

Anatomy of A Crisis: Drivers of Food Price Increases

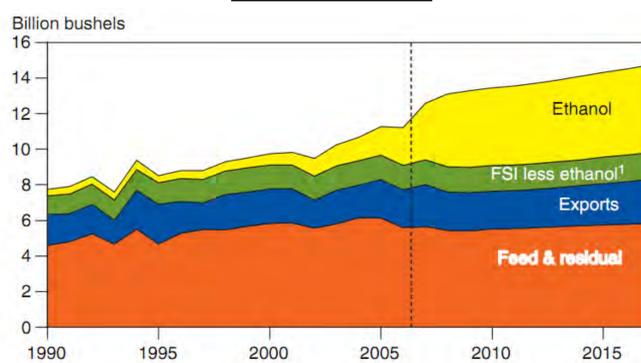
Abstract: In this paper, we investigate the significance of identified possible contributors of the current food crisis; ethanol production, population and income growth, crop production, and energy costs in the United States. We answer the question: What are the key drivers of food prices in the domestic United States, by rank ordered identified drivers according to statistical significance and comment on the predictions regarding food price increases made by the established literature. By means of Pearson correlations derived from the statistical software SSPS, we test and analyze the significance of each of the individual drivers. In doing so, we utilize a systematic trend analysis that includes assessing social, technological economic, ecological, and political themes. In our design, “food” is represented by two commodities: corn and wheat in light of their prominence in the popular press surrounding commodity price spikes.

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Literature Review

The recent civil unrest in the Middle East, in part due to the precipitous rise in global food prices, has re-focused world attention on the current food crisis that began in the mid-2000s. Between the first quarter of 2006 and the second quarter of 2008, “US corn prices increased 161 percent...wheat prices rose 142 percent...soybean prices increased 117 percent and average rice prices increased 97 percent...” (Lambert & Miljkovic, 2010, p. 211). Furthermore, following this steep two-year increase in prices, “on an annual basis, food prices in 2009 increased by more than 12% over 2008, in contrast to the 1.76% decline in non-food prices” (Chand, 2010, p. 10). Extensive research has been conducted on the causes and consequences of food crises spurred by spikes in staple and feedstock prices, but factors driving increasing food prices are inherently complex. In our research, we focused on what we believe to be key long-term causes of the most recent crisis, namely biofuel production, energy costs, and supply-demand dynamics. In our analysis of these drivers, utilizing primarily US data from governmental sources, we hope to expand this debate.

U.S. Corn Use



¹Food, seed, and industrial less ethanol.
Source: USDA Agricultural Projections to 2017.

Important Literature

- Abbot, P., Hurt, C., & Tyner, W. (2008) What's driving food prices. Issue Report. *Farm Foundation*. www.farmfoundation.com
- Armah, P., Archer, A., & Phillips, G. (2009). Drivers leading to higher food prices: Biofuels are not the main factor. *In Vitro Cellular & Developmental Biology Plant*, 45(3), 330-341.
- Headey, D., & Fan, S. (2008). Anatomy of a crisis: The causes and consequences of surging food prices. *Agricultural Economics*, 39(3), 375-391.

Methods

By systematically analyzing trends that ranged from social, economic, and technological, we were able to identify key potential drivers of food prices. We then used SSPS statistical software to find the Pearson Correlation Coefficients of our independent variable as they related to the historical prices of corn and wheat dating back to 1980 and rank them by order of importance.

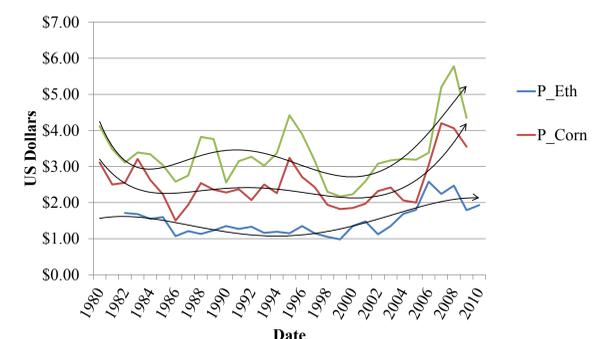
Trend Analysis

STEEP	Trend	Indicators
(USA, 1980-2011)		
Social	Population growth	US population
	Rising income	US GNI as % of GDP
	Rising food prices	Domestic price of corn Domestic price of wheat
Technological	Ethanol Production	Millions of gallons
	Fossil Fuel Production	BTU units
	Alternative Energy	Domestic energy expenditure
Economic	Decreased reliance on OPEC and foreign oil	Volatility of crude oil price
	Instable Middle East	Domestic fossil fuel production
Ecological	Reduce carbon emissions	Corn-to-ethanol production
	Reduce pollution	Corn production Wheat production
Political	Government subsidies for ethanol	Ethanol subsidies as % of GDP

Correlation Analysis

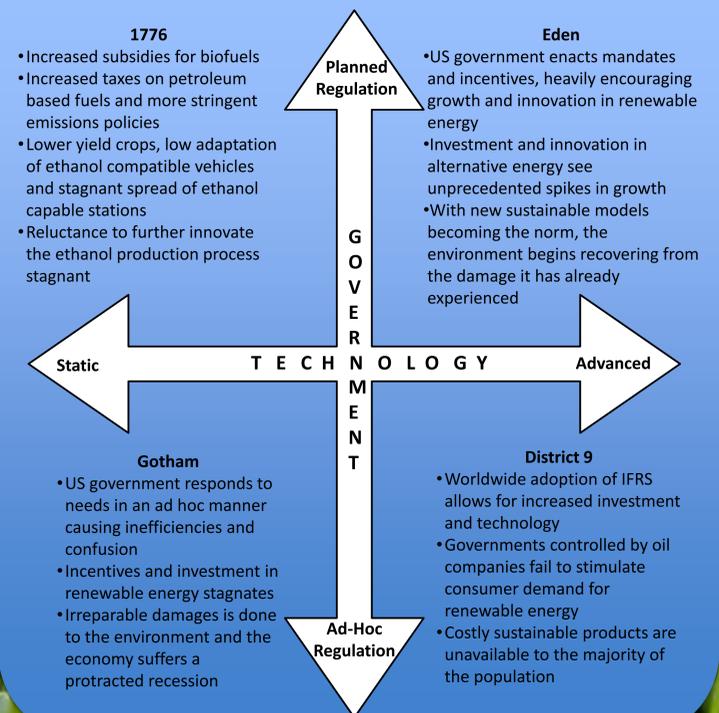
Rank	Indicator	P Value Corn Price
1	Ethanol Production	0.000
2	Ethanol Price	0.000
3	US Corn to Ethanol	0.000
4	Crude Oil Prices	0.000
5	Unleaded Gas Price	0.054
6	Energy Expenditure	0.100
7	GNI per Capita	0.124
8	US Population	0.169
9	Fossil Fuel Production	0.512
10	Corn Production	0.826
11	Wheat Production	0.843

Price of Ethanol vs. Corn & Wheat Prices



Source: USDA, Nebraska Energy Office

Scenario Matrix



Conclusion

The culmination of our research is a more lucid understanding of the primary drivers of food crisis which, in order of statistical significance, are comprised of the following: ethanol production, ethanol price, corn diversion to ethanol, crude oil prices and energy expenditure. All of these variables exhibit significance at the 10% level. This research is directly related to business, as food is perhaps one of the only commodities that affects humanity worldwide, and gas prices are increasingly becoming an important aspect of any company's consideration. Therefore, in order for businesses to remain competitive, they must forecast these variables into the future and continuously monitor them. This is perhaps the greatest contribution of our research, and could have enormous impacts on the businesses that choose to heed our recommendations.

Special Thanks

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