

Engel's Law

Rulon Pope

BYU Studies has a long history of publishing the annual lecture given by the recipient of the Karl G. Maeser Distinguished Faculty Lecturer Award, BYU's highest faculty honor. In past years the journal has published lectures given by such wide-ranging luminaries as Hugh W. Nibley, Arthur Henry King, Allen E. Bergin, L. Douglas Smoot, William A. Wilson, and Jerald S. Bradshaw. In addition, over half of the fifty recipients of this award have published other works of various kinds in BYU Studies. And so it is with great pleasure that BYU Studies Quarterly publishes this year's lecture by Dr. Rulon Pope of the BYU Economics Department, this year's Maeser Lecturer. His speech was delivered as a forum address on May 15, 2012, at Brigham Young University.

In 2007, *Time* magazine presented a photo essay from *Hungry Planet: What the World Eats* by Peter Menzel and Faith D'Aluisio.¹ It was beautifully photographed and depicted families from around the world and their expenditures on food. Though not a random sample, it is instructive to consider how food consumption varies throughout the world. For the United States, there is substantial variation in weekly food expenditures between the Revis household of North Carolina spending \$341.98, the Cavens from California spending \$159.18, and the Fernandez family from Texas consuming \$242.48. One notes that convenience or prepared foods are displayed prominently in the Revis family's food budget, while the Cavens' and the Fernandezes' expenditures suggest more intensive household production of food. Household size and composition and perhaps ethnicity seem to matter as well.

As to expenditures elsewhere around the world, it is interesting to look into these beautiful and beautifully photographed faces and the food they

eat. To mention a few, the weekly sums vary from \$5.03 by the Namgay family of Bhutan and \$25 by the Aboubakar family in Chad to \$500 per week consumed by the Melander family of Germany.

These extreme variations in expenditures on food arise from variations in income, prices, and preferences. Economists have spent at least two hundred years sorting out both conceptually and empirically how each of these contributes to the mosaic of variations across individuals and through time. In developed economies, many resources are spent collecting household consumption data. In the U.S., these data are typically the Consumer Expenditure Survey collected by the Bureau of Labor Statistics. The survey is intended to measure how the buying habits of Americans change over time. Today the survey consists of two components, an interview and a diary survey. Over 13,000 households respond to the diary survey alone. Agricultural economists study the demand for food. Agricultural economics, including some of my own work, often focuses on studying the demand for food as it relates to problems of world hunger.

A year after graduating from BYU in economics, I entered graduate school at Berkeley to study agricultural and resource economics. From my fellow students, I learned much about their intense desire to understand and alleviate poverty and malnutrition. In today's policy parlance, my fellow students were interested in contributing to "food security." As followers of Christ, we all wish for the well-being of the world's poor. Developed economies have their own version of food insecurity and programs to ameliorate suffering and malnutrition. Among many in the U.S. are food stamps, which are now called the Supplemental Nutritional Assistance Program (SNAP), and the National School Lunch program.

When I completed my graduate studies in 1976, the times seemed optimistic: the Green Revolution was well underway, improving crop yields in developing countries. Norman Borlaug had received widespread recognition, including the Nobel Peace Prize, for his contributions to the Green Revolution. Many graduates of my program at the time focused on Asia (often India) or Africa. Though extreme poverty reigned in these regions, solutions seemed possible if not rather imminent.

Now, many years later, I suspect that the majority of my graduate school colleagues are both pleased and distressed. Pleased that productivity increases and a focused concern have elevated the number of calories per capita available in the world from 2,435 kilocalories in 1974–76 to about 2,900 today (well above adequacy for men doing moderate activity). Furthermore, much of Asia has had strong economic growth, as illustrated by figure 1, which shows increases in Bangladesh, India, Indonesia, and Vietnam in real gross domestic product per capita, which is a measure of

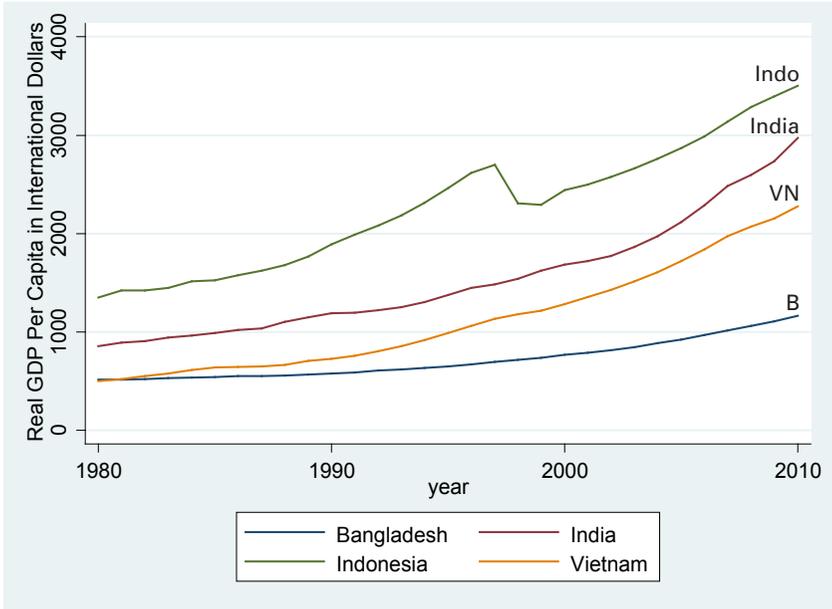


FIGURE 1. Source: Calculated from International Monetary Fund, Economic Outlook Database, September 2011. Available at <http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx>.

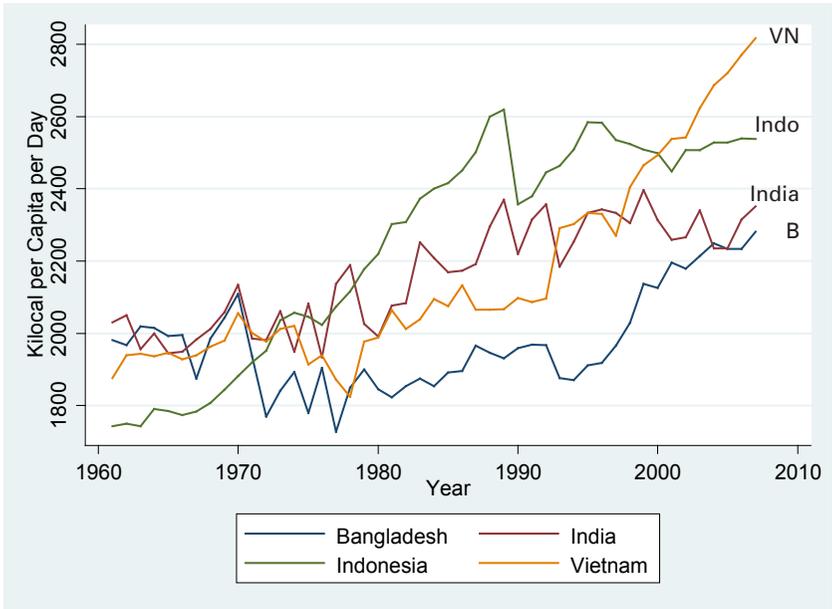


FIGURE 2. Source: Food and Agriculture Organization of the United Nations, Data and Tables. Available at <http://faostat.fao.org/site/609/default.aspx#ancor>.

income or output per person. This growth has led to increases in food availability in these countries (see figure 2) and, on average, a steady retreat from severe malnourishment. However, “more than three quarters of the population live in households with per capita calorie consumption below 2,100 per day in urban areas and 2,400 per day in rural areas—numbers that are often cited as ‘minimum requirements’ in India.”² Undernutrition levels in India remain higher than most countries of sub-Saharan Africa, a region where 30 percent of the population is hungry. Infant and child mortality rates are high in both sub-Saharan Africa and India.

The United Nation’s Food and Agriculture Organization estimates that there are 925 million people who currently suffer hunger or undernourishment. Indeed, the World Health Organization (WHO) estimates that hunger is the number one killer and threat to health in the world; consequently, WHO has as the first of its Millennium Development Goals for our century to “eradicate extreme poverty and hunger.”³ Adequate nutrition (food security) is surely the most essential component of well-being among the world’s poor.

One can view food insecurity as a production problem, which was the focus of the green revolution. As important and successful as it has been to increase agricultural yields (and hence to increase quantity and reduce prices), many now view the food problem primarily in terms of improving food distribution and economic growth. Landless rural and urban poor may not have sufficient claims on food even though a country has a net surplus of food. The arguments of Nobel Laureate Amartya Sen have been provocative but cogent. As the preface to his remarkable book on famine and poverty states: “The traditional analysis of famines concentrates on food supply. This is shown to be fundamentally defective—it is theoretically unsound, empirically inept, and dangerously misleading for policy. The author develops an alternative method of analysis—the ‘entitlement approach,’ which concentrates on ownership and exchange.”⁴ I interpret Sen’s conclusions on the food problem to mean that people command insufficient resources to purchase enough food. Indeed, it is useful to note that 80 percent of malnourished children come from countries with agricultural surpluses. Although inequality is clearly an important cause of malnourishment, it is apparent that the food security problem is in the long run largely a growth or income issue, with 98 percent of the world’s undernourished people coming from very poor developing countries where the hungry are the poorest among the poor.

For all net consumers of food (those who consume more than they produce), a large increase in food prices implies they will be much worse off. Indeed, in the Bengal famine of 1943, which killed millions of people in India and so shaped Sen’s work, it was likely not food production shortages

but insufficient means to purchase food that caused suffering and death. Food production was up compared to some nonfamine years, but fear of a shortage and market disruptions drove prices upward while wages were declining with widespread unemployment.⁵

Though I have done research on both the production and consumption of food, today for the remainder of my remarks I will emphasize food consumption or demand with a few simple conclusions. Demand is an old topic and demand for food is among the oldest, and I feared it may not make a suitable presentation today, but then I remembered a saying by Jack Handy of *Saturday Night Live* that seems only somewhat appropriate here at BYU: “When you die, if you get a choice between going to regular heaven or pie heaven, choose pie heaven. It might be a trick, but if it’s not, mmm boy.”

Budget Shares

Often budget shares are used to get a sense of the relative magnitude of various consumption categories. For food, this would be the share or percent of your budget or income spent on food. Figure 3 shows roughly what household annual expenditures and budget shares look like for an average U.S. household. Food (excluding tobacco and alcohol) is around 12.4 percent of the average household’s expenditures of \$49,638. Note that almost half of all food expenditures were for food consumed away from the home. This is a remarkable change during my lifetime. Let us turn to how these budget shares compare to people in other countries and times.

Consumption and Income—Engel’s Law

Ernst Engel, born in Dresden, was a businessman, actuary, and government statistician known throughout Germany. As chief of a newly minted statistical office, he became interested in economics, specifically in studying food demand. Though he examined households in other parts of Europe, table 1 shows the simple methods of analysis he used studying (averaging) 199 Belgian households with data provided by Edouard Ducpétiaux. The table shows across the first row decreasing shares of expenditures on food as income increases. The same representation in chart form is shown in figure 4. Though many of these broad classifications of consumption are seen to vary by income, Engel emphasized one result that is now known as Engel’s Law: “The poorer is a family, the greater is the proportion of the total outgo which must be used for food. . . . The proportion of the outgo used for food, other things being equal, is the best measure of the material standard of living of a population.”⁶

Where Does the Money Go?

The Department of Labor's latest survey provides a detailed look into how the average U.S. consumer unit spends their annual paycheck.

U.S. CONSUMER UNIT EXPENDITURES

Average annual expenditures and percent of total:

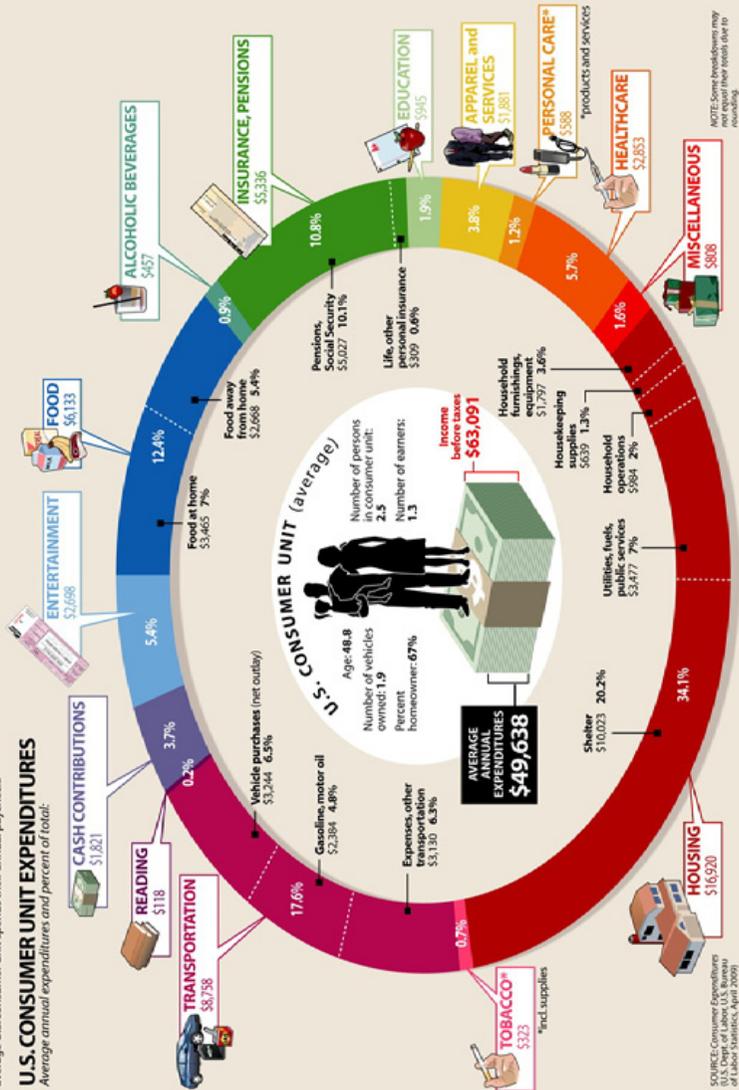


FIGURE 3. Source: <http://visualeconomics.creditloan.com/how-the-average-us-consumer-spends-their-paycheck/>.

Table 1. Percentage Composition of Belgian Workmen's Family Budget

Category of expenditure	Family type		
	1. On relief	2. Poor but Independent	3. Comfortable
Nourishment (<i>Nahrung</i>)	70.89	67.37	62.42
Clothing (<i>Kleidung</i>)	11.74	13.16	14.03
Housing (<i>Wohnung</i>)	8.72	8.33	9.04
Heating and lighting, etc. (<i>Heizung</i>)	5.63	5.51	5.41
Appliances and means for work, etc. (<i>Geräte</i>)	0.64	1.16	2.31
Intellectual education, etc. (<i>Erziehung</i>)	0.36	1.06	1.21
Public safety, etc. (<i>öffentliche Sicherheit</i>)	0.15	0.47	0.88
Health, recreation, self-maintenance, etc. (<i>Gesundheitspflege</i>)	1.68	2.78	4.30
Personal service (<i>Dienstleistungen</i>)	0.19	0.16	0.40
Total on all wants (<i>Bedürfnisse zusammen</i>)	100	100	100
Average income (francs)	565	797	1198
Average expenditure (francs)	679	845	1214
Minimum expenditure (francs)	370	440	541
Maximum expenditure (francs)	1256	1769	2823

Sources: Lines 1–10 from Ernst Engel, “Die Produktions- und Consumptionverhältnisse des Königreichs Sachsen,” *Zeitschrift des Statistischen Bureaus des Königlich Sächsischen Ministeriums des Innern* (1857), 27, table 6; lines 11–14 from G. Stigler, “The Early History of Empirical Studies of Consumer Behavior,” *The Journal of Political Economy* 62 (1954): 98, table 3.

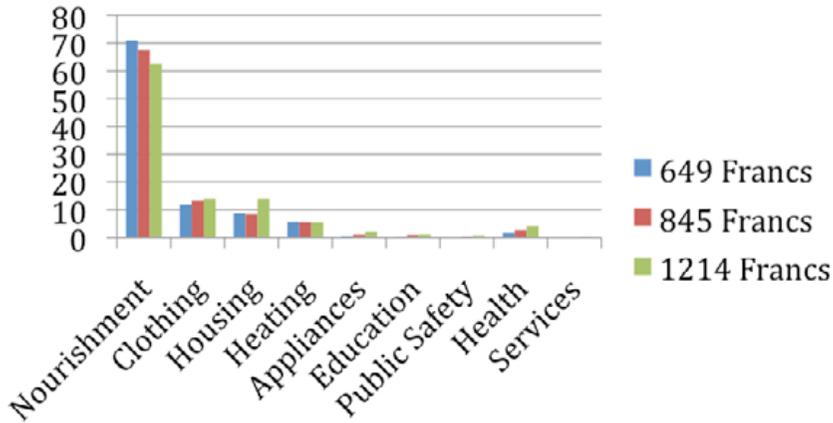


FIGURE 4.

Assuming prices are constant, Engel's Law can be depicted graphically in two equivalent ways. The first shows a declining budget share of food graphed against income on the horizontal axis (figure 5). The second shows a conventional Engel curve, which displays food consumption increasing, but rising less than proportionately to income, holding prices of goods fixed (figure 6).

Engel, having discovered the "law," exclaimed that Ducpétiaux and Frédéric Le Play (who provided a second data set) "had delivered the pearls but not the string," presumably meaning that the pearls were the data but the string was the analysis that illuminated or exhibited the pearls. Engel's Law is a wonderful example of the inductive method in economics. The intuitive and deep empirical regularity of Engel's Law is that the share of resources spent on food falls with increasing income.

Why had Engel emphasized food? Food then, as now, was a prominent and essential part of household budgets. There is some evidence he was concerned about the Malthusian conjecture about population and food: that "the power of population is indefinitely greater than the power in the earth to produce subsistence for man" and that mankind was destined to a life of subsistence living and misery.⁷ Based on his studies of food demand, Engel came to believe that household expenditures on food do not grow at the same geometrical rate as income. He envisioned a society where "resources could be dedicated to the production of other goods unrelated to food," as consistent with his empirical studies, that is, Engel's Law.

The impact of Engel's studies soon became apparent. On this side of the Atlantic, Wright in 1889 noted, "The remarkable harmony in the items of expenditure [between Massachusetts and Europe] shown by percentage

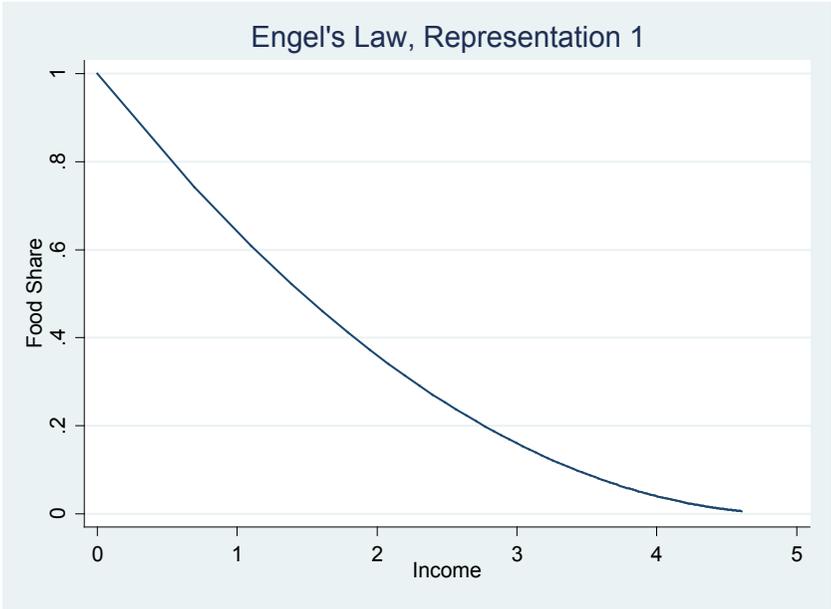


FIGURE 5.

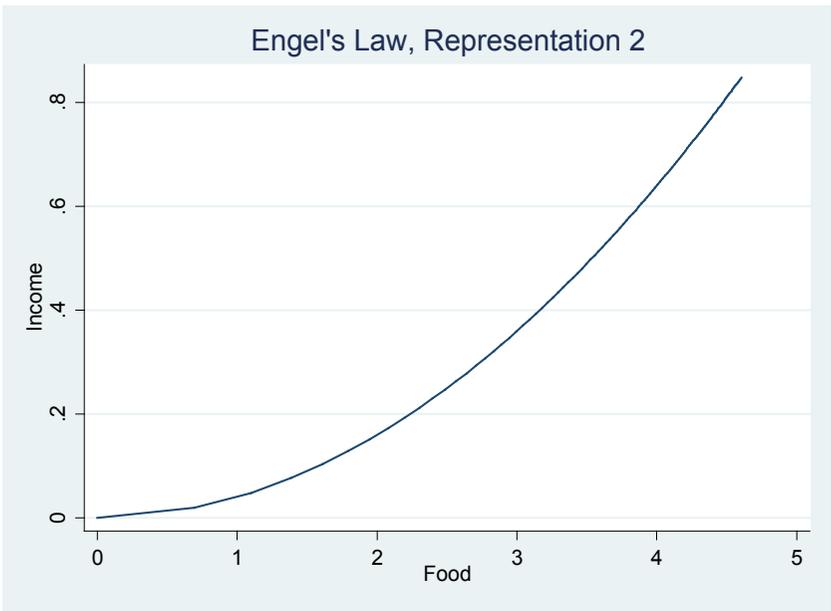


FIGURE 6.

of total expenditure must establish the soundness of the economic law propounded by Dr. Engel.”⁸ There have been accolades with each notable anniversary of Engel’s work. On the centenary of Engel’s publication, Hendrik Houthakker, a prominent Harvard economist, exclaimed, “Of all the empirical regularities observed in economic data, Engel’s Law is probably the best established.”⁹ And just recently there was a sesquicentennial paper lauding Engel’s accomplishment, showing the robustness of Engel’s conclusions across space and time.¹⁰

A few clarifying comments about taxonomy are helpful. Omnivores in the audience might relate to the two goods depicted in figure 7. When consumption of a good increases as income is increased, economists call this a “normal good.” When consumption of a good decreases as income is increased, economists call this an “inferior good.” Engel is arguing that food (nourishment) is a normal good but one whose budget share declines as people have more income or wealth. Economists call such goods “necessities.”

These are not inherent properties of goods but are descriptions of a person’s behavior as income changes. Ramen noodles may be a normal good for a missionary (he would buy more if he had a little more income), but postmission, after selling pest control or security services, he would likely consider ramen noodles an inferior good. That is, at higher income levels, consumption would fall with increasing income. However, if all food consumed behaves according to Engel’s Law, it will be normal throughout the income range and the proportion of one’s income (expenditures) spent on food will fall as one’s real income or purchasing power rises.

Though Engel’s analysis was about individuals or groups of individuals, is it useful to think about applications across countries? The World Bank conducted the International Comparison Project—the largest project of its kind to provide a coherent understanding of international consumption. The Economic Research Service of the U.S. Department of Agriculture has updated this study considering a broad grouping of consumption goods. Countries are classified into low, middle, and high income.

Looking down the first column of table 3, we can observe the kind of data consistent with Engel’s Law. Food expenditures, though higher in wealthy countries, have a much smaller budget share than in poor countries. There are other apparent differences between high-income and low-income countries. High-income countries have larger budget shares for housing, medical care, transportation, and recreation.

Another way of illustrating Engel’s Law is that a 1 percent increase in income should increase consumption of food by less than 1 percent. For countries in table 2, food demand is relatively more responsive to increases



FIGURE 7. Steak would be an example of a normal good, while a hot dog would be an inferior good.

Table 2. Income Elasticity of Food

<i>Country</i>	<i>Income Elasticity for Food</i>
Congo, Dem. Rep.	.85
India	.78
U.S.	.35

Source: USDA Economic Research Service, <http://www.ers.usda.gov/Data/InternationalFoodDemand>, Table 1.

Table 3. Own Price Elasticity, Major Consumption Groups

	<i>Food</i>	<i>Medical</i>	<i>Recreation</i>
Congo, Dem. Rep.	-.863	-1.145	-2.778
India	-.739	-1.170	-1.537
U.S.	-.297	-0.902	-0.930

Source: Updated to 2005 from Seale, Regmi, Bernstein, Economic Research Briefs, October 2003. See also: <http://www.ers.usda.gov/Data/InternationalFoodDemand/DataAndMethodology.htm>.

in income among the poorest of countries (such as the Democratic Republic of the Congo). One interprets these numbers as a 1 percent increase in income would lead to a .85 percent increase in consumption of food in the Democratic Republic of the Congo, .78 percent in India, and .35 percent in the U.S. All of these numbers are less than 1 percent and conform to Engel's Law.

Some Implications of Engel's Law

The implications of Engel's Law are truly profound.

1. *Engel's own finding that the food budget share predicts well-being implies that economic growth is a solution to the calorie- or nutrient-deficit problem.* If used with care, the budget share for food can be used to infer well-being, as Engel asserted.¹¹ Some countries use the food budget share at a point in time, calling it the Engel Coefficient, to measure well-being. In figure 8, convergence of the food budget shares between rural and urban residents of the Xinjiang region of China was used to argue that both groups had become equally well off. This created a flurry of protests, and eventually bloggers began considering whether prices of goods were similar, rural and urban, which is a key issue.

As an aside, many countries use the Engel Coefficient to set national poverty lines. The most common method is to divide the cost of a nutritionally adequate diet by the Engel Coefficient.¹²

2. *Though the law implies that demand for food in a household or a country will rise as incomes rise, it tends to imply that the entire agricultural sector falls as a percent of economic activity as a country grows, because income shares going to food fall with growth.* Increases in farm productivity will often tend to reinforce this conclusion. Suggestive data for this conclusion are that the farm's share of workers in the U.S. fell from 41 percent in 1900 to less than 2 percent a century later, and farm share of GDP fell from 8 percent in 1930 to less than 1 percent in 2002. China has seen a breathtaking change in that most labor was in agriculture in 1960 (about 80 percent) and today is less than half that amount. South Korea is even more striking, with 61 percent labor in agriculture in 1961 and 7.2 percent today. Indeed, one of the significant differences between developed and developing economies is the proportion of the labor force in agriculture. Engel's Law (and labor substitution) means that economic growth will tend to create an exodus of employment from agriculture to other sectors.

3. *For poor countries, having a vibrant agricultural sector will be relatively more important, because agriculture will be a large proportion of the economy.* This conclusion has led international economic organizations like

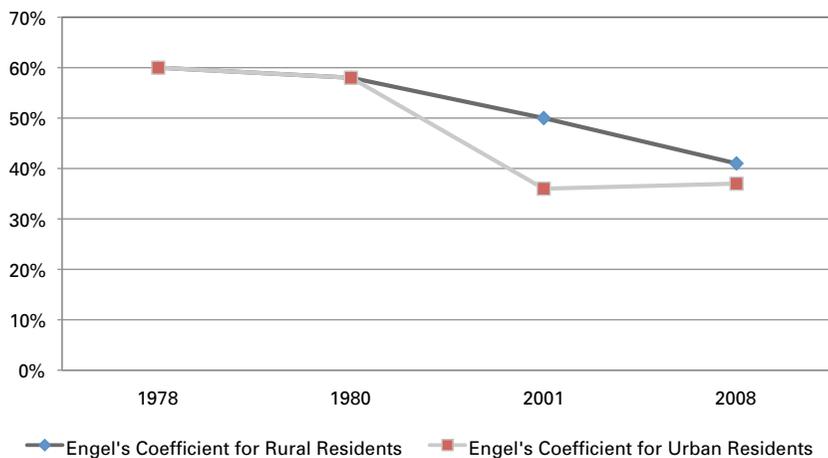


FIGURE 8. Engel's Coefficient for Xinjiang Residents. *Source:* "Development and Progress in Xinjiang," Gov.cn—Chinese Government's Official Web Portal, 2009, http://english.gov.cn/official/2009-09/21/content_1422566.htm.

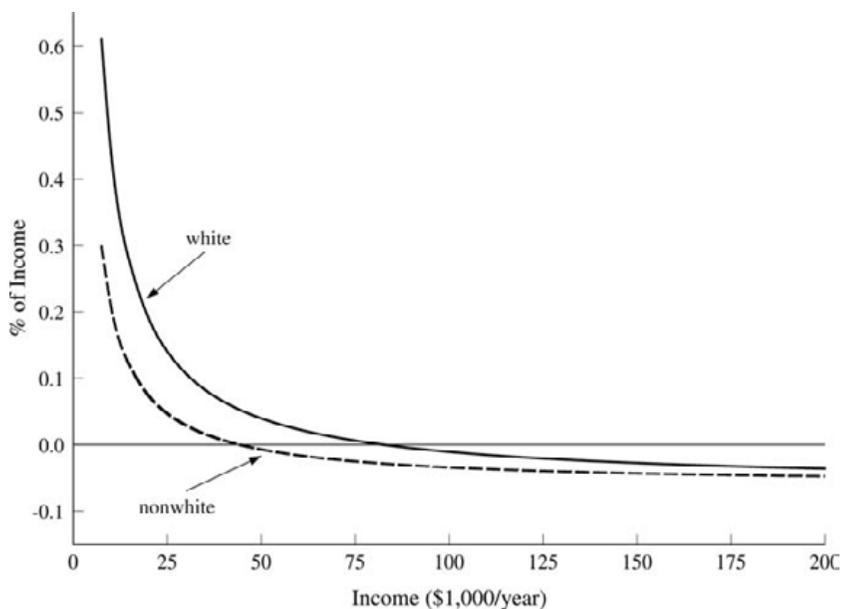


FIGURE 9. *Source:* Hayley Chouinard, David E. Davis, Jeffrey LaFrance, and Jeffrey M. Perloff, "Milk Marketing Orders: Who Wins and Who Loses?" *Choices: The Magazine of Food, Farm, and Resource Issues* 25, no. 2 (2010).

the World Bank to focus more on the development of agricultural markets in recent times as opposed to strategies aimed at development of manufacturing for export.¹³

4. *Policies or market events that raise agricultural prices will tend to have a disproportionately large impact on the poor who are net food consumers compared to the rich, because food is a large portion of their budget.* This implies that policies intended to raise agricultural prices will reduce real incomes proportionately more for the poor than for wealthy individuals. For example, policies intended to raise the price of milk, as the U.S. has, will be regressive in that the poor will suffer proportionately more than the wealthy.¹⁴

Figure 9 shows how the regulatory burden (diminishment of well-being) of the U.S. dairy program disproportionately falls on the poor on the left side of the graph.

5. *The finding by a nineteenth-century lawyer, mathematician, and dabbler in economics, Eugene Slutsky, is significant.* In 1915, he developed a now famous calculus equation that is taught to every major in economics. It predicts that goods with larger budget shares and larger responses to higher incomes will tend to be more price responsive (other things equal). That is, Engel's Law implies that the poor will be more sensitive to price changes of food than the wealthy.

As is clear from table 3, food demand is more responsive to price changes for the poor compared to the rich. That is, a 1 percent increase in the price of food will elicit a .86 percent reduction in food consumption in the Democratic Republic of the Congo, .74 percent in India, but only a .3 percent reduction in the U.S. Thus, when there is a commodity price boom, the poor will, in percentage terms, substantially shift consumption away from food because their purchasing power is severely eroded, whereas the rich will be impacted less and be less responsive.

A recent BBC report that began, "A year of record food prices has forced millions of parents in the developing world to cut back on food for their children, says aid agency Save the Children,"¹⁵ tells of the kind of hardship that occurs for net demanders of food when food prices rise.

You might ask, "How will the poor reduce their food consumption?" This might entail consuming fewer meals, fewer calories, or less expensive calories, perhaps leading to severe malnutrition. Hence, combining with the earlier point, the poor will be particularly impacted by price changes.

Though Engel's Law is so remarkably simple, it might appear that all of the questions were long ago settled regarding its validity and procedures to estimate Engel curves. It depends on what one means by long ago and what one means by settled. I will briefly cover a few additional points to clarify and explain the research journey.

The Hard-Fought Wars to Clarify and Measure

Refining Engel's Law raises the questions: What is held fixed as income varies to create the Engel curve? Does it apply to each individual, countries, or other aggregates? Should income, total expenditure, wealth, or some other measure of consumer resources be used in the calculation in the denominator of the budget share? These and a host of other issues have been systematically investigated, with most of them reasonably resolved.

Briefly, Engel's Law is a statistical relationship best stated as follows: *The expected or average budget share falls with increases in income, holding other things such as prices, education, age, family composition, risk, and other demographic variables constant.* Therefore, Engel's Law does not mean that a family with six children and \$50,000 of annual income will have a lower budget share for food than a family of two with \$40,000 income. Indeed, changes in demographic variables alter the Engel curve as shown in figure 10. Larger family sizes increase food consumption for a given income. Also, it is known that during the human life cycle, consumption expenditures change, even when all of the usual demographic variables and income are held constant, as shown in figure 11. Budget shares for food rise and then fall with age, producing a curve with an inverted U shape. During the life cycle, expenditures in total, expenditures on food, and budget shares rise during mid-life.

One can use straightforward methods to make a correct and consistent statement of Engel's Law for an individual, a household, a state, or a country.¹⁶ Indeed, at a point using country budget shares and income across the world, one will find Engel's Law evident. However, over time, changes in the distribution of income within a country will potentially shift the country's Engel curve.¹⁷

Though the household is usually the unit of analysis, there is relatively new research on what is called a nonunitary view of consumption. For developed economies, three regularities seem prominent: first, interhousehold inequality of incomes has risen; second, the inequality of consumption among households has had a much less dramatic rise; and, third, intra-household inequality of earnings has fallen as more women have entered the labor market, but inequality of consumption is likely more than indicated by the proportion of household earnings earned by women.¹⁸ A number of research papers have shown that changes in female income as a percent of total household income alters food consumption.¹⁹

In terms of explaining consumption by income, it is likely best to include all of the resources available for consumption as income. Borrowing against future income is often possible. Further, future income includes expected

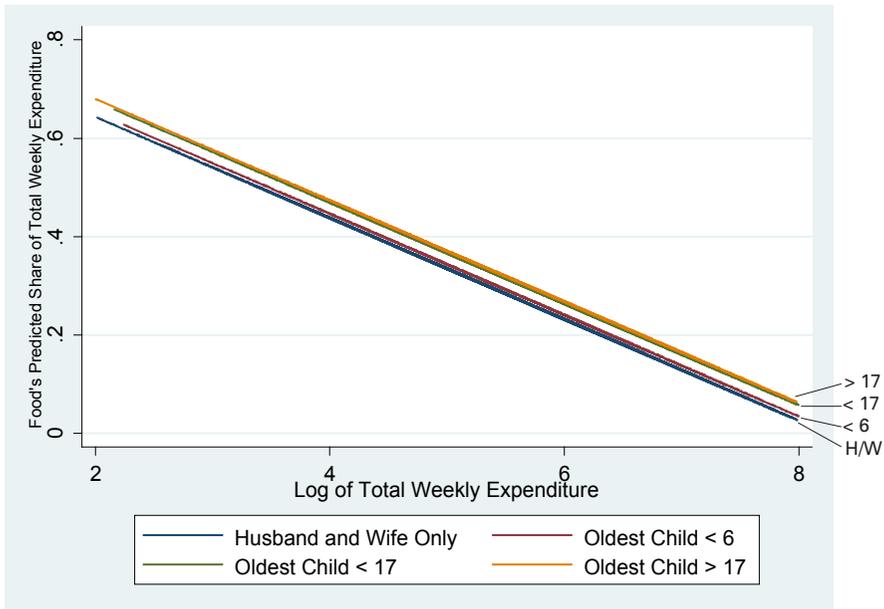


FIGURE 10. Source: Consumer Expenditure Survey 2010, provided by ICPSR.

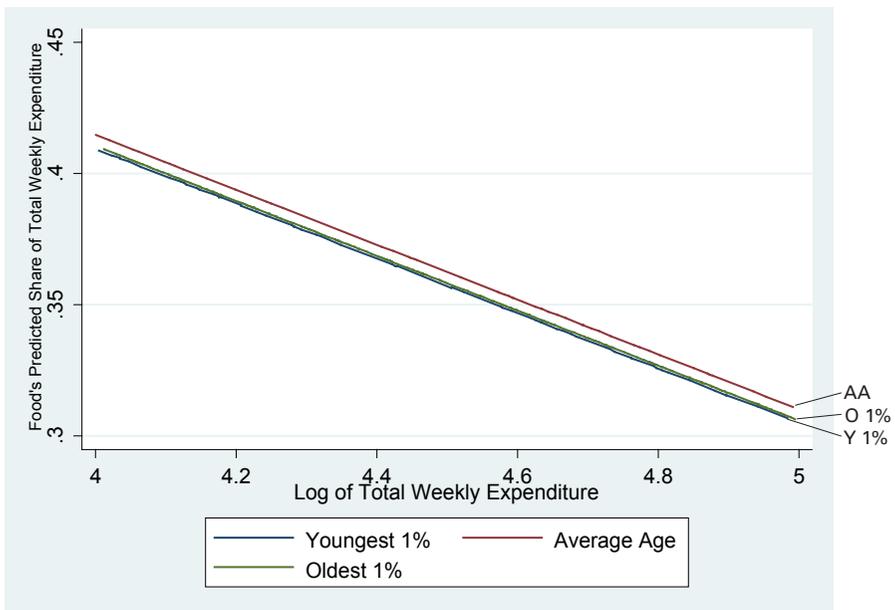


FIGURE 11. Source: Consumer Expenditure Survey 2010, provided by ICPSR.

future earned income and the income flow from assets. However, since the future is uncertain, it is sometimes argued that current total expenditure is superior to current income because these expenditures account for a household's expectations of future income. Using total consumption expenditures also obviates the need to consider taxes as well. For those who are credit constrained (consuming only out of cash on hand), it might be very appropriate to use current income at one's disposal as the denominator of the budget share.²⁰

Newer Frontiers

First, economists have verified that, separately, food consumption at home and food consumption away from home are consistent with Engel's Law.²¹ When one considers that leisure is a normal good and that the relative cost of preparing food at home is increasing, it is unsurprising that the proportion of food expenditures that are away from home has grown strikingly in the last four decades to almost half of all food expenditures. This no doubt explains some of the variations in the types of food and also total food expenditures seen among households at the beginning of this presentation. There is a normative side to these changing consumption patterns, because of the concern that food consumed away from home is on average less healthy.²²

Second, one of the significant challenges to Engel's Law actually emerges from researching poverty traps and trying to answer the question, why do people remain poor? One version is called the nutritional poverty trap. The argument goes that the poor, if they received additional income, would wish to spend as much as possible on food, thus increasing the budget share because this would cause them to be stronger and enhance their ability to work in the future, thus increasing future income. To exemplify, a family spending 70 percent of their budget on food might spend 100 percent of an income increase on food, increasing the budget share for food and violating Engel's Law. Some have used this argument to advance short-term food interventions with the hope of elevating nutrition and, hence, future income.

A great body of evidence supports the idea that better nutrition will increase productivity (this may be true for most of the world's population). What is not clear is whether people will choose better nutrition and whether they can escape poverty. Women working in Chinese cotton mills were able to do 14 percent more work for each 10-gram increase in their hemoglobin.²³ Sugar cane cutters were found to reduce work capacity by 50 percent if they were undernourished.²⁴ A very impressive study of small farms in Sierra

Leone found that a 50 percent increase in calories per person was associated with a 16.5 percent increase in farm output. For those with consumption of fewer than 1,500 calories per person per day, the increase was even higher, at 25 percent.²⁵ In 1995, the World Development Report estimated that stunting (small stature) causes an economic loss of \$8.7 billion per year and that a 1 percent increase in height is associated with a wage increase of 1.38 percent.²⁶ Indeed, large increases in food consumption (among other reasons) in Europe and the U.S. explain the increase in labor capacity and subsequent incomes, as documented by Robert Fogel. Fogel estimates that in Europe during the eighteenth and early nineteenth centuries, 20 percent of the potential labor force was excluded from the work force because of poor diet.²⁷ A great deal of additional evidence has been amassed on the importance of nutrition on earnings and other indicators of well-being.²⁸ It is well known that malnutrition can have long and lasting effects. Perhaps one of the most sobering findings from this literature is recorded in a study of Zimbabwe. Alderman, Hoddinott, and Kinsey, after studying the impact of drought on those born in the early 1980s, concluded conservatively that the drought and the accompanying “loss of stature, schooling and potential work experience results in a loss of lifetime earnings of 7–12 percent.”²⁹

Given available evidence, Indian diets still conform to Engel’s Law. There is some puzzling evidence that Engel curves for calories have fallen over time. This indicates that fewer calories are purchased for a given total expenditure. This can occur because people are substituting more expensive calories or are consuming fewer calories because the rigors of manual work have diminished.³⁰ There is accumulating evidence about whether other populations are in a nutritional poverty trap. Kedir and Girma, studying Ethiopian Urban Households, found that food budget share increases with income for the very poor. Budget shares for food began to decline with the thirty-fifth to forty-seventh percentiles of the total expenditure distribution.³¹ Clearly, more and better data and analysis are needed to settle the matter. However, Banerjee and Dufflo, the economists who likely have investigated the matter more than others, are hesitant to conclude that there is a poverty trap or that income (nutrition) shocks can lead to an escape from poverty.³²

Third, an area of interest to me is the effect of uncertainty on food demand. Not only expected wealth but also wealth risk is an important determinant of consumption. Therefore, it is not just what one expects future labor income and housing and other investments are going to be worth, but the entire distribution (chances of each scenario occurring) of future income and income from wealth. The 2008 downturn may provide the basis for an empirical strategy to identify these effects. Recall

that employment was substantially at risk, wealth values were uncertain, and a number of grocery stores went out of business during this time.³³ It is well known that expected wealth in the future affects demand.³⁴ It is becoming more clear that the variability or uncertainty about future wealth affects consumption as well.³⁵ To the extent that this variability affects food demand, one might call this effect the precautionary motive for food consumption. As counseled by Church leaders, we may stock up on food items and liquid wealth (cash) to deal with contingencies. Thus, increased uncertainty may temporarily increase food purchases in order to prepare for the vagaries of life. Nearly every natural disaster is accompanied by “runs on grocery stores” by the imprudent and ready storage of food by the prudent. However, prudent behavior is also to be self-reliant, frugal, and flexible—being able to adapt our consumption behavior to our economic circumstances. If a family is uncertain about the future, then purchases in the short run may increase as stocks of food are expanded, but consumption of food will diminish because of the uncertain future. LDS Church leaders have emphasized these and other behaviors as wise, usually stressing that one should plan for eventualities and be prepared for them. Note that on the Church’s Self-Reliance and Family Well-Being website,³⁶ the four main link headings are “Preparing for Emergencies,” “Finances,” “Home Storage,” and “Becoming Provident Providers”—with the latter discussing the idea of “discerning between needs and wants.” Therefore, one expects that prudent consumers would eventually reduce consumption of food during a downturn, because expected wealth diminishes and wealth at risk rises. A number of anecdotal headlines during the last four years suggest that this has occurred, and, more importantly, in recent Consumer Expenditure Survey data, there seems to be some preliminary evidence that this prudent counsel is consistent with behavior. In particular, the level and composition of food consumed away from the home changed so that more modest expenditures resulted.

Conclusions

Since Engel, economists have struggled to improve concepts, data, and procedures for estimating Engel curves. Engel’s Law remains intact after these 150 years of study. However, economists today are not likely to respond, as did the jubilant Engel, that we have found the string (Engel’s Law) which illuminates the pearls (the data). We can always wish for more. Perhaps, congruent with economics being the dismal science, one recent expert commented, “Engel curve and demand function models still fail to explain most of the observed variation in individual [household] consumption

behavior.”³⁷ As long as individual tastes are not observed directly, then we are destined to miss some of the richness of behavioral responses to more income. Yet, it is clear, Engel was really onto something important for understanding our changing world.

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