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A Better Gas Tax?

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This isn't an argument about whether or not taxes—particularly energy taxes—are "good" or "bad." Rather, this essay has a narrow focus: IF we're going to attempt to reduce gasoline demand through taxation, what is the best way to do it?

Here's my somewhat counter-intuitive theory: to most effectively reduce long-term gasoline demand, gasoline taxes should increase, not decrease, long-term price volatility.

First, let's look at European gasoline taxes. In the UK, gasoline tax is .50 GBP per liter plus 17% VAT ($3.75/gallon before VAT, $4.42/gallon with VAT). In Germany it's .65 Euro per liter plus 19% VAT ($3.80 per gallon before VAT, $4.53/gallon with VAT). Compare that with US taxes, which range from a low of $0.26/gallon (Alaska) to a high of $0.63/gallon (California). The much higher European taxes operate to reduce price volatility because they remain static in the face of changes in the underlying price of gasoline. For example, if taxes effectively double the price of gasoline, then a 10% increase in the pre-tax gasoline price results in only a 5% increase in the after-tax price of gasoline paid by the consumer.

Why does price volatility matter? Let's pretend that individual consumers consciously perform risk-management analysis on their future gas requirements (in decisions such as where to live or what car to drive). In that calculus, the theoretically rational consumer would look at the gas requirement of a purchase at today's gas price (say, the gas cost of a daily commute). This consumer would also consider the possibility that gas prices would increase or decrease, and calculate the present value of these changes. The key question here is not whether gas will get cheaper, because that only results in making a presently affordable choice still affordable. Rather, the key question is whether it is possible that gas will get so expensive as to force the consumer to forfeit the presently affordable choice. Therefore, the potential for volatility making gas cheaper won't spur an increase in present demand choices to the same extent that the potential for volatility making gas more expensive will reduce the present demand choices.

Here's an example. You're looking in to buying a moving, and the new location is 10 miles (each way) farther to your job. You drive a car that gets 20 mpg (only for the sake of simpler math). If present gas prices are $3/gallon, and you commute to work 200 days per year, then this new location will cost you $600/year more than your old location. If you assume that volatility is low—say, that prices can only move by a factor of 2 either way—then the most you could save is $300/year (at $1.50 gas), and the most additional expense would be $600/year (at $6 gas). However, if volatility is extreme—say a factor of 10 either way—then the most you could save is $540 (at $.30 gas), and the most additional expense would be $6000/year (at $30 gas). The second scenario—more assumed potential for price volatility—will have a greater demand-

reducing effect on today's choices than does the low-volatility assumption because the risk of rising prices is much more potentially damaging than the potential benefit of falling prices.

It's difficult to compare European and American gas demand (especially the elasticity of that demand) because the culture and built-environment are so different. However, assuming everything else is equal, what happens when the underlying cost of wholesale (pre-tax) gasoline goes from $2/gallon to $4/gallon? In Europe, assuming a gas tax of $5/gallon, the price rises from $7/gallon to $9/gallon—a change of 28.6%. In America, assuming a gas tax of $.50/gallon, the price rises from $2.50/gallon to $4.50/gallon—a change of 80%. When contemplating a consumer choice such as what car to buy (and how much to weigh fuel efficiency) or how long a commute is affordable, the higher volatility regime necessitates that gasoline demand will play a higher role in that decision, all things being equal.

What does this mean? It tells us that, IF the goal of a gasoline tax is to cause consumers to make choices that reduce gasoline demand, then that tax should operate to increase volatility. One way to do this is to make the tax per gallon a function of the price of that gallon of gasoline—for example, make taxes 100% of the wholesale price of exchange traded gasoline on a week-to-week basis. This would, nearly, double the volatility already present in wholesale price swings, whereas setting gasoline tax at a fixed level equal to the price of today's wholesale price of gasoline (and not adjusting it continually as that price changes) would effectively halve volatility.

So far, this analysis has made one essential assumption—that consumers will rationally consider the risk inherent in future gasoline price swings, and will adjust their risk calculations based on the impact of a changing tax regime. Surely that won't be universally true, but, in addition to at least some of the general public, more sophisticated businesses will should be able to understand this (especially when the policy is explicitly labeled as intending to increase volatility), and it can be communicated to the public in general as the rationale behind a shift in tax regimes. Getting Americans to consider a gas tax increase as a good idea, of course, is an entirely separate matter!

Do examples from the real world validate this notion that increased price volatility reduces the demand for a commodity? I think it does, at least within the world of energy. As I recently observed, gasoline consumption choices in Germany seem to actually be moving away from efficiency (though I can't show that this is more than correlation based on anecdotal evidence). Within the US, a recent report by Deloitte concluded that US utilities are focusing on "demand management" and energy efficiency rather than investing in new generating capability precisely because there is increasing uncertainty over the future of regulations on greenhouse gas emissions. The Deloitte report suggests that increasing volatility leads directly to increasing efforts at demand reduction.

While I'm the first to admit that gas taxes are only a preliminary step to dealing with Peak Oil, if we're going to use them for the purpose of demand reduction, we should do so in an efficient —rather than counter-productive—manner. A common adage is that gas tax must sting in order to work—and a tax that is designed to increase volatility is a tax that is more effective at stinging. Gas taxes should be variable and a percentage of the current underlying price of wholesale gasoline in order to enhance, rather than reduce, the consumer's exposure to volatility. The pessimist in me realizes that this is very unlikely in America (I think it's more likely that gas taxes are rolled back to pander to the near-term concerns of voters). Maybe the Europeans will listen—they explicitly use gas tax to reduce demand, and seem to understand that such a tax must sting to work, but currently tax in a counter-productive fashion.