

Bennett's Law

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What foods do poor people buy when they have a bit more money?

Bennett's Law is the empirical regularity that says that as people go from very poor to less poor, they substitute away from coarse grains towards finer grains, and as they go from merely poor to perhaps middle income or non-poor, they substitute away from carbohydrates altogether and start bringing in more protein, usually in the form of animal sourced foods.

Marc Bellemare recently published "the first credible test of Bennett's Law".

Marc: On the basis of a handful of assumptions. Micro-theory will tell you that as income goes up, the demand for food goes up. So where we started from was, that is theory. What do we see empirically? Is that really true empirically? And can we get an answer to that question of what is the income elasticity of food demand? Because that's a very thorny issue, as you may know. And if you ...

Jeremy: Let me just stop you for a minute there, because I understand price elasticity of demand. What is income elasticity of demand?

Marc: The income elasticity of demand measures what happens to quantity demanded in percentage terms for a 1% increase in income. What's great about an elasticity measure, elasticity is a unit free unit of measurement. It tells you for a 1% change in something, how does the other thing respond in percentage terms. So it is — whether you measure it in dollars, in euros in kwacha — you get a measure that you can compare across contexts. And this is where we kind of come in with this paper because ...

So we looked at what micro-theory says, we looked at what the empirical evidence so far said, and we asked ourselves, how can we do better? And it's fairly easy to do better. First off, you know, I take

theory seriously, but I don't take it as gospel, meaning that economic theory is often wrong in specific contexts. It'll tell you one thing, and then you look at the data, you get the best estimate you can get, and you find something that is not in line with theory necessarily. But more worryingly for us, is the fact that many of the estimates you see in the literature that are bandied about by policy makers, some researchers, are just poorly identified, meaning that they are not necessarily an accurate number.

And that is especially true when it comes to income elasticity of demand. That is something that I've taught. I think in most undergraduate courses I have ever taught, we don't really have a good sense of what happens to food demand when income goes up. The reason being the first thing is demand for what? Because you can measure the demand for food in several different ways. The most standard way that people think about would be perhaps in terms of calories, right? What we do in the paper is we look at food expenditures, because that is something that we can harmonise across contexts, and it is fairly accurately measurable. You know, I'm not saying that calories are not accurately measurable, but they're often based on imputations that are very old and that are dating to kind of a time when the calorie content of various foods was very different from what we have today. And so you can measure it in dollars or expenditures, you can measure it in calories. You can say we will measure it in terms of macronutrients. How many grams of protein, how many grams of carbohydrates do people consume? You can measure it in terms of micronutrients. You can say, well, what is the demand for vitamin A, vitamin D? And because we have so many different measurements of what food demand is, we have a construct validity issue, right? So me talking about food demand may not be the same thing as an FAO colleague talking about food demand or a nutritionist talking about food demand. We needed something that could be compared across contexts. And so we settled on food expenditures, which is by no means a perfect measure, but it is the measure that we have. It is something that is measurable in monetary terms.

And then the way we got to writing this paper was, I recall having a conversation with Eeshani Kandpal, my co-author, one of my co-authors on this. The other is Katherina Thomas. And I remember telling her, I'm very interested in Bennett's Law because, you know, the name notwithstanding, it wasn't really a law up until our paper.

Bennett's Law was more like, you know, something that we kind of observe in cross-sectional and time series data, but we don't really have an iron-clad estimate for. And so I recall an early conversation with Eeshani and saying, well, what could we work on together? And I said, well, we should do a randomised control trial where we test Bennett's Law. And Eeshani, who is infinitely smarter than I am, said, wait a second. We don't have to spend any money doing this. There are publicly available data sets of cash transfer, randomised controlled trials. So randomised trials where ... Be selected to receive an infusion of cash regularly should you meet some conditions. And that kind of gives us internal validity. That is what allows us to make a causal statement there. And what's very interesting about that is that we have five RCTs of conditional cash transfers in four different countries. So we have two in Mexico. We have one in the Philippines, one in Uganda, and the last one is in Nicaragua.

Jeremy: Okay. So you've got these ... Effectively they're government programs usually where some people get a cash handout and other people ... I don't know whether they're actually randomised. You say they're randomised controlled trials, but there's a group of people who get the cash and a group of people who don't, and you can look at their expenditures. So what is the income elasticity of demand for food purchases?

Marc: Well, it's positive. So in line with your intuition, as poor people get money and this is money that's given to them kind of in a random fashion, they can they take some of it and spend it on food. In other words, demand for food goes up. The interesting news is that it's not as much as people expected. Our estimates are lower than what the literature had hitherto presented. And that is an interesting fact. Or, that's an interesting result, because honestly, I was of the school of thought that, you know, you're going to see them very much an economist in that sense, but I was of the school of thought that income fixes everything. Money is the, you know, is the answer to a lot of problems. And so I thought, well, if we just give people more income, right, if as incomes go up, as the development process takes place, all of those nutrition issues are going to get resolved because people are just going to start upgrading what they consume, and they're going to be, you know, they're going to be better nourished. We're going to see fewer hungry people. So our income elasticity estimates are not as high as what most people kind of would have

speculated up to now. And that was kind of a very sobering fact because it ...

You know, sometimes you find a result that really changes how you view how the world works. And that is one of them. That is one of those things where I, you know, it hasn't happened frequently in the course of my research that I had a finding where I thought, this is entirely ... It's not entirely different, right? If it were entirely different, I would have found that giving people more money means that they spend less money on food. That is not what we find, but we find that they don't spend as much as what we expect. And thus the whole kind of income as solution to so many problems does not hold.

Jeremy: Just to go back. You said that elasticity is great because it tells you how much does spending go up for a 1% increase in income. And naively, you might think 1% increase in income, 1% increase in spending on food. So how much do they increase their spending on food.

Marc: Yeah. So so what we do is we find an income elasticity for overall food expenditures of 0.03. It's about three cents on the dollar.

Jeremy: That's really not very ...

Marc: It is really not very much, exactly right. It is way less than you would expect. I mean, I would not expect a 1 to 1. I would not expect a one dollar on the dollar because we know that food is a necessity, which means or we know, we know from theory — again, see, I'm taking theory a little bit too seriously — what we know from theory is that food ought to be a necessity, meaning that the income elasticity of food ought to be less than one, for food overall. That is, for luxury goods, for stuff like caviar, we would expect the elasticity to be greater than one, because those are luxury goods or they're deemed to be luxury goods. But for food overall, we would expect it to be between 0 and 1, and we certainly find between 0 and 1, but we find it much closer to zero than I expected going into this project.

Jeremy: And it's also ... I mean, I have ... My expectation would be that it would be higher, especially because very often cash transfers are targeted at women because they're kind of responsible for feeding the family, and they're often accompanied by education on nutritional questions. So maybe that targeting is not necessary either.

Marc: That is something we can't quite get into, right? We can't speak to the targeting of those cash transfers. What we have is this exogenous variation in who gets cash and who doesn't. I would like to clarify, too, that this is an intent to treat estimate, meaning that when we give people money, we can't force them to take it up and do stuff with it, right? So this is, we intend to treat those people or the people who ran those randomised control trials in the first place intended to treat the people who receive the cash. What they do with it is entirely up to them. So it's what we call in the literature an ITT estimate.

That being said, Jeremy, I want to go back a step. What we find is, yes, overall for food, we find that it's 0.03. So three cents on the dollar. But of course staples, right, stuff again going back to like my definition of coarse versus fine stuff like sorghum and millet exhibit the most inelastic demand. And their estimated income elasticity is not statistically different from zero, meaning that for a change in income, we don't see people changing in a statistically meaningful fashion their expenditures on coarse staples. What has the highest — which is in line with so many reports and so much of the conventional wisdom in this kind of economics of food demand and nutrition literature — is that the most elastic demand is animal sourced protein. And so in that sense, we do find stuff that's in line with people's expectations of, yes, as people get these kind of as people get these random infusions of — random across people, not over time — they they will spend, you know ... The demand of food, sorry, the category of food that responds most to this influx of cash is animal source protein.

Jeremy: So that's getting to Bennett's law or Bennett's Observational Regularity.

Marc: Correct. Yeah.

Jeremy: Can can you can you actually do the three steps, of course to fine staples and fine staples to meat?

Marc: So you got us there. So, I am very, very happy to report that yes, we can get to those three steps. What I'm slightly less ... What I was kind of more surprised by, not disappointed necessarily, is that we find partial support for Bennett's Law. The average household in our, across our five contexts substitutes fine staples for coarse staples, substitutes protein for coarse staples, both of which are consistent with Bennett's Law. But you'll notice that there is a glaring omission,

right? We don't find that they substitute protein for fine staples. So this is kind of like this middle step where people might, where you think, well, they would move away from rice and consume more chicken perhaps, or more fish. We don't see that step. What we do find is that people will substitute chicken and maybe pork and beef for sorghum and millet, and they substitute rice for sorghum and millet. But we don't find that middle step, which may just ... I mean, we don't know whether that's kind of a noise problem in the data, where, you know, it's the data are just a little bit too noisy to detect that. We find the right sign in that direction, but we just don't find significance, is what we find. But it is exciting.

I mean, you know, I said I was disappointed. That is not entirely true. I mean, I'm very excited about providing the first credible test of Bennett's Law in the literature. It's something that's been kind of on my mind very much since I learned about it. I thought, this is fantastic. This is entirely true, entirely true based on my expectations or based on my intuition and the patterns that we observe in, kind of, in our lives.

So if I, if I may just kind of a little personal aside. My parents, you know, you don't have to go very far up the family tree to find people who were living in rural areas of Quebec in poverty and people for whom even ... You know, if I talk to my mother, she will tell you that a meal is not a meal unless it's got starch. So a meal is not a meal if it doesn't have potatoes. A meal is not a meal if it doesn't have bread. And she will entertain the possibility of pasta and rice as well, which are not exactly endemic to French Canada, but she will entertain that possibility. And so these things don't change very quickly, I think, across generations, because of habit formation and the way we eat. And that might be something to look into, I think, as a next step of, sure, okay, you see that people themselves will change a little bit at the margin, but there's a lot of holdovers from history. There's a lot of holdovers from culture and from these are habits of consumption that are formed well in infancy. Right? I mean, you look at how people eat and they'll say, well, I've always eaten this way when I was little, and there's all kinds of emotions and kind of cultural baggage that is tied into that, and personal history that's tied into how people eat that demand might not switch as easily for food as it does, say, for VCRs or the type of computer that you're using.

Jeremy: Maybe this is a digression, or maybe ... Well, if ... Is there a kind of inverse Bennett's Law that when people are rich and educated and have been for a while, they start eating lower, they start eating whole grains and less meat and quote unquote, healthy.

Marc: That is a fantastic question. That is where my mind has been for, I would say, about ten years, because when I learned about Bennett's Law, yes, I thought, hey, you know, I've lived in Madagascar. I certainly have seen people in a cross section of Malagasy society, right, certainly eat lots and lots of rice at the low end of the income scale, eat a lot more meat. So the guys that I was working with, the enumerators that were working with me on my, on my survey when I did my dissertation fieldwork. They they loved meat, right? Whenever we would go out as a team and I was footing the bill, those guys would go all in on meat. And they were very happy to eat, you know, like more than rice and greens. So I've seen that. And, you know, we see it in our own experience and again, in a time series sense of my grandparents and my parents and the way they were raised and the way they eat. And so that I asked myself, okay, but this is very interesting. It tells us what happened in the past from a development sense, living in a high income country. But quo vadis, right? What am I looking at for the future?

And so I've got an undergraduate student, a wonderfully talented young woman. And best of all, she is intellectually curious and she's driven, and she loves to think about food policy. But what she is doing is, using qualitative evidence to document what are the consumption patterns of people in this country, in the United States, across the income domain. And so my initial speculation — and she she doesn't have very firm results yet — we met yesterday for the, not for the first time, but for the first time she brought some qualitative results. But my expectation going in was exactly as you say, right as you get to a certain income level — and sorry for this very roundabout answer, it took a while to get here — but as you get to a certain income level, you start demanding different food. You start worrying about health aspects of the food you're consuming. Sure, Bennett's Law tells you that as you get rich, you're going to consume more animal sourced foods. And that's certainly true is true in what Eeshani, Katherina, and I find in our paper. But if you look at the data in the United States, for instance, you see that people consume a lot more fish and seafood, a lot plant, a lot more plant derived protein.

I mean, I am an example myself. A colleague is visiting here who is giving our Friday seminar and she is staying with us. And this morning I was making her coffee and I said, what do you want? We have regular milk, but we also have pea milk and almond milk because my wife likes to drink pea milk with her coffee and I drink almond milk, and we have dairy milk because that's what my daughter eats in her cereal and, you know, little kids should probably get dairy milk with all the enhancements and enrichments that it has. So yes, we certainly see that in the data, right? That as people get very wealthy, they will substitute away from this, away from kind of like straight up animal source protein and go towards vegetable or plant derived protein. And even within kind of animal source, they're going to look at fish and seafood more than anything. So you're entirely right.

Jeremy: Okay. Going going back to the poorer people and their demand for meat and animal protein, if it's kind of, if it's lower than may be expected, does that mean that fears about the impact of demand for animal protein on greenhouse gas emissions— so more livestock, more greenhouse gas emissions, more climate change — are those fears then exaggerated?

Marc: I hesitate to say that this is but one estimate. My sense if I were to go purely with our estimates, I would say yes. Maybe those fears are a little bit exaggerated. That doesn't mean that they're wrong, right? It just means that they are less than what we were expecting. That being said, the fact remains that income elasticity for a food demand for animal sourced foods remains positive. Which means that as countries that are on the lower to middle income scale develop, they are going to again, the sign is right, right? The sign is what people thought it was. And so as as the demand for food, as the demand for animal source protein goes up in low and middle income countries, something is going to have to give if we want — with the goal of climate — if we want to kind of hit those climate targets. And thus I think it is incumbent on high income countries to kind of examine their own consumption patterns, because where I have a problem as an economist and where I have a problem as a, you know, as a critical thinking citizen, is when I hear policymakers kind of look at those demand patterns and say, oh, well, people in low income countries are going to have to adjust their consumption and move away from ...

And there are a lot of people like that who will kind of lecture low and middle income countries and say, oh, you got to, don't do what we did, right? Do as I say, not as I did, which I find very hypocritical because there comes a stage of development where we are not working in offices, typing on computers all day. Right? People do physical work in the manufacturing sector or stuff that's not necessarily a services sector, where you need you need to grow strong and tall. And the way you do that is by consuming enough animal source protein. I'm not a nutritionist, but from what I know, you can get enough protein from plant derived foods. But from what I know, you don't get the nine necessary amino acids in plant derived proteins the way you get them as easily available in animal source foods. And so to deny that to billions of people when you're sitting pretty here in your ivory tower, I find this a little bit, you know ... It's not, you know, it's not just wrongheaded, it's also hypocritical.

Jeremy: Yeah. I mean, the Eat Lancet, the original Eat Lancet diet was a classic example of, oh, no, poor people mustn't eat meat. Nobody must eat meat. Anyway, leaving that aside, finally, in the paper, you actually say that increased income had a limited impact on food consumption and in turn, on nutritional well-being. But you also say that cash transfers are effective, and that's especially if you compare them to nutritional supplements and in-kind transfers. So, I'm a policy maker. What's your best advice?

Marc: I think ... So my best advice would be do ... Cash transfers are indeed effective right? They have, they hit several targets. We're looking at one slice of what those cash transfers do. And the good thing about cash transfers is that they're very straightforward. They are incredibly simple to administer. And so if you think about well what's cost effective, what's easy to do is ... Giving people cash is easy to do and then it gives them ... And this is where I may differ from many other policymakers or from many policymakers and other economists or other social scientists ... But I think when you give people cash, they will use it for what they think is best for them. And sure, you're going to have some collateral damage, like someone's going to use the cash to drink it, someone's going to use the cash for, you know, to buy cigarettes with it, to buy illicit drugs. That is not something you can fix. And that is something that, at any rate, as the development process occurs, you're going to see more and more of that. So I find the whole cash transfer argument to be very appealing. It's very administratively simple and it delivers results even if the

results are more humble, even if, or even if the estimates of the effects are more sobering than what you thought going in, as I did with this paper.

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