Methodology

* 1. Hypothesis

This work is focused on determining the effects of price fluctuations in two agricultural commodities: soybeans and maize, on the national GDP per capita. It will also examine the effects of inflation measured through the Consumer Price Index (CPI) and the Agricultural Price Index, money supply, nominal interest rate, and unemployment.

* 1. Data

The data covers the time range between 1982 and 2010. It has been gathered from reputable sources including the IMF, the Bureau of Labor Statistics, Federal Reserve, and the United States Department of Agriculture: Economic Research Service. All data was further annualized when provided in monthly values and computed in 2009 USD for a coherent analysis. The conversion factors utilized to convert to 2009 USD were generated from research done by Oregon State University from data provided through the Office of Management and Budget of the White House and the Congressional Budget Office.[[1]](#footnote-1)

Data Analysis

* 1. Hypothesis

This work is focused on determining the effects of price fluctuations in two agricultural commodities: soybeans and maize, on the national GDP per capita. It will also examine the effects of inflation measured through the Consumer Price Index (CPI) and the Agricultural Price Index, money supply, nominal interest rate, and unemployment.

* 1. Independent Variables

The independent variables used in this study were chosen for their specific relevance, both proven in the literature and through multiple testing methods, towards understanding GDP growth fluctuations.

Upon review of the summary statistics we can see that per metric ton, soybeans are nearly twice the average price of maize in 2009 USD. Maize ranged between a low of $107.78 in 2005 to a high of $291.81 in 1983. Closer inspection of the data shows a roughly linear decrease in maize prices since 1982, with small variance therein. Soybeans ranged between a per metric ton low of $203.81 in 2001 to a high of $557.12 in 1983. 1983 was a record high year for many agricultural goods due to severe drought and a large reduction in PIK (payment-in-kind) government sponsored loans as part of agricultural programs.[[2]](#footnote-2) We see a steady decline in soybean prices until 2007 where they began to increase again resulting from the overall financial crisis.

Review of the Agricultural CPI (Raw Materials Index) during the period from 1982 to 2010 shows a steady increase until 1995 where it slowly began to decrease for about a decade, whereupon it began to increase again. There is an immediate decrease in 2009, again most logically a result of the financial crisis. The record high was 125.35 in 2010, and the record low was 60.72 in 1982, describing an overall wealth increase for the United States during this time period. In contrast to the Agricultural CPI, the urban-consumers CPI data from the Bureau of Labor Statistics illustrates a gradual percent change per year increasing during the entire period, except for 2009 where there is a slight decrease in the urban-consumers CPI similar to the Agricultural CPI. The urban-consumers CPI shows a record low of 96.5 in 1982 and a record high in 2010 of 218.01, also describing an increase in overall wealth during this time period.

The nominal interest rate, as measured from the Federal Funds rate, in contrast to the CPI, shows a gradual decrease over the time period. The highest recorded nominal interest rate from historical data provided by the Federal Reserve Bank, was in 1982 at 12.24%. There was an increase in 1989, coinciding with the Black Monday stock collapse of October 1987, leading into the early recession on the 1990s. The interest rate continued to fluctuate in a decreasing manner until 2000, with the increase during the dot com bubble crisis. The lowest recorded was in 2009 at 0.16%, again confirming to the Federal Reserve’s response to the Financial Crisis.

With review of the money supply, in billions of dollars, it can be shown that it has steadily been increasing. Over this time period alone, there has been almost a 400% increase in the money supply since 1982 currently totaling 16333.3 billion USD. The average over this time period was 8942.896 billion USD, with a low of 4604.175 billion USD in 1982 and a high of 15857.57 billion USD in 2010, all prices normalized monthly.

Finally, unemployment data shows a gradual decrease in unemployment until 1990, following the early recession of the 1990s The ramifications of this event led to increased unemployment and slower GDP for several years into the 1990s. The data then shows a continuous decrease until 2000 which can be attributed to the general recession of the last decade, ending in the financial crisis and the overwhelmingly high unemployment rates. 2000 had the lowest levels of unemployment, around 3.97%, which steadily increased to 9.63% at the end of the decade, which still does not match the 1982 level of unemployment at 9.71%. This high level of unemployment can be attributed to the early 1980s recession created by the contractionary monetary policy established by the Fed to control high levels of inflation.

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| Independent Variables Mean |
| Maize 169.8243  Soybeans 351.6624  Agricultural CPI  CPI 156.0737  Nominal IR  Money Supply 8942.896  Unemployment 6.227586 |

1. Please see Appendix I for table of Conversion Factors utilized in this research. [↑](#footnote-ref-1)
2. Federal Reserve Bank of Kansas City. “Another Troubled Year for US Agriculture” <http://www.kansascityfed.org/PUBLICAT/ECONREV/econrevarchive/1984/4q84drab.pdf> [↑](#footnote-ref-2)