

# Updated Overview of KSU Domestic Meat Demand Indices

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This short document provides an overview of how updated domestic meat demand indices maintained at KSU are created. A brief overview of past related work and associated history is followed by a procedural update to document the current approach employed. This fact sheet then ends with an outline of the procedure now being applied, along with a list of sources used as data and inputs.

Perhaps the first meat-livestock focused academic to “notably elevate awareness” that demand differs from consumption was Dr. Wayne Purcell (former faculty at Virginia Tech University). Dr. Purcell’s “*A Primer on Beef Demand*” is now a classic resource to which I often start associated history lessons. Dr. Purcell certainly deserves credit for notable heavy-lifting in the 1980s and 90s aiding the beef-cattle industry during a period of substantial demand challenges. Thereafter Dr. Jim Mintert (former faculty at both Kansas State University and more recently Purdue University) largely carried the torch supporting related meat demand resources maintained at Kansas State University. More recently, I have attempted to aid in monitoring meat demand and associated education efforts; ultimately desiring to increase economic viability from improved understanding consistent with my interpretation of the land-grant university mission.

Across this multi-decade history there have been several evolutions both in the data and information available to analysts as well as how analysts have examined changes in meat demand. This evolution can be expected (and hopefully encouraged) to continue. The last fact sheet (Tonsor, 2019) composed on this topic and posted to AgManager.info was dated May 2019 following research with Drs. Anton Bekkerman and Gary Brester (Montana State University faculty at the time). In short, the approach as applied during the May 2019 – April 2026 period was based on a ratio of observed (or more accurately stated, estimated) and expected (given observed prices and no demand change) quantities.

Fast forwarding to 2026 and I have had extended discussions with Dustin Aherin on related methodological matters. Dustin astutely recognized that the past approach to deriving expected (given no demand change) quantities was sensitive to the base index period selected. Ultimately, resulting assessment led to updating procedures that are now employed to indices maintained on AgManager.info.

To document clearly, the indices employed continue to compare observed (more accurately, estimated) quantities with quantities we would expect to observe if demand did not change (given observed changes in inflation-adjusted prices). The approach employed beginning here in July 2026 can be written as:

$$Index = \frac{Q_t^{Observed}}{Q_t^{Expected}} * 100 = \left[ \frac{Q_t^{Observed}}{Q_0^{Observed} * \left\{ \left[ 1 + \left( \frac{P_t^{Observed} - P_0^{Observed}}{P_0^{Observed}} \right) \right]^{\left( \frac{\% \Delta Q}{\% \Delta P} \right)} \right\}} \right] * 100$$

where  $Q_t$  is per capita quantity at time  $t$ ,  $P_t$  is inflation-adjusted price at time  $t$ , *Observed* is estimated or observed, *Expected* is expected quantity given no demand change. The primary adjustment here is how the  $\frac{\% \Delta Q}{\% \Delta P}$  term enters as an exponent to account for the constant proportional relationship of  $\frac{\% \Delta Q}{\% \Delta P}$ . Because price elasticity of demand ( $\frac{\% \Delta Q}{\% \Delta P}$ ) is defined as the percentage change in quantity per a *very small* percentage change in price, expected  $Q_t$  in the newly employed approach accounts for the compounding effect of multiple percentage changes in  $Q$  resulting from multiple very small percentage changes in  $P$ , like the concept of compound interest. A key benefit of this adjustment is that selection of the index's base period (Jan. 1988 in current AgManager maintained indices) no longer impacts month-over-month and year-over-year demand change conclusions.

To form the demand indices, information is needed on the U.S population, domestic production, imports, exports, and cold storage to derive an estimate of per capita disappearance which is used to approximate observed consumption. Furthermore, we need nominal retail prices, consumer price indices for deflating nominal prices, and price elasticity estimates. To be transparent in how the indices are created here we provide a summary of the sources underlying our creation of demand indices:

- U.S. population is obtained from the St. Louis Federal Reserve.
- Commercial production (pounds) is obtained from the Livestock Marketing Information Center ("catsltr.xls", "hogsltr.xls", and "PoultrySlaughterProduction.xls" spreadsheets).
- Meat import and export quantities (pounds carcass weight equivalent) is obtained from the Livestock Marketing Information Center ("MonthlyTrade.xls" spreadsheet).
  - This data is available beginning in 1988 so that is when our demand indices begin.

- Cold storage quantities (pounds) is obtained from the Livestock Marketing Information Center ("Totcdstg.xls" spreadsheet).
- Nominal retail meat prices (cents/lb) are obtained from the Livestock Marketing Information Center ("RETMT.xls" spreadsheet).
- Consumer price indices (1982-1984=100) are obtained from the Livestock Marketing Information Center ("CPI.xls" spreadsheet).
- Estimates of own-price elasticities are used from the models provided by Tonsor, Lusk, and Schroeder (2018). In particular, the own-price elasticity estimates of -0.479, -0.307, and -0.339 are used for beef, pork, and chicken demand indices.

It is further worth noting that several of these individual data series are updated over time or may be released initially as preliminary estimates to subsequently be replaced with "final" estimates following revisions. Accordingly, initial demand index values may be updated as input-data are modified.

## References

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