

Steering towards Sustainability:
Successful Leadership Tactics and Human Behavior

Rebecca Scott

No matter what challenge a leader seeks to surmount, one thing remains constant: to successfully lead, he needs others to follow.

When the challenge is to develop an environmentally-sustainable economy, convincing others to follow is especially crucial. Most present-day threats to sustainability arise from our behavior: only by changing the behavior of groups and individuals will leaders be able to steer us toward sustainability.

Successful leadership tactics, therefore, must take into account the malleability of our behavior. Do we resist change, or do we resign ourselves to it? Do we choose our actions rationally, or do we ignore the incentives around us? Answers to these questions should tell us whether leaders need to develop novel behavior-changing tactics—or whether traditional economic tactics, applied with timeless courage, will work on the 21st century problem of sustainability.

Fortunately, one aspect of our behavior—oil consumption—is observable and open for examination.

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“America,” the U.S. president admitted in early 2006, “is addicted to oil.”

The statement bore interesting political implications, but of far greater interest was its peculiar wording. Oil consumption, the statement implied, was not a strictly-rational choice. It could not easily be restrained by the same policy instruments used to keep other markets in check. It was, instead, an “addiction”—a compulsion, an uncontrollable urge.

Any hope of transitioning to a sustainable world economy hinges upon reigning in that urge, however, and thus—oddly enough—does it become vital to evaluate the president’s word choice. *Is* oil consumption indeed, as President Bush characterized it, an “addiction”? Or is it a rational behavior, a behavior that we can change by adjusting our regulation of the market?

If it is the former, then the pessimism that currently prevails about our ability to control oil consumption—and with it, emissions and ultimately the earth’s precarious climate system—is justified. If it is the latter, then leading the world in the direction of sustainability is as trivial as nudging some tax rates.

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At first glance, the economics of one subset of the oil market—specifically, the gasoline market—lends some credence to the pessimistic view. Whether gasoline is an “addiction” or an appetite we can control is, in essence, a question of how responsive consumers are to changes in the price of gasoline.

In economic literature, this responsiveness is usually gauged according to a measure called price elasticity. Price elasticity, the percentage change in demand that results from a percentage change in price, tells us how much people’s consumption of a good stretches when prices drop—and how much it snaps back when prices rise. Economists have churned out a plethora of studies on the price elasticity of gasoline, and these studies do not sketch an optimistic picture of people’s sensitivity to price increases.

Estimates of U.S. price elasticity of demand for gasoline, for example, routinely fall below 0.1. Given a price elasticity of 0.1, consumers would only reduce their consumption of gasoline by 1% in response to a 10% increase in the price. In a meta-analysis of 41 different studies providing seventy different estimates of gasoline price elasticity, Espey (1996) finds

elasticities as low as 0.02. In a survey of more than 100 studies, Dahl and Sterner (1991) find average elasticity estimates ranging from 0.13 to 0.88, depending on the type of model employed.

A study's choice of model framework has a significant influence on the magnitude of its price-elasticity estimates, both Espey (1996) and Dahl and Sterner (1991) find; and indeed, many different model frameworks have been tested. Perhaps the most interesting model frameworks are those that allow for short-run elasticity to diverge from long-term elasticity. Partial adjustment frameworks, for example, model gasoline consumption at any point in time as a function of the current gasoline price *and* the level of consumption in the past. This allows them to measure the effect of inertia on gasoline consumption. Inertia is an important consideration, because consumers make many of their choices on medium- and long-term horizons: what kind of cars they will drive, how far from their jobs they will live, even how often they'll visit the grocery store. Dahl and Sterner (1991) find that partial adjustment models produce short-run elasticity estimates averaging 0.20 and long-run elasticities averaging 0.23 or 0.88, depending on whether a month or a year of lags is included. Although the immediate response to an increase in the gasoline price may be small at first, therefore, people will continue to adjust as time goes by.

What looks like a gasoline "addiction" in the short run, therefore, begins to look more price-responsive in the long run. But even estimates of long-run price elasticity may understate leaders' to ability to change gasoline-consumption behavior via the market. Price elasticities measure our responsiveness to price changes, but not all price changes are created equal.

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The price of gasoline is not just a price: as political commentaries so frequently point out, it is a function of taxes, world events, the availability of crude oil, even the weather. Yet in an extensive review of the literature, I have found no studies that allow people to adjust their gasoline consumption differently when confronted with different types of price changes. Given the well-documented gap between short- and long-run price elasticities, furthermore, it seems imperative to decompose price elasticities according to the various price *components*. If consumers perceive some price changes as temporary and others as permanent, it would be entirely rational for them to adjust relatively little to the former and relatively more to the latter.

With this in mind, I set out to test whether all price fluctuations, and specifically those arising from taxes and the price of crude oil, are equivalent in the eyes of the consumer. Using fifteen years of monthly data for 42 U.S. states, I estimated several models in which tax- and non-tax components of the gasoline price were allowed to influence gasoline consumption independently.ⁱ Amazingly enough, Americans' gasoline consumption was over 2.5 times more responsive to the tax component of price than it was to the non-tax component.ⁱⁱ Although my regressions implied a long-run elasticity of only 0.35 with respect to the *total* price, in fact, they implied a long-run elasticity of 1.28 with respect to the *tax* component of price.ⁱⁱⁱ This implies that if leaders were to increase taxes so that that the gasoline price rose by 10%, in the long run consumers might reduce their consumption by *more* than 10%.

In short, it appears that gasoline taxes are far more effective in reducing gasoline consumption than simple measures of price elasticity—even long-run price elasticity—give them credit for. People may not adjust their gasoline consumption much in response to short-lived price changes driven by fluctuations in the market for crude oil, but they do respond actively to long-lived increases in gasoline taxes.

The implications are heartening for leaders seeking to steer us toward sustainability. Developed economies are not “addicted” to gasoline, consuming compulsively and uncontrollably—and leaders do not need to invent novel addiction-breaking strategies. Rather, as the U.S. vice president observed shortly before the president’s “addiction” speech, “The market *does* work out there.”^{iv} It may take considerable political courage to use traditional economic tactics like excise taxes—but if leaders can find that courage, they should also find success.

Works Cited

Bush, George W. State of the Union Address. Washington, D.C., 31 Jan 2006. 2 Feb 2006

<<http://www.whitehouse.gov/news/releases/2006/01/20060131-10.html>>.

Cheney, Dick, and Laura Ingraham. "Interview of the Vice President by Laura Ingraham," *The Laura Ingraham Show*, 3 Feb 2006. 2 Feb 2007

<<http://www.whitehouse.gov/news/releases/2006/02/20060203-5.html>>.

Dahl, Carol, and Thomas Sterner. "Analysing Gasoline Demand Elasticities: A Survey." *Energy Economics* 13, no. 3 (1991): 203-210.

Espey, Molly. "Explaining the Variation in Elasticity Estimates of Gasoline Demand in the United States: A Meta-Analysis." *Energy Journal* 17, no. 3 (1996): 49-60.

Scott, K. Rebecca. *U.S. Gasoline Demand Responsiveness to Tax and Non-Tax Components of Price*. Undergraduate Thesis, Princeton University, Apr 2006. 1-75. Available through Mudd Library, Princeton University, Princeton, NJ, USA, or by e-mail request to rebecca.scott@economics.ox.ac.uk.

ⁱ For extensive discussion of model specifics, data, and econometric methods, see Scott (2006).

ⁱⁱ The discrepancy does not disappear when extrapolations are undertaken to account for tax incidence. Scott (2006), pp. 34-35.

ⁱⁱⁱ Standard errors of 0.14 and 0.38, respectively. Scott (2006), p. 49.

^{iv} Emphasis added. "Interview of the Vice President by Laura Ingraham," *The Laura Ingraham Show*, 3 Feb 2006.