

Meat Demand – The Big Picture

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6/22/09

Every day billions of us make decisions on what we will buy, and how much of each item. Those decisions are tempered by how much money we have to spend, the relative prices of the goods and services available to us, and our individual preferences. Our preferences are probably more determined by social norms and habit than we would like to admit, and do vary greatly by country.

Meat demand around the world is no different than any other good. Depending on a wide variety of local conditions there are significant differences in meat diets at any point in time. For example, in Australia, Brazil, Argentina and the U.S. we observe that beef has a much larger share of the diet than in Europe or China. The major reason is that beef consuming countries need large areas of land suitable for grazing a beef cow herd. China and Europe are crowded places, with limited land available for extensive grazing systems. So, in Europe and China pork and poultry make up the vast majority of the meat diet.

When we look at total meat produced and consumed over time the spatial differences at a point in time tend not to matter. What does matter though is total income and resulting total consumer buying power. Funds available for consumer spending have driven almost all the growth in meat demand since at least 1961 (and probably before that if the data were available).

The relationship between total consumer buying power and total meat production is one of the most remarkably consistent in all of agricultural economics. The results of a simple regression between consumer spending and total meat consumption is shown below:

<i>Variable</i>	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>
Intercept	12.618	0.8204	15.38
Consumer Expenditures (2000 US\$Trill.)	8.994	.04607	195.3

Goodness of fit:

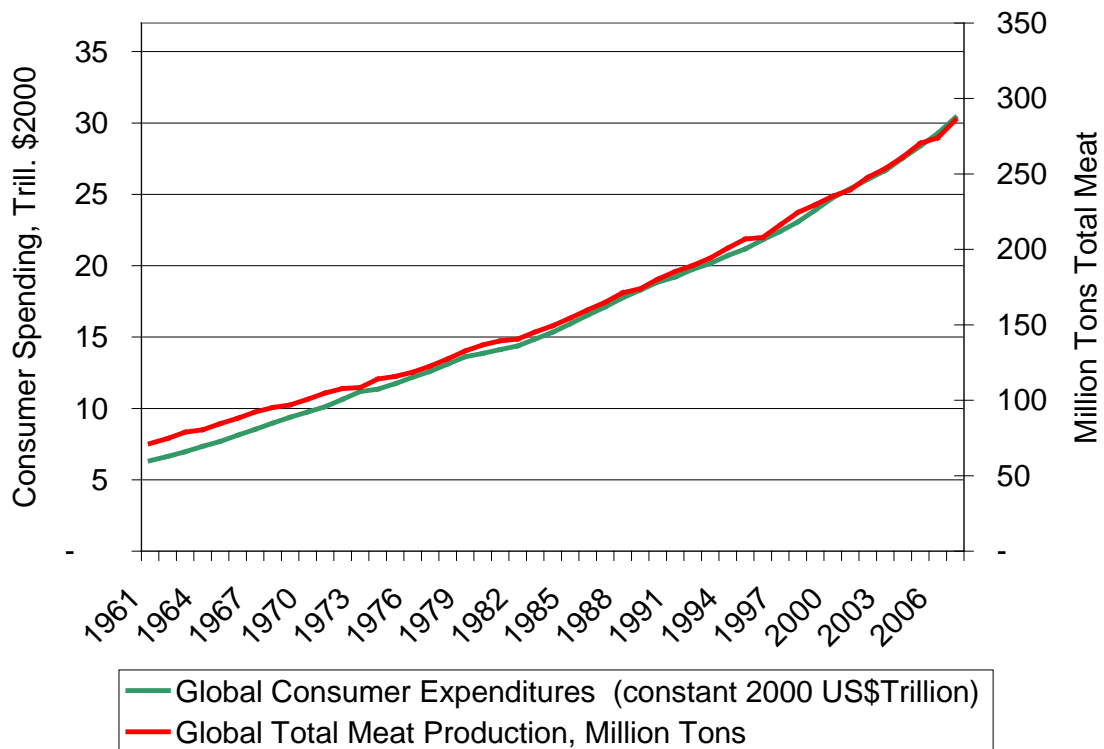
Multiple R	0.9994
R Square	0.9988
Adjusted R Square	0.9988
Standard Error	2.145
Observations	47

Where:

Y = Total global meat production from FAO, FAOSTAT database, 1961-2007

Consumer Expenditures = Global final consumption expenditures, \$2000, from the World Bank, World Development Indicators database, 1961-2007

Graphically, the relationship between the variables appears below. The statistical fit is not quite as good in the 1960s as it was in later years, but the overall pattern is still quite consistent.



Several functional forms, including logarithms and exponential, were tried. The simple linear form had the best statistical fit and least amount of autocorrelation.

At the data means the elasticity of production to a change in expenditures is 0.91. That is, a 1% increase in expenditures results in a 0.91% increase in meat production (the elasticity from a natural log functional form was also about 0.90). The coefficient for expenditures indicates that a \$1 trillion increase in \$2000 expenditures results in about a 9 million ton increase in total global meat production.

Not included as a separate variable, but also of critical importance, is global population. From 1961 to 2007 population more than doubled. All else equal, that factor alone should have doubled meat demand. Looking forward, the rate of population increase is expected to slowly decline over the next 40 years.

Slower population growth will slow the rate of increase in global total real income and consumer spending. Thus we should expect some slowing in the rate of increase in meat demand and production.

The equation tells us several things about 1961-2007. There is a strong and consistent pattern of globally increasing real incomes that drove real consumption spending, and that drove meat demand, and then production. The relationship has been consistent enough to tell us that the preference for spending for meat has been strongly ingrained for the almost 50 years of available data. Despite some news about increasing societal preferences for avoiding meat consumption there has been no measurable change in global meat spending behavior.

Another pattern seen around the world is that as economies reach higher levels of real income and spending the demand for meat tends to respond less to increases in real income. Market saturation may have an effect on future responses to increases in real income on a global scale, but there is no sign of any weakness in that response through 2007. Outside of the richest countries of the world there are still well over 5 billion middle and low income people who would very likely increase meat consumption if they had more income. Population growth in low income countries also tends to be higher than the global average.

It is implied by the equation that future gains in the volume of meat produced in the world will depend almost entirely on demand increases driven by increased incomes and spending. However, one significant item that has not been statistically significant, meat prices, could derail this relationship, at least temporarily.

In fact, the astute reader should have already asked: "But what about meat prices, don't they matter too?" The answer is yes, they do. But from 1961 to 2007 prices on a global scale did not vary enough to disturb what consumers do with their meat spending habits.

Looking forward from 2009 we are seeing, on a global scale, real costs of meat production coming from grains and oilseeds markets that appear to have quickly moved to new price plateaus. Those higher costs are in the process of being passed through as higher real retail meat prices. Will those price increases be enough to cause a permanent change in consumer behavior? History would argue that we might not see a significant effect.

We saw this same thing happen in the 1961-2007 data used in the regression. From 1972 to 1976 there was a similar step-up in real feed costs and real meat prices. If you look closely at the chart 1973 global meat production did actually fall below the long term trend, but then recovered in 1974-1975. Increases in real income overcame real price increases, and the long term trend resumed.

Prices do matter in other important ways. The relative prices of meats have had an important effect on the global market shares of the major meats. Beef, generally the most expensive meat to produce, has seen its global share fall. Chicken meat, the least expensive of the major meats, has seen major global share increases since 1961.

Prices also matter enormously on the scale of short time periods and individual country and species markets. Here in the U.S. we are currently seeing a price-cost squeeze coupled with a decline in real consumer spending that is leading a significant reduction in total meat production. However, if history and the regression results above mean anything at all, when the global and U.S. economy begins its recovery meat demand will resume its long term growth path.

Market-driven price signals are also essential in determining decisions all the way down to the level of how producers process and market individual meat cuts. At an a very low level of granularity price signals can determine, for example, whether chicken leg quarters are deboned, exported, or sold in the fresh market. These decisions are critical to producer profitability and to supplying consumers with the optimal mix of the many products that can potentially be made from a live animal of any species.

Finally, freely moving, market-driven, prices are a major driving force behind the long term growth of global meat production and consumption. Prices are the signaling mechanism that, at a very low level in time and space, efficiently tell producers what to produce and consumers what to buy. Market prices are the mechanism through which we can approach an efficient and optimal product mix that simultaneously avoids waste, gives consumers the products they want, and allows producers to earn a profit. Paradoxically, at a very low level, prices are almost all that matter.