Using ERS Food Price Forecasts to Estimate Food Expenditures for American Households

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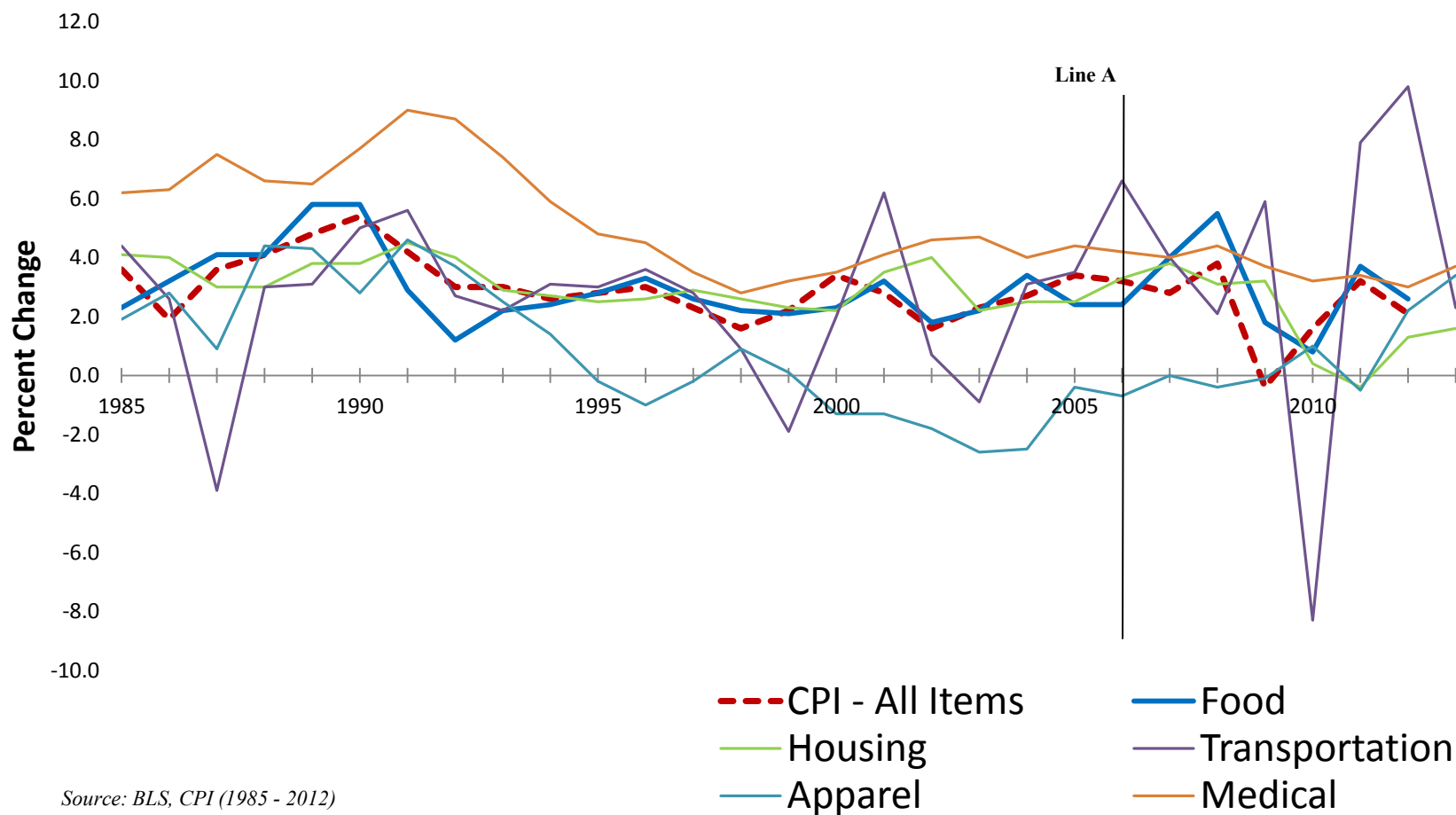
Agenda

- Introduction

- Overview of retail food price inflation

- Forecasting methodology

- Application of forecast

- Concluding remarks

Understanding Food Price Inflation

- The average share of income spent on food in 2012 was 12.8% according to the BLS' Consumer Expenditure Survey (CE)

- Retail food prices have been volatile for the past 6 years

- Retail food prices have increased more relative to other CPI categories
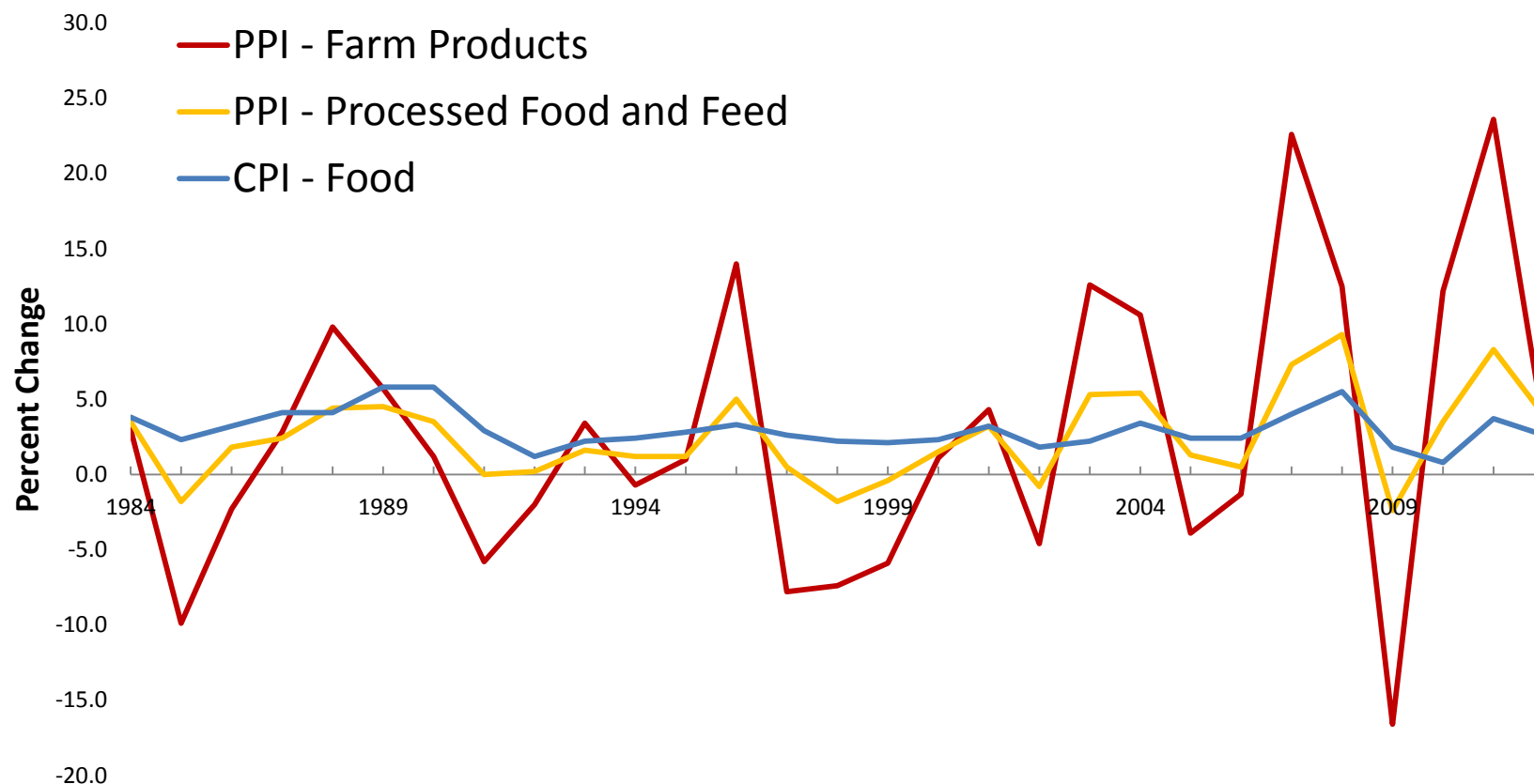
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12-Month Percent Change in CPI Over Time By Category

Source: BLS, CPI (1985 - 2012)

Legend:
- CPI - All Items
- Food
- Housing
- Transportation
- Apparel
- Medical

Line A

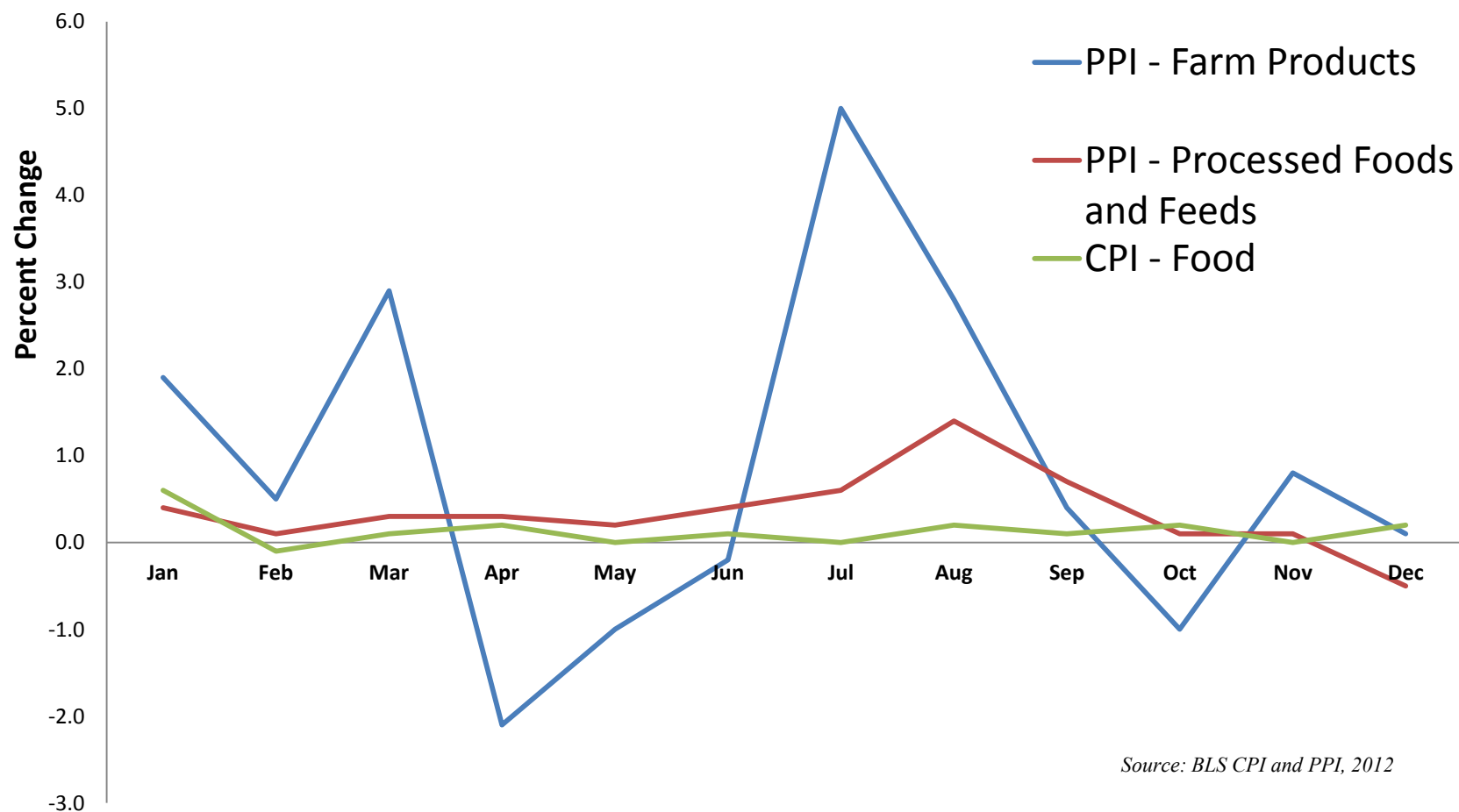# Price Transmission Pathway From Farm to Retail

- Price transmission refers to the measurement of the effect of prices in one market on prices in another market

- Food prices are affected by commodity prices, fuel prices, and surging global demand

- Timing and magnitude of price transmission between the stages of production varies

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12-Month Percent Change in Price
By Stage of Production

Legend:
- PPI - Farm Products
- PPI - Processed Food and Feed
- CPI - Food

Y-axis (Percent Change): 30.0, 25.0, 20.0, 15.0, 10.0, 5.0, 0.0, -5.0, -10.0, -15.0, -20.0

X-axis: 1984, 1989, 1994, 1999, 2004, 2009

Source: BLS PPI and CPI Data , 1984 - 2012

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Monthly Percentage Change, 2012
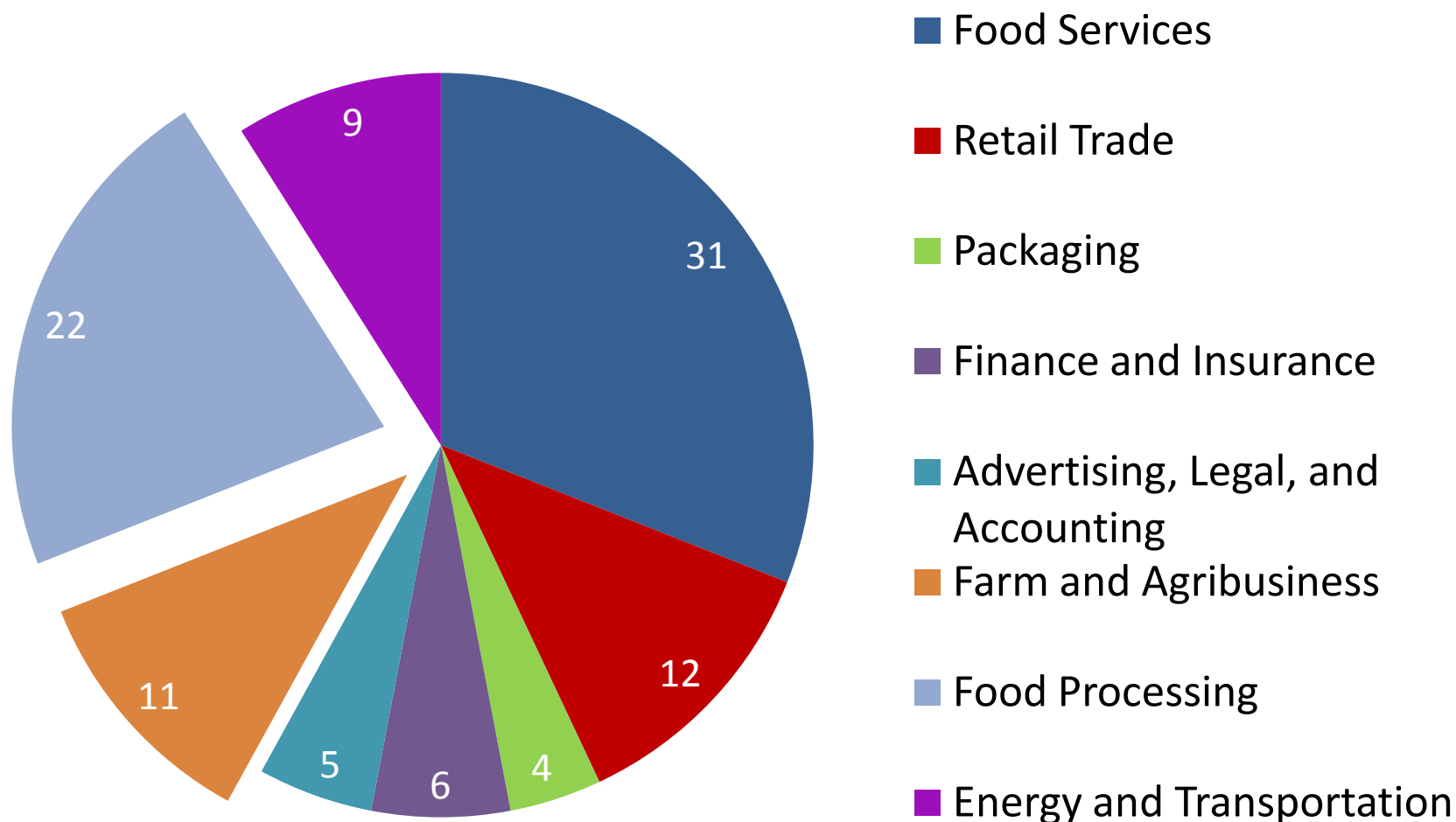

Source: BLS CPI and PPI, 2012

Effect of Input Prices on the Stages of Production

Many input factors contribute to prices paid for food in the supermarket

- 11 cents on the retail food dollar goes directly to the farm through the sale of commodities

- Food processing accounts for another 22 cents on the dollar

- Transportation and retail costs also play a role

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Where a Dollar Spent on Food Goes

Legend:
- Food Services
- Retail Trade
- Packaging
- Finance and Insurance
- Advertising, Legal, and Accounting
- Farm and Agribusiness
- Food Processing
- Energy and Transportation

Pie chart values: 31, 12, 4, 6, 5, 11, 22, 9

Source: ERS Food Dollar Series, 2011

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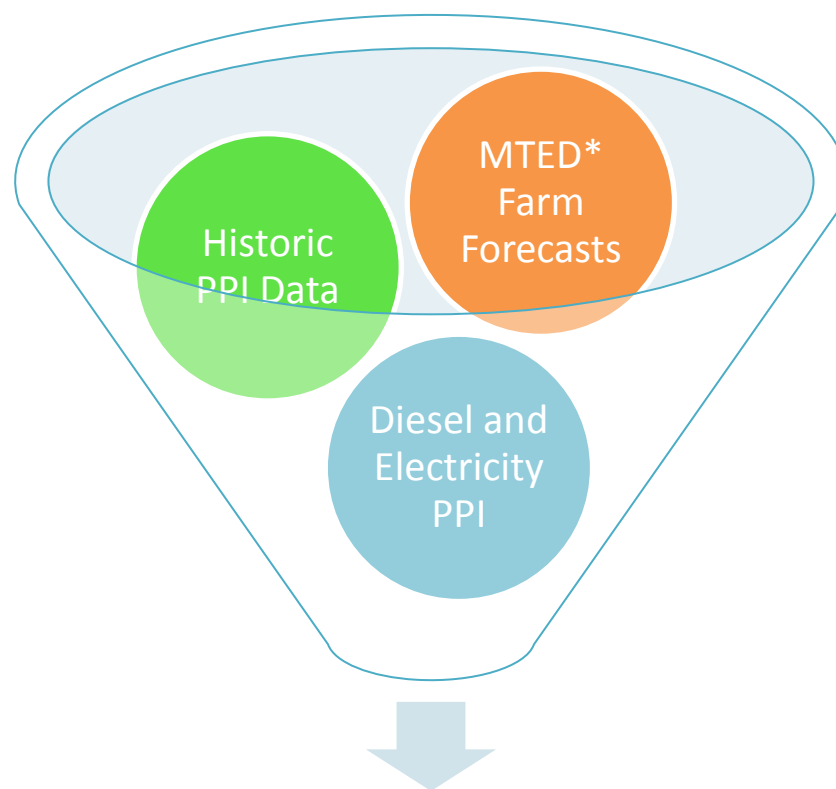
Forecasting Framework

- Retail prices are dependent on farm and food processing prices

- Multi-stage pass through approach is used
  - *First Stage*: Forecast PPI farm and wholesale prices
  - *Second Stage*: Forecast CPI using forecasted PPI data
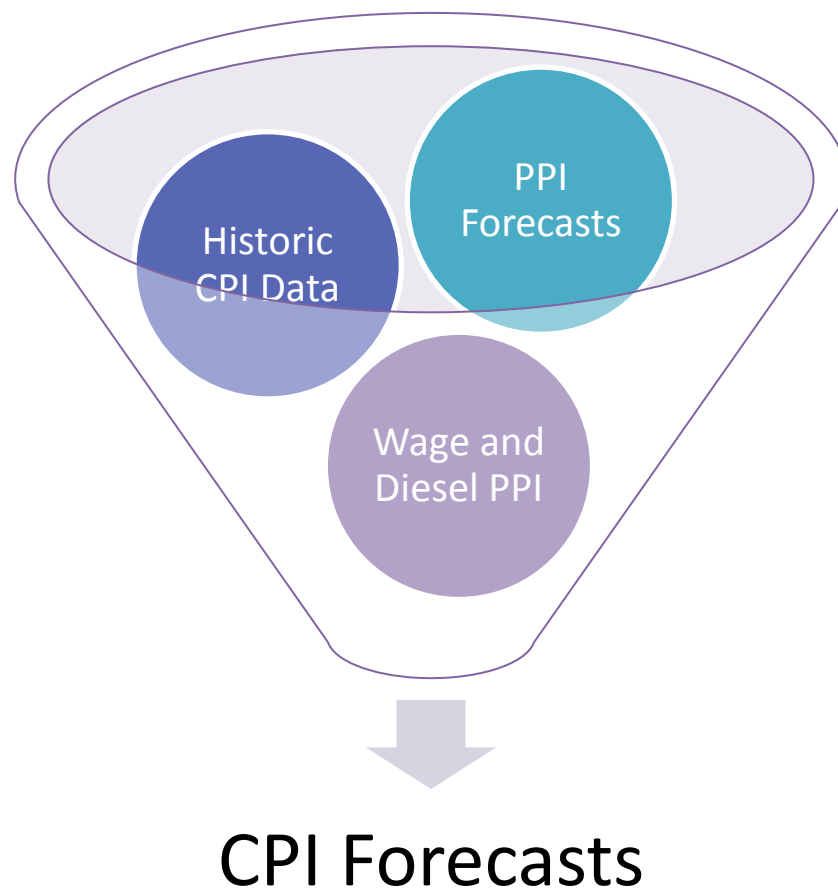
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First Stage of Pass-Through Model

PPI Forecasts

*The Market and Trade Economics Division (MTED) branch of Animal Products and Cost of Production produces commodity forecasts on a quarterly and monthly basis.

Second Stage of Pass-Through Model

CPI Forecasts

Underlying Framework for Food Price Forecasting at ERS

- Error Correction Model (ECM): two step method
  - Stationarity and cointegration
  - Estimating the cointegrating vector
- Establishing a lag structure
- Test for structural breaks
- Locally weighted scatterplot smoothing (LOWESS) technique
  - Converts quarterly data to a monthly frequency

Output from Forecasts at ERS

Food Outlook Topic Page updated on the 25th of each month

- Analysis of the most recent month of CPI data
  - Focusing on key month-over-month and year-over-over changes
- Annual forecasts, portraying average year-over-year price changes
  - Relying on non-adjusted CPI data
  - Revisions are made as new data becomes available

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Item	Relative importance[1]	Month-to-Month July 2013 to Aug 2013	Year-over-Year Aug 2012 to Aug 2013	Annual 2011	Annual 2012	Forecast 2013	Forecast 2014
Consumer Price Indexes	Percent	Percent change					
All food	100	0.2	1.4	3.7	2.6	1.5 to 2.5	2.5 to 3.5
Food away from home	39.9	0.2	2	2.3	2.8	2.0 to 3.0	2.5 to 3.5
Food at home	60.1	0.2	1	4.8	2.5	1.0 to 2.0	2.5 to 3.5
Meats, poultry, and fish	12.9	0.7	2.2	7.4	3.6	1.5 to 2.5	2.5 to 3.5
Meats	8.3	0.6	1.3	8.8	3.4	1.0 to 2.0	2.5 to 3.5
Beef and Veal	3.9	-0.1	1.6	10.2	6.4	2.0 to 3.0	2.5 to 3.5
Pork	2.5	1.4	1.7	8.5	0.3	0.5 to 1.5	2.0 to 3.0
Other meats	1.9	0.9	-0.1	6.4	1.7	-0.5 to 0.5	2.0 to 3.0
Poultry	2.4	1.4	5.5	2.9	5.5	3.5 to 4.5	3.0 to 4.0
Fish and seafood	2.1	0.5	3	7.1	2.4	2.0 to 3.0	2.5 to 3.5
Eggs	0.8	0.3	-1	9.2	3.2	2.0 to 3.0	2.0 to 3.0
Dairy products	6.3	0.4	1	6.8	2.1	0.0 to 1.0	2.5 to 3.5
Fats and oils	1.8	0.3	-1.1	9.3	6.1	-1.0 to 0.0	1.5 to 2.5
Fruits and vegetables	9	1	3.6	4.1	-0.6	2.0 to 3.0	2.5 to 3.5
Fresh fruits & vegetables	6.9	1.5	4.5	4.5	-2	2.5 to 3.5	2.5 to 3.5
Fresh fruits	3.7	0.6	1.4	3.3	1	2.0 to 3.0	2.5 to 3.5
Fresh vegetables	3.2	2.4	8.1	5.6	-5.1	2.5 to 3.5	2.0 to 3.0
Processed fruits & vegetables	2.1	-0.3	0.7	2.9	3.8	1.0 to 2.0	2.5 to 3.5
Sugar and sweets	2.1	-1.1	-2.7	3.3	3.3	-2.0 to -1.0	2.0 to 3.0
Cereals and bakery products	8.6	0	1.3	3.9	2.8	1.5 to 2.5	2.0 to 3.0
Nonalcoholic beverages	6.6	0.3	-1	3.2	1.1	-1.0 to 0.0	2.5 to 3.5
Other foods	12	-0.9	-0.4	2.3	3.5	0.0 to 1.0	2.0 to 3.0

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September 2013 ERS Forecasts

Item	Month-to-Month	Year-over-Year	Forecast
	July 2013 to Aug 2013	Aug 2012 to Aug 2013	2013
Consumer Price Indexes	Percent change		
All food	0.2	1.4	1.5 to 2.5
Food at home	0.2	1	1.0 to 2.0
Meats, poultry, and fish	0.7	2.2	1.5 to 2.5
Fruits and vegetables	1	3.6	2.0 to 3.0

Source: ERS Food Outlook, September 2013

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Food Acquisition by Income Level

- According to the CE, the lowest income households spend between 9.9% to 11.3% of their income on food-at-home

- Those earning over $70K spent an average of 6.5% of their income on food-at-home

- Due to consumption patterns, increases in certain food categories have a greater impact on lower income households
  - Meats, Poultry, Fish, and Eggs
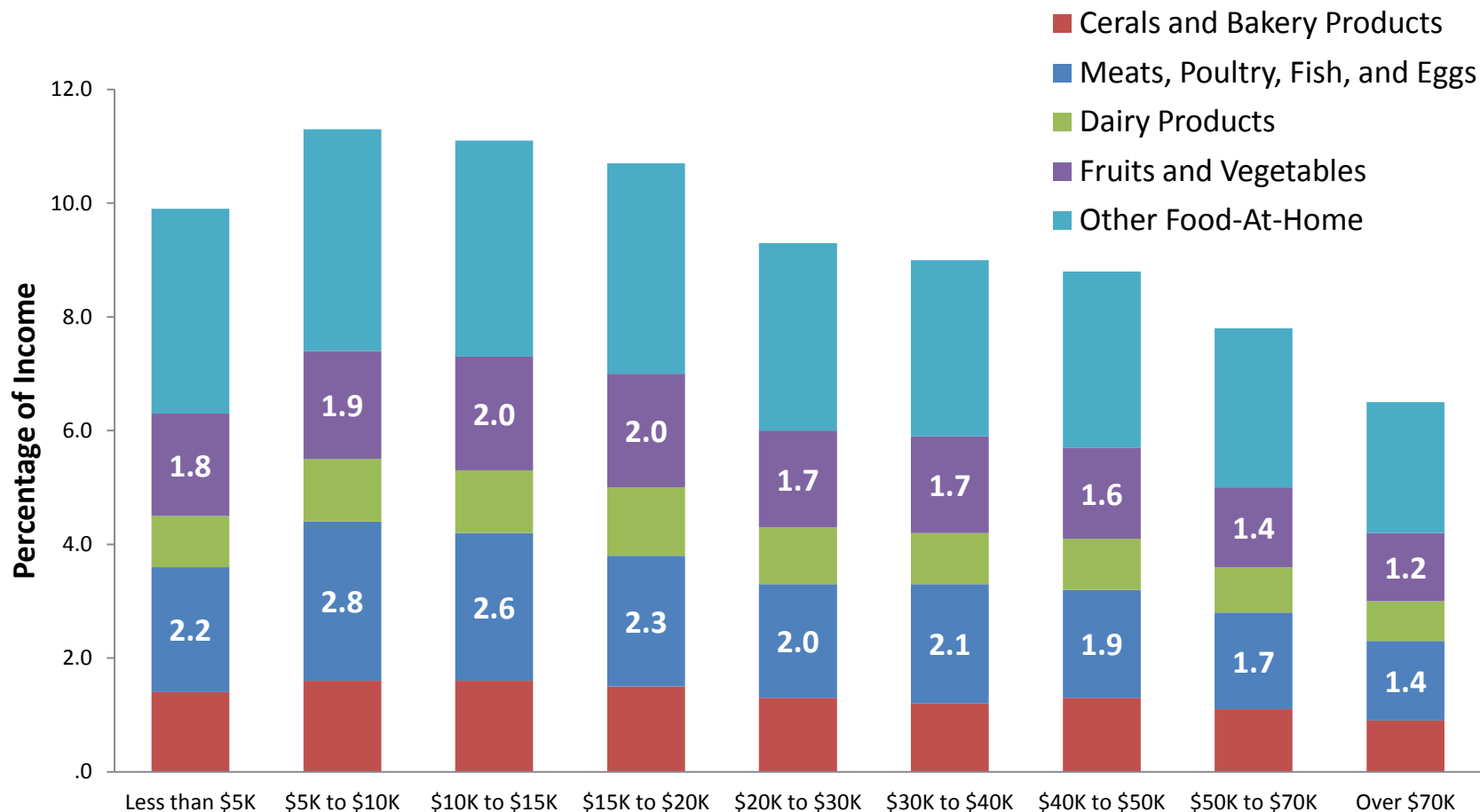 - Fruits and Vegetables

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Food Spending At Home
By Percentage of Income and Income Level
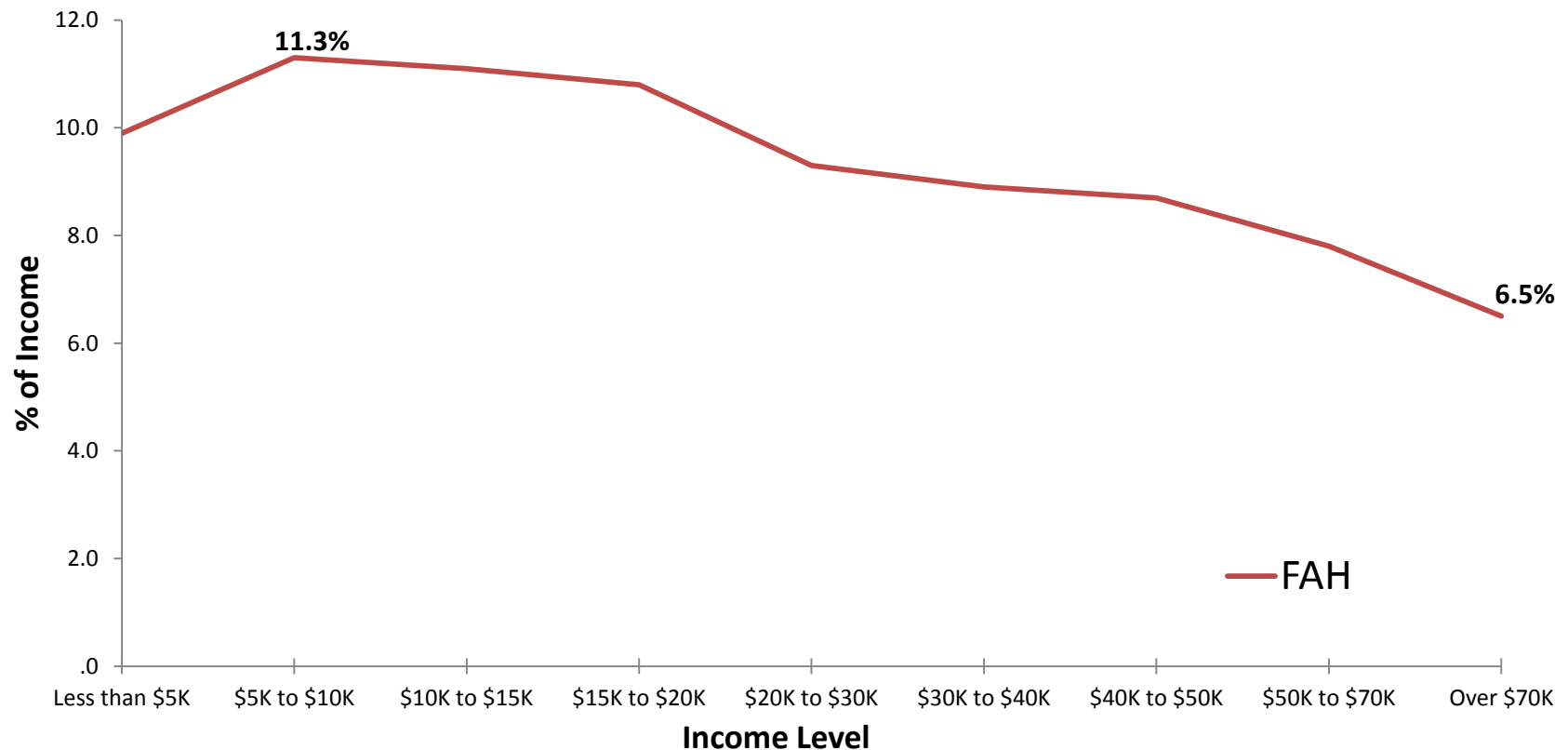
Source: BLS Consumer Expenditure Survey, 2012

2012 Food-at-home Expenditures (%)
By Income Level and Food Category

Legend:
- Cerals and Bakery Products
- Meats, Poultry, Fish, and Eggs
- Dairy Products
- Fruits and Vegetables
- Other Food-At-Home

Source: BLS Consumer Expenditure Survey, 2012

Call for Food Expenditure Forecasts by Income Level

- The Food Marketing Institute recognized a need for impact analysis of food price inflation on food expenditures by income level

- ERS Food Outlook forecasts can be applied to the BLS' Consumer Expenditure Survey to fill this need

Integrating ERS Forecasts with BLS' Consumer Expenditure Data

- Apply expected changes to the annual food expenditures for households across income levels

- Used 2013 and 2014 ERS forecasts to extend 2012 Consumer Expenditure Survey expenditures

- Mean forecasts are applied to each food-at-home category by income level to arrive at inflation adjusted expenditures, holding income level and preferences constant

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Impact of Predicted Inflation on 2013 and 2014 Food Expenditures

By Income Level

Summary Results

Holding income constant, the share of income spent on food from 2012 to 2014:

- Increased for lowest income households by 0.41 percentage points

- Increased for households earning the highest salaries by 0.28 percentage points

- The disparity was much larger during the food price surge of 2007 - 2008

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Resources for Food Price Trends Research

- ERS CPI Forecasts
http://www.ers.usda.gov/data-products/food-price-outlook.aspx

- New ERS Reports
http://www.ers.usda.gov/publications/err129/
http://www.ers.usda.gov/Publications/EIB75/
http://www.ers.usda.gov/Publications/ERR105/

- BLS CPI, PPI, and Average Price Data
http://data.bls.gov/PDQ/outside.jsp?survey=cu
http://data.bls.gov/PDQ/outside.jsp?survey=wp
http://data.bls.gov/PDQ/outside.jsp?survey=ap

- AMS Fruit and Vegetable Report
http://www.ams.usda.gov/mnreports/fvwretail.pdf

- IMF World Commodity Prices
http://www.imf.org/external/np/res/commod/index.asp

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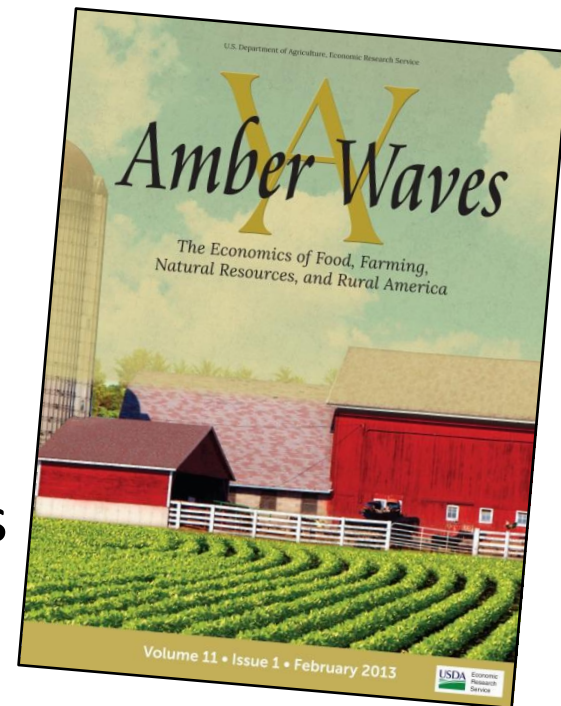
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Thank you!

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