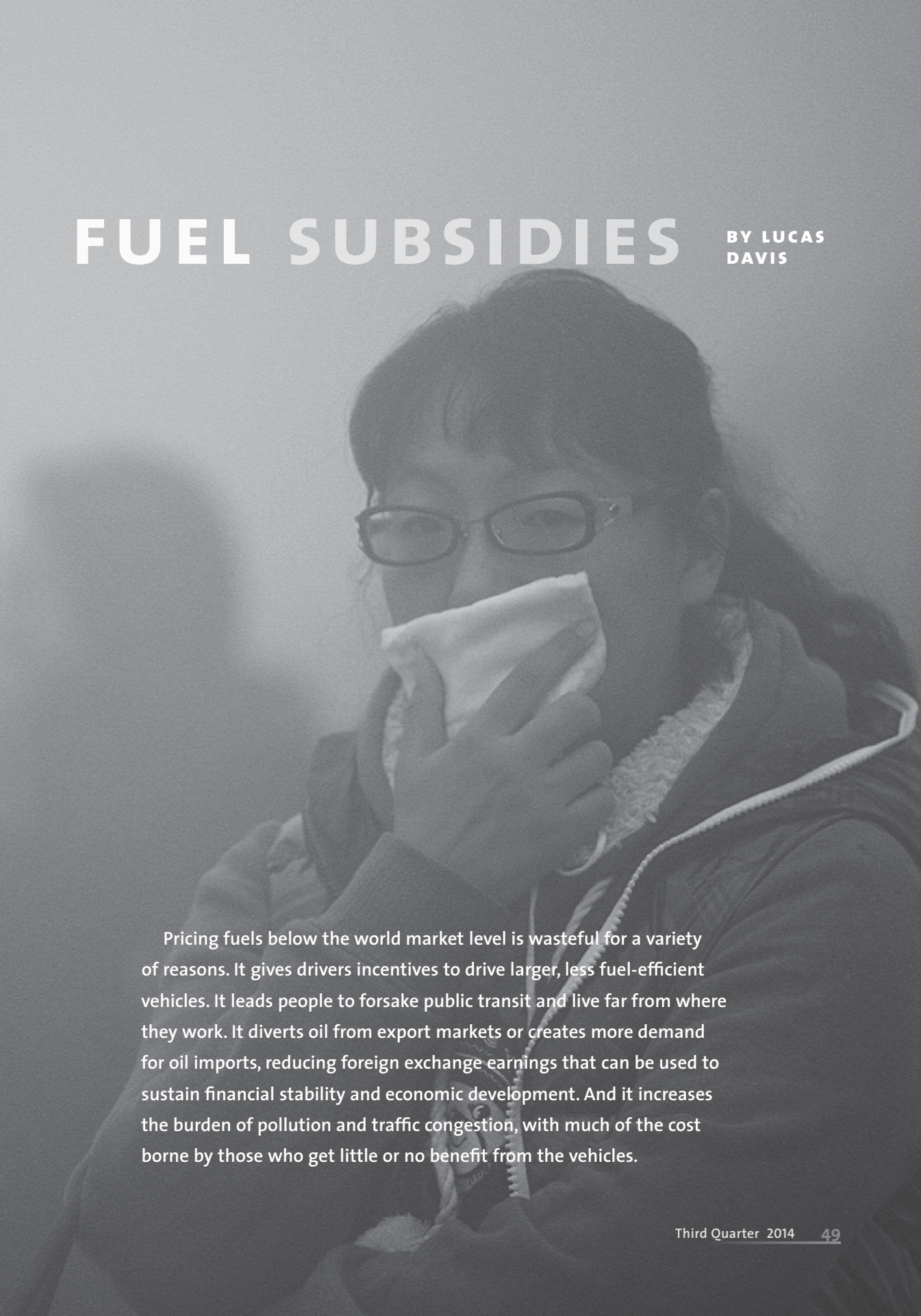


THE COST OF GLOBAL

Next year, global oil consumption is projected to reach 90 million barrels per day – up by about 17 percent since 2000 in spite of the fact that consumption has actually declined in advanced economies. That should not be surprising. Low- and middle-income economies from China to India to Peru have been playing catch-up for the past few decades, and hundreds of millions of people have been able to realize the dream of owning cars. But look a bit more closely and you see a darker side to this rush to mobility: in no small part, higher oil consumption reflects the fact that many countries subsidize the price of fuel at the pump.

FUEL SUBSIDIES

BY LUCAS
DAVIS



Pricing fuels below the world market level is wasteful for a variety of reasons. It gives drivers incentives to drive larger, less fuel-efficient vehicles. It leads people to forsake public transit and live far from where they work. It diverts oil from export markets or creates more demand for oil imports, reducing foreign exchange earnings that can be used to sustain financial stability and economic development. And it increases the burden of pollution and traffic congestion, with much of the cost borne by those who get little or no benefit from the vehicles.

GLOBAL FUEL SUBSIDIES

All this is widely known by economists who decry the inefficiency – the failure to get the maximum value in terms of investment and consumption – from available resources. And it is generally understood, too, by governments caught between reformers' urgent pleas for change and the well-founded fear that raising fuel prices is politically perilous. Here, I estimate what's at stake in purely economic terms, the loss in welfare and productivity worldwide that is the consequence of fuel price distortions.

PRICE AT THE PUMP

The figure below plots gasoline consumption per capita and gasoline prices for two dozen countries. This is the price that drivers paid at the pump in each (converted to dollars at

current exchange rates) as of November 2012. Prices include all relevant taxes and subsidies.

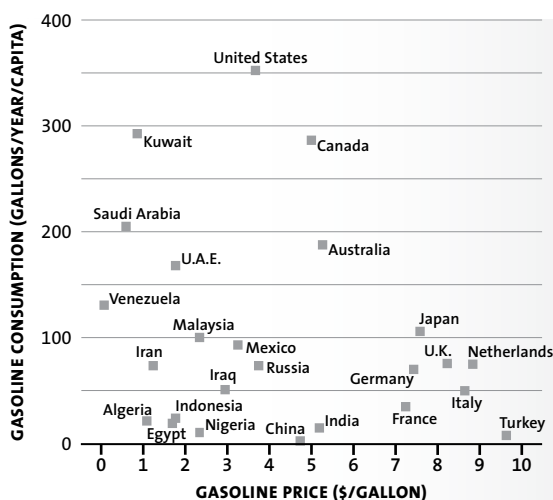
What I find most striking is the enormous variation in prices. Gasoline averages \$5.26 per gallon, but ranges from 9 cents a gallon (Venezuela) to more than \$9 (Turkey). To be sure, some variation can be explained by differences in transportation, refining and distribution costs. But that covers just pennies per gallon, not dollars. One sees the same thing with diesel prices, which tend to be a bit lower, averaging \$4.12, with a range from 4 cents to above \$7.

This wide variation is especially striking in light of the fact that the market for crude oil and refined petroleum products is global. It doesn't matter whether a country is an oil producer or whether it refines fuel within its borders. Since both crude and refined products are freely traded, the *opportunity cost* of fuel – what a country forgoes in internationally traded goods in order to consume an extra barrel – is similar everywhere.

The drivers of this wide variation in prices at the pump are taxes and subsidies. On one side, you have countries – including Britain (\$8.20 per gallon), Italy (\$8.63), the Netherlands (\$8.82) and Turkey (\$9.61) – that impose large gasoline taxes. Most economists support taxing gasoline to reflect the damage done by carbon dioxide emissions, local air pollution and other external costs of driving. But these countries' prices are much higher than estimates of the full societal cost of gasoline consumption. However, while the use of fuel as a tax cow is itself inefficient, our concern here is the subsidy side of the ledger.

Many countries subsidize gasoline and many more subsidize diesel. In these economies, fuels are sold below the international market prices. Most of them are in the Middle East (and, by no coincidence, are oil exporters). But Asia (Malaysia, Indonesia), Africa

**GASOLINE CONSUMPTION AND PRICES
WORLDWIDE, NOVEMBER 2012**



SOURCE: World Bank

LUCAS DAVIS is the Harold Furst professor of management philosophy and values at the Haas School of Business at the University of California, Berkeley. A more technical version of this analysis was published in the *American Economic Review: Papers and Proceedings*.

Expenditures on energy subsidies in many countries exceed public expenditures on health, education and other key components of government spending.

(Egypt, Nigeria, Algeria) and South America (Venezuela, Ecuador, Bolivia) are also in the group.

IMPACT ON GOVERNMENT BUDGETS

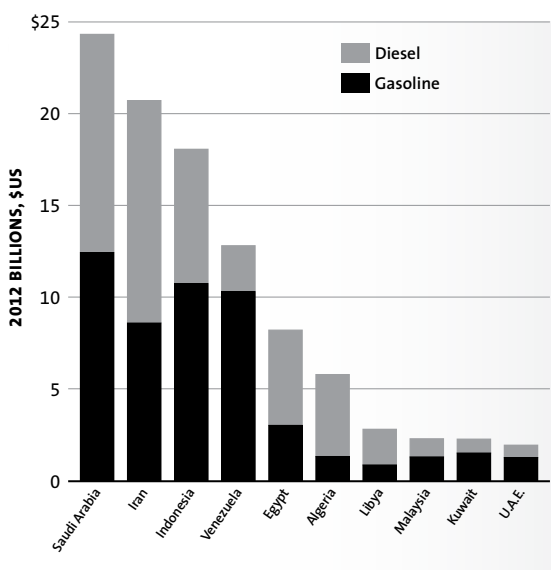
The figures to the right show the countries with the largest fuel subsidies. These dollar amounts were calculated as the difference between the price at the pump and the price of fuels in international markets. For example, the price of gasoline in Iran (in 2012) is \$1.25 per gallon, compared with about \$3 in global markets, for a subsidy of \$1.75 per gallon.

Subsidies worldwide totaled \$110 billion, with about \$55 billion each for gasoline and diesel. These top 10 countries represent 90 percent of total global subsidies. The big four are Saudi Arabia, Iran, Indonesia and Venezuela, with Saudi Arabia alone providing subsidies of almost \$25 billion annually in a country of just 30 million people.

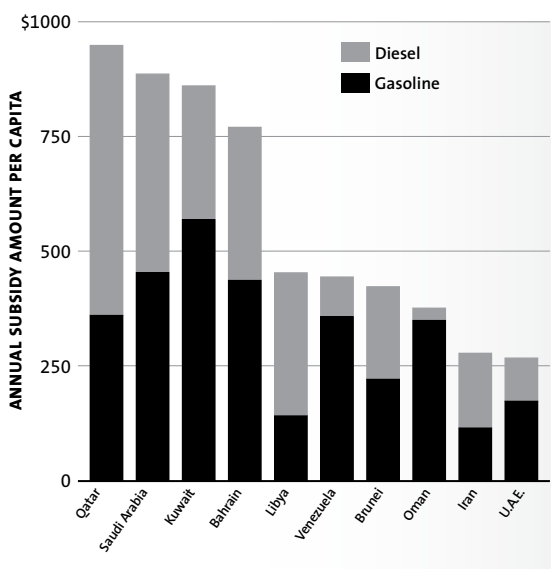
The subsidies have an enormous impact on government budgets, requiring taxes to be higher than they would otherwise be, and inhibiting the ability of governments to address other fiscal objectives. We are talking big numbers here: expenditures on energy subsidies in many of these countries exceed public expenditures on health, education and other key components of government spending.

Saudi Arabia remains near the top of the list in terms of subsidies per capita at \$885 annually. But the list is augmented by several smaller Middle Eastern countries, including Qatar, Kuwait and Bahrain. Fuel subsidies have long been viewed in many oil-producing countries as a way to share the wealth with their citizens. This is not the approach in all

ANNUAL FUEL SUBSIDIES, TOP 10 COUNTRIES



ANNUAL FUEL SUBSIDIES PER CAPITA, TOP 10 COUNTRIES 2012



GLOBAL FUEL SUBSIDIES

major oil-producing countries, however. Prices are at or above the market level in Iraq (\$2.95 per gallon for gasoline), Mexico (\$3.26), Russia (\$3.74) and Canada (\$5).

It's not hard to explain why oil-rich countries sell fuel domestically below the world market price. For one thing, there is typically strong popular sentiment to share the bounty directly. For another, many of these countries set domestic fuel prices when oil was selling for far less and were reluctant to raise prices thereafter.

But to free-market economists, this idea of using prices to distribute resource wealth doesn't make much sense. After all, there are alternative approaches for resource-sharing that don't distort incentives for their use.

Residents of Alaska, for example, receive an annual dividend (\$900 in 2013) derived from oil and gas revenues, but pay gasoline prices above the U.S. average. Note that, whereas cheap gasoline leads to more consumption, the Alaska Permanent Fund Dividend is a lump sum payment that is in no way tied to personal consumption. It may, on the margin, make people more likely to move to Alaska or to stay there once they arrive. But it doesn't encourage overconsumption of energy.

GLOBAL GAS GUZZLERS

The problem with cheap gasoline is that it causes people to own cars that burn more fuel per mile and to drive them too much. Studies show that the magnitude of this distortion is large. Saudi Arabia, for example, has experienced a ninefold increase in fuel consumption since the early 1970s and is now the sixth largest oil consumer in the world. This is remarkable, given that Saudi Arabia is 43rd in terms of population.

Venezuela is another striking example. Venezuela has the cheapest gasoline on the



planet, 9 cents per gallon for gasoline in 2012 (and even less at current exchange rates). This is not a typo: the price of gasoline in Venezuela is about one-fiftieth of what I pay in California. Venezuela's gasoline is so cheap it makes Middle Eastern gasoline look expensive.

Venezuela, moreover, is one case where the cost to the government treasury is quite direct. The country doesn't have enough refin-



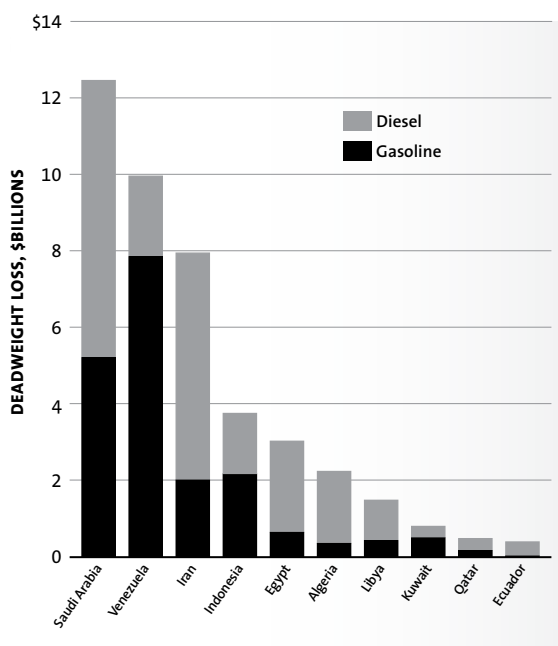
Rush hour on the Iddo bridge in Lagos, Nigeria

ing capacity to meet domestic demand for gasoline, so it exports crude oil and then imports gasoline. This means that the Venezuelan government pays about \$3 per gallon for gasoline, only to turn around and sell it for a tiny fraction as much.

Not coincidentally, gasoline consumption in Venezuela is extremely high. Ecuador and Bolivia also subsidize gasoline, but not to

anywhere near the extent. Mexico, after subsidizing fuels for many years, now has gasoline and diesel prices that are close to international market prices. And most countries in Latin America have substantial taxes on gasoline. As a result, gasoline consumption per capita in Venezuela is 40 percent higher than any other country in Latin America and more than three times the regional average.

DEADWEIGHT LOSS FROM FUEL SUBSIDIES TOP 10 COUNTRIES US \$2012



SOURCE: Author

Decades of subsidies have left Venezuela with one of the least fuel-efficient vehicle fleets in the world. When oil prices spiked during the 1970s, Venezuelans imported large numbers of large low-mpg cars, mostly from the United States. Many of these gas guzzlers remain in use today. Almost anywhere else in the world, these vehicles would have been scrapped long ago.

PURE WASTE

Fuel subsidies transfer income from the government (taxpayers) to drivers. But they also create economic waste – income nobody gets – because they enable transactions for which the buyer’s willingness to pay is below the opportunity cost of the fuel. In other words, it costs more to provide the subsidy than the extra value created for the gasoline consumer. In Venezuela right now, there is someone –

well, many people – driving around who value gasoline only slightly more than the minuscule price at the pump. Gasoline can be sold in international markets for about \$3. So each time one of these drivers burns an extra gallon, the world (in this case, Venezuelans) becomes worse off by \$2.91. Economists call this a “deadweight loss,” in which, value is simply destroyed rather than transferred.

The total size of this deadweight loss depends on the elasticities of demand and supply – that is, how demand and supply respond to changes in fuel prices. For a subsidy of a given size, the more elastic the demand and/or supply, the larger the deadweight loss. These elasticities are thought to be small in the short run – drivers complain about price increases, but don’t modify their behavior much on a week-to-week basis because of them. Most studies, though, have found that long-run elasticities are quite large. Given time, there are many ways for producers and consumers to respond to prices. In the case of consumers, the means are quite obvious: people buy more efficient cars, drive less or change their driving habits to burn less fuel.

The figure to the left shows the deadweight loss per country under typical assumptions about these elasticities. The total global deadweight loss from fuel subsidies is \$44 billion. This is split roughly evenly between gasoline (\$20 billion) and diesel (\$24 billion). Deadweight loss is concentrated among countries with the largest subsidies. The big two offenders, Saudi Arabia and Venezuela, represent about half of total global deadweight loss, while representing only one-third of the dollar value of subsidies.

OTHER PEOPLE’S PROBLEM

Fuel subsidies are different from subsidies in most other markets because of the substantial “external costs” of fuel use – costs borne indi-



Burning an effigy of then-Prime Minister Manmohan Singh during a protest against fuel price hike in Bhubaneswar, India

rectly by those other than the drivers. Part of this is climate change associated with carbon dioxide emissions. Globally, more than one-third of energy-related carbon dioxide emissions come from driving.

But there are other important externalities too. Despite substantial improvements in emissions-control technologies, vehicles remain one of the main sources of local pollutants, emitting nitrogen oxides (which cause smog) and particulates (i.e. soot, which damages lungs). Driving also causes traffic congestion and accidents, two externalities that impose hundreds of billions of dollars in costs annually in lost time, property loss and injuries. Note, moreover, that traffic death

rates tend to be relatively high in high-subsidy countries, where the growth in vehicle use has far outpaced growth in road infrastructure. Venezuela's death rate from road accidents is eight times higher than Germany's and nearly four times higher than in the United States.

Refining these estimates of external costs is an important area of research because it is so closely tied to the quality of life in developing countries and the pace of global climate change. A team from the International Monetary Fund is calculating country-specific estimates of external damages for 140 countries; this is due to be released later this year. But preliminary results have been published



Demonstrators protest a recent price hike by Shell in Buenos Aires, Argentina

and, not surprisingly, show large variation in damages across countries. This reflects, for example, differences in traffic congestion between countries with large urban populations and those without. The overall level of damages tends to be high, however, typically well exceeding \$1 per gallon.

By my calculations, subsidies lead to fuel consumption of about 30 billion more gallons per year than it would otherwise be. At \$1 per gallon, this excess consumption imposes external costs of \$30 billion annually. Combined with the estimated deadweight loss (\$44 billion), the total economic cost of fuel subsidies is about \$74 billion annually. While undoubtedly these calculations could be refined substantially, they make it clear that subsidies are a major source of waste that is concentrated in a handful of economies.

SUBSIDY REFORM

Subsidy reform is difficult. Nigeria and Jordan, for example, were forced to withdraw re-

forms when confronted by street mobs. And one reason that Egypt's democratically elected government made little headway with the country's dire fiscal problems is that it feared the consequences of fuel subsidy reform: back in 1977, an attempt by Anwar Sadat was aborted after 160 people died in riots.

But it is not impossible. In 2011, Iran, its back to the wall because of economic sanctions, managed to phase in higher fuel prices by compensating lower-income households with cash subsidies. And in 2013, Indonesia took a major step forward by increasing gasoline and diesel prices by 75 cents per gallon. Prices remain well below the market level, however, and Indonesia is still a net importer of gasoline. But the increase was certainly a victory for good government over populist rhetoric.

The Indonesian reform worked while previous attempts had not because the public had grown to understand how dire the situation had become. Fuel subsidies in Indonesia

The financial security of middle-income households, who do bear most of the cost, is often a flashpoint for broader discontent with corrupt, inefficient government.

cost the government \$18 billion in 2012; this was 2 percent of Indonesia's GDP and a whopping 11 percent of the country's total government budget. Only Saudi Arabia and Iran spent more on subsidies in 2012.

The Indonesian government was also clever in how it implemented the reform. At the same time that fuel prices were allowed to rise, the government rolled out a substantial increase in financing for welfare programs. The commitment increased public acceptance for the reform by mitigating the distributional impact for the poor.

This approach to reform makes a great deal of sense and has been used with some success elsewhere (as in the case of Iran). The key is government credibility. If Indonesians had not believed the government's commitment to fund cash transfers to those who could least afford higher fuel prices, the initiative probably would not have stuck.

THE TRAP

The temptation to subsidize fuel is clear – especially for oil-exporting countries. The oil is generally viewed as part of the national patrimony, and, as such, citizens “deserve” a share, delivered at the cost of production. But the cost of lifting, refining and delivering the oil is typically far below the value of the oil in world markets, where price is determined by supply and demand.

When local demand was modest relative to production, the inherent inefficiency could be overlooked, and it generally was. But demand has crept up, as consumers responded to both growing income and the incentives to buy gas-guzzlers and drive them a lot. Once

in, of course, it is hard to get subsidies out. Prices at the pump are highly visible. And while relatively little of the burden of price increases is typically borne by the poor, it is easy to exploit for political purposes. Note, too, that the financial security of middle-income households, who do bear most of the cost, is often a flashpoint for broader discontent with corrupt, inefficient government.

But get them out they must. Fuel subsidies effectively drain away foreign exchange earnings that are critical to broader economic development, and absorb ever larger shares of government budgets. What's more, they reduce the quality of life for many by feeding traffic congestion and local air pollution. After numerous failures, the elements of a successful strategy are emerging. One key is to include cash transfers to buffer the impact without distorting incentives to consume fuel. Another is to explain why eliminating subsidies is so important to the long-term health of the economy.

Yet another is to blame external forces for the necessity of change, implying that the government had no choice in the matter. The IMF has traditionally played this bad-cop role, making loans to distressed economies contingent on progress toward raising energy prices. Of course, this can be problematic because it gives the government's opponents a way to tar rulers as subservient to foreigners.

Plainly, the process is too painful in most countries to be attempted before the onset of crisis. But it will happen. As Herb Stein, President Nixon's chief economist, allegedly put it, “If something cannot go on forever, it will stop.” **M**