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The Tata Nano Strikes Back--Does Jevons' Paradox Apply to Productivity, Too?

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Can improvements in energy efficiency "save" modern civilization as we face declines in world oil production? While the efficiency revolution may let us drive on half the gas, the productivity revolution may make it affordable to twice as many--or more...

One argument against the efficacy of improving energy efficiency is called Jevons' Paradox. This suggests that, when we improve our energy efficiency, we also reduce our demand for energy from that same use. That decreased demand in relation to supply makes energy cheaper, which in turn makes us use more of it. It has been suggested that this "rebound effect" only accounts for 5-20% of efficiency gains, but I have written previously about the potential for a "shadow" rebound effect that potentially accounts for nearly the entire efficiency gain.

The Tata Nano: While the efficiency revolution may let us drive on half the gas, the productivity revolution may make it affordable to twice as many--or more.

Often, I find it difficult to apply the very theoretical Jevons' Paradox to pragmatic thinking about our energy future. The recent launch of the Tata Nano, however, stands as an example of Jevons' Paradox in action. *Possibly of much greater importance, however, are two related issues: the feedback effect between increased economic productivity and increasing energy consumption,*

and the aspirations of an emerging global middle class.

On January 10th, Tata Motors introduced its new, $2500 "Nano." The launch was well covered on this site and many others: roughly 50 miles per gallon, four doors, and one windshield wiper. And the potential for the Nano to bring millions of new drivers to a world already trying to conserve energy and reduce carbon emissions was covered as well. And if you dig deep enough, there was even one blogger who raised the nexus between Jevons' Paradox and the Nano. What I hope to do is to raise that issue here, and to expand the analysis to cover what I consider to be the even more pressing nexus between the Nano, productivity improvement, and world oil consumption.

"*But I've heard that today's economy is far more productive per barrel of oil consumed than our economy was in the past—won't a continuation of this trend decrease demand for energy?*"

The Tata Nano isn't the world's most fuel efficient car, and therefore it doesn't suddenly brings the automobile within reach of potentially billions of new drivers purely because of fuel efficiency. Rather, the Nano is revolutionary because it is representative of another trend in the modern economy—our ability to produce more for the same amount of energy consumed, and it's broader corollary, our ability to produce most everything more efficiently and cheaply. If you track economic statistics with much interest, you have probably noticed that the statistics covering "productivity" show a virtually permanent increase over the past few decades. The Nano is a prime example of exactly that trend—in real dollars (and accounting for subsidies), it is probably the least expensive four-door car every built by a considerable margin. Some of that comes from economy of scale, some from the ability to leverage processes and materials developed elsewhere, and some is simply the result of designing with precisely that goal in mind. But the result is the same: a car for less money means a car that more people can afford to buy. To the extent that we are dealing with energy-consuming products, greater efficiency of production seems to affect energy consumption via a process similar to that described by Jevons for energy efficiency. The more people who can afford to consume oil in their own car, the more that will.

The larger issue is that increasing productivity—of exactly the type that led to the Nano—is a critical requirement for the growth that drives our economy. Economic growth is driven by three main factors: increasing population, increasing energy availability, and increasing productivity. It is often assumed, here and elsewhere, that a focus on productivity is the only realistic way to maintain economic growth if we are to control population and pollution while dealing with plateauing or declining energy supplies. Does the Nano throw a wrench in that analysis? Even if this unanticipated consequence of increasing productivity only serves to negate our gains in energy efficiency, this is enough to cast serious doubt in my mind over our ability to maintain economic growth going forward.

The Tata Nano is also emblematic of another trend—the rapid emergence of a massive, global middle-class. This middle class may not have the same standard of living or net worth of the "middle class" in the West, but it is significant none-the-less. Today, tens or even hundreds of millions of Chinese, Indians, South East Asians, and Latin Americans can comfortably and confidently provide for the basic necessities for themselves and their families with money left over. They're spending—and (yes, America) saving—this surplus toward aspirational goals, one of which is to own a car. Car culture in China is thriving, and with the launch of the Nano it seems that industrialists are betting on it thriving in India as well. Can the world, its oil supply and environment, accommodate another 100 million cars? What about another two billion cars? J.D. Power & Associates expects yearly light vehicle sales in India to double to 3 million vehicles per

year by 2015, and sales in China to triple to 17 million per year. Unlike the U.S., where the vast majority of our roughly 17 million in annual car sales do not represent a new person beginning to drive a car, most of the sales in India and China go to first time drivers.

The danger of an economy that seems adept at squeezing ever more productivity out of each hour of labor and barrel of oil is that this same trend that *could* help the West soften the impact of Peak Oil seems poised to exacerbate the global energy supply crunch by making energy consuming cars affordable to an ever greater portion of the world's population. An expanding consumer base makes it much more difficult to achieve aggregate gains via efficiency-if the number of cars doubles, the efficiency must also; if the number of cars triples, is it realistic to triple miles per gallon across our global fleet? Quadruple? This development seems to carry with it the significant moral hazard (already a hot debate topic within the world of carbon emissions) in the possible "solution" of denying these efficiency gains, or their products, to the world's poor. Where is the cut-off? Do we cap the "middle class" at one billion? Two billion? Three? The possibility and morality of such a move are highly suspect. We may be stuck between the rock of 2+ billion new middle class consumers over the next few decades and the possibly much harder class and geopolitical situation of those 2+ billion aspirants realizing the will never become "middle class" because of the decisions and prior consumption of the 1 billion in the "West."

What next, will these people want air conditioning, too?