

The Indiana Jones of Economics, Part I



STEVEN D. LEVITT

05/05/2008 | 12:07 pm

A few years back the *Wall Street Journal* dubbed me [the Indiana Jones of economics](#).



Robert Jensen

In reality, that title more rightfully belongs to [Robert Jensen](#), an economist at Brown University who is doing some of the most interesting and adventurous economics studies these days. Jensen has documented how cell phones revolutionized fish markets in India, how [simply telling students](#) in the Dominican Republic once about the high value of an additional year of school can impact their choices years later, and how [introducing T.V.](#) into rural India affects the position of women.

The real reason I call Jensen the Indiana Jones of economics is because of another paper he has written in which he and co-author **Nolan Miller** set out to find one of the elusive Holy Grails of economics: a [Giffen good](#). A Giffen good is one where increasing the price for the exact same good actually leads people to buy *more* of the good. In economic terms, the price elasticity of such a good is positive, rather than negative. The way economists measure elasticities is often by looking at what is called an “arc elasticity.”

Jensen tells his story in three parts which we will post over the next three days, aptly entitled “Raiders of the Lost Arc Elasticity.”

Raiders of the Lost Arc Elasticity, Part I

By **Robert Jensen**

Several years ago, my colleague Nolan Miller and I set out on a thrilling adventure. OK, this being economics, both “thrilling” and “adventure” are relative terms. But, the story does involve the search for an elusive, fabled prize shrouded in mystery, travel to far-off lands, and the promise of immortality. We had set out to find a Giffen good, a journey we [just recently completed](#).

So, what’s a Giffen good? It’s a (theoretical) violation of one of the most sacred and holy laws of economics: the Law of Demand. It has excited and intrigued economists for over a century, though no

verified example had ever been found.

The Law of Demand says that if the price of a good goes up, the quantity demanded decreases. A Giffen good is one where when the price goes up, the quantity demanded increases. It's named after Sir **Robert Giffen**, a 19th century British civil servant and economist who is believed to have first suggested the possibility.

How might this happen?

Imagine you are extremely poor, just barely able to afford enough to eat. And for simplicity, pretend there are only two foods: a basic, staple food like bread that gives you a lot of calories and fills your stomach at a relatively low cost, and a luxury food like meat, that tastes good (indulge me, vegetarians) or adds variety to your diet, but is very expensive, offering few calories per dollar.

So, if you're really poor, you'll eat a lot of bread to fill your stomach and get your calories — then with whatever money you have left over, you buy a bit of meat to make yourself happy.

You're going merrily along like this, until the price of bread goes up. Now you can't afford the same bundle of bread and meat you were buying before. You have two choices:

1. Eat less bread and more meat.
2. Eat more bread and less meat.

Actually, if you enjoy being alive, you really only have one choice: option two.

The problem with option one is that if you cut back on bread, you lose a lot of calories and a lot of bulk to fill your stomach. And because meat is so expensive, you get very few calories from the small amount you add to your diet. So, since you were just barely getting enough to eat before, you would end up with too few calories and a grumbling stomach. Eventually, you might even end up dead.

But if you instead cut back on meat and eat even more bread than before — while you may enjoy your diet less — you'll at least get enough calories and fill your stomach. Really, you have little choice. So you break the Law of Demand: the price of bread goes up, and you end up eating more of it.

Anyone who has ever sat through introductory economics has probably heard about Giffen goods. Maybe you were told about potatoes during the Irish famine. If so, you were mislead. The potato example has been disproved.

The search for an alternative example has lead economists to explore crazy, far-out cases, like the demand for fermented whale bile among river-dwelling southern Kazoo from 1873 to 1875. But these searches always came up empty.

In fact, just a few years before his death, Nobel Laureate **George Stigler** wrote that the best proof that no Giffen good exists is that whoever found one would attain immortality (in the economics profession, anyway, which is one-half a step above being the most famous asphalt engineer) — and since this is such a great reward, people must have already looked everywhere for one.

Despite this declaration, we were determined to find the elusive Giffen good!

(Oh, the blog title. For technical reasons, the way you explore demand is through estimating an "elasticity," which tells you how the quantity demanded changes when the price changes — all in percent terms.

In the Giffen case, where quantity demanded increases when price increases, you would have a positive price elasticity. And for even more technical reasons, you really want to estimate the "arc" price elasticity. Yes, a long way to go just for a bad pun).

So, to rephrase: We were determined to find the elusive positive arc price elasticity of demand!

Next time: [Catastrophe strikes!](#)

TAGS: [robert giffen](#), [robert jensen](#)

The Indiana Jones of Economics, Part II



STEVEN D. LEVITT

05/06/2008 | 12:23 pm



Robert Jensen

In the second installment of [his adventure story](#) about searching for the elusive Giffen good, **Robert Jensen** describes some of the setbacks they suffered along the way.

Raiders of the Lost Arc Elasticity, Part II

By **Robert Jensen**

Let me start at the beginning to explain how our search for a Giffen good evolved. About five years ago, I was using a large, publicly available data set of Chinese households to explore the link between income and health. My colleague **Nolan Miller** walked into my office, saw what I was doing and asked, half as a joke, if I'd looked for a Giffen good.

I looked at my data, and sure enough, there it was. Higher rice prices in southern provinces of China were associated with higher rice consumption. The same held in northern provinces with wheat (things like noodles). We giggled like idiots, and quickly wrote up the results in a short paper.

But then the ground began to rumble as a giant boulder rolled towards us: The Identification Problem. Readers of this blog will know this problem well, but I'll describe how it applies here.

Remember, we're looking for a positive correlation between price and consumption/demand — higher prices associated with higher quantity demanded, lower prices with lower quantity demanded. So, let's say we see a bunch of towns, and people living in those towns with the highest rice prices consume the most rice. Case closed, right?

Not quite. Plain old economics tells us that if people want more of some good, its price goes up. So, we see high rice prices where there is high rice consumption, but did the high consumption cause the high price (economics as usual) or did the high price cause the high consumption (Giffen behavior)?

The usual solution to this problem is to find some outside factor that affects the price but does not

affect demand (except through price), and then in effect look at how the change in price associated only with this factor affects demand.

So we tried matching the data to rainfall records (rainfall affects crop yields, and thus price). After spending months and months on this, there just wasn't enough data to estimate the relationship well, so the procedure failed. And anyway, we began to think this wasn't a valid strategy, since rainfall could also affect the demand for rice (by affecting wages, the prices of other goods besides rice, and a host of other factors).

So, we were thwarted — we had some evidence of Giffen behavior, and it was sort of believable, but not quite.

We were on the verge of tossing out the whole project when it hit us: why not go to China, give people subsidies to change the price they pay for foods and see what happens? This way, we would know that our price change caused the change in consumption, and the identification problem would be solved.

So we did just that. We teamed up with a respected Chinese economist, **Sangui Wang**, and I headed off to China, fedora on my head and trusty whip by my side (OK, Yankees cap and laptop).

Together, we set out across China, through deserts and forests, from half-empty villages to bustling cities, searching for clues by interviewing the poorest people about their diets. Theory told us where to look for Giffen behavior — the “Giffen conditions” included: households that were extremely poor, and consuming a simple diet of primarily a basic good (like rice or wheat), a little bit of a fancy good (like meat), and little else of budgetary or nutritional significance.

We chose one southern province, Hunan, where rice was the dominant staple, and one northern province, Gansu, where wheat was dominant. It became clear early on in our travels that the Giffen conditions seemed to hold almost everywhere we went. Thus, theory told us these guys should be Giffen consumers, so it was time to put the theory to the test.

We chose our sample sites and assembled a data collection team. We printed vouchers that households could use to purchase rice (in Hunan) and wheat (in Gansu) at subsidized rates for six months, and contracted with local shopkeepers to honor the vouchers in exchange for reimbursement. We gathered a pre-subsidy baseline survey for 1,300 households, chose at random which households would receive the vouchers, and returned for two more rounds of data collection, one during the subsidy period, and one after the subsidy had ended.

All that was left to do was wait. This made for a very tense half year.

As the months passed and the program ended, I'd wake up every morning and run to my computer to check if the data had come in. I knew it would take a while for our local team in China to enter and validate the data, but I couldn't help checking over and over, like a rat pressing a lever hoping for a pellet of food.

And then one day, there it was, the e-mail from our team with a file attached. This was the culmination of a long journey, over five years of our lives, with our academic reputations on the line. Hearts pounding, faces flushed and hands trembling, we ran the first regression ...

... and found the exact opposite of what we were looking for.

Next time: [What went wrong?](#)

TAGS: [robert giffen](#), [robert jensen](#)

The Indiana Jones of Economics, Part III



STEVEN D. LEVITT

05/07/2008 | 10:35 am



Robert Jensen

Over [the last two days](#), **Robert Jensen** has described his hunt for the ever-elusive Giffen good. Like all action adventure stories, this one has a happy ending. Jensen then goes on to explain the important implications of his findings for food policy in the developing world.

Raiders of the Lost Arc Elasticity, Part III

By Robert Jensen

What had gone wrong? A simple, human flaw called stupidity (mine).

I had coded our price change variable in the wrong direction (a price reduction was coded as a price increase — a negative price decline). So the data was in fact telling us the exact opposite of what we thought — we had indeed found a positive arc price elasticity of demand. The Giffen good.

In fact, we sort of found two Giffen goods. The evidence that rice was a Giffen good in Hunan was very strong; the evidence for wheat in Gansu was a bit weaker. But it turns out that our experimental design in Gansu had a flaw (we subsidized wheat flour, whereas many people purchased prepared wheat foods like noodles, so our subsidy didn't affect them). And many of our Gansu households didn't fit the Giffen conditions well; when we focused on households that did, the evidence of Giffen behavior was stronger.

In the end, it's funny that people have looked in crazy places for Giffen behavior (fermented whale bile, anyone?), and it turns out it could be found in the most widely consumed food in the most populous nation in the history of humanity — rice in China. But, it turned up exactly where theory predicted it would. And the Giffen conditions (poor households with simple diets) are widespread in developing countries.

We're sure more cases could be found, now that it's clearer where and how to look for them.

The Giffen effect is an important part of economic thought, history, and pedagogy. And along the

way, we had produced some new theoretical predictions about consumption behavior that the data supported — so that was good for the economics side of things.

But it turns out the Giffen story also has some important, real-world implications for public policy that matter much more.

Many low-income countries use consumer price subsidies or price controls to improve or protect the nutrition of the poor. For example, both India and Egypt spend about 1 percent of their G.D.P. subsidizing basic foods such as rice and wheat, making them among the largest forms of social assistance for the poor in both countries.

But critics often attack such policies on several fronts. The biggest concern is that they distort market signals, i.e., how price reflects scarcity. For example, high oil prices tell us that demand is high relative to supply. If we subsidize the price of oil, we're getting rid of the market signal that tells us to conserve or discover new ways to use less oil, as well as the incentives to use or develop new alternative fuel sources or technologies.

Price subsidies are also criticized because they often lead to shortages, smuggling, and black market activity — or in practice, disproportionately benefit the poor the least.

But subsidies enjoy significant political and popular support because it is believed they at least protect the nutrition of the poor. This is especially the case when comparing subsidies to other forms of welfare, like cash payments, since people worry that the poor may spend the cash on things other than food, or at least may not use the money in a way that improves their nutrition.

But when we subsidized the price of rice and wheat, people consumed less of them, not more.

And in a [follow-up paper](#), we show that when you take together all the consumption substitutions people make, our large subsidies did not improve nutrition at all.

In fact, in Hunan nutrition actually declined in response to the subsidy. In Gansu, the effect on nutrition was essentially zero. And our sample included only the very poorest households, malnourished by international standards and earning much less than a dollar per person per day — i.e. the exact group whose nutrition subsidies are intended to improve.

Of course, households that got the subsidies were still better off, because we increased their purchasing power. But at the end of the day, you can't dictate what people eat, and they can act in ways that make them happier but may reduce or even reverse the intended consequences of government policy like subsidies (or price controls, or rations, or in fact anything else designed to improve nutrition).

Now, we're absolutely, definitely not saying that we should therefore do nothing to help the poor. Quite the opposite. And that's especially the case in light of recent, dramatic increases in world food prices — which have been much larger than the price changes we analyzed and which have affected a wide range of foods, not just a single food like we studied.

In fact, it would be immoral to do nothing to alleviate the suffering of the poor.

But while there may be some reasons to prefer subsidies as a form of welfare, it's time to abandon the long-standing presumption that they are the best policy because they improve nutrition.

So, hidden inside this old economics mystery, the real prize was an observation relevant to real world policy issues. We just hope it doesn't end up in a crate, hidden away in some warehouse like the Lost Ark ...

TAGS: [robert giffen](#), [robert jensen](#)