

# The Great Depression

## A Monetarist View

Danny Byrne

Econ 145

California State University, Sacramento

Fall 2006

Earlier research, by Friedman-Schwartz (1963), suggests the Great Depression can be explained by a contracting money supply due to poorly regulated banks and inadequate monetary response. This paper investigates this theory through estimating the relationship between industrial production, the monetary base, the currency-to-deposit ratio, and the interest rate from 1921 to 1960. The empirical estimates show that both the monetary base and the currency-to-deposit ratio are important in explaining business cycles. These results, coupled with close examination of economic activity, interest rates, and the money supply, suggest that much of the economic distress from 1929 to 1933 could have been alleviated by the Federal Reserve expanding the monetary base earlier as well as incorporating more aggressive bank regulation.

*JEL Codes: C52, C68, E52, E65, G18*

## Introduction

The summer of 1929 marked the beginning of the most severe recession in the United States since the Civil War. To this day, economists struggle to understand the complexities involved in this massive economic downturn. In this paper I will investigate and use two main opposing hypotheses regarding what happened, what went wrong, and what could have been done to alleviate the severity of this recession. In today's context, the speculative mistakes and/or economic misfortune leading up to the Great Depression serve to help us learn from and perhaps better shape future policies and more effectively control unfavorable economic distress.

## Literature Review

The Great Depression is a critical event in American History. Many issues contributed to the magnitude of this recession, so it is difficult to identify the causes and underlying mechanisms contributing to the Great Depression. Since the end of this recession in 1933, economists have studied the possible causes that triggered or worsened the recession. Of the countless studies, experiments, and testing that have been conducted since the end of the Great Depression, two main hypotheses have surfaced: (1) reduction in spending/expenditures (from many possible sources) caused the Great Depression and (2) a reduction in money supply or failure of monetary policy worsened the initial recession.

Friedman and Schwartz (1963) argued that the Great Depression was exponentially magnified by the Federal Reserve's failure to conduct effective monetary policy in the years leading up to, during and shortly after the economic recession. Temin (1976) suggests that the Great Depression can be explained as a large negative shock to

aggregate demand. Temin (1976) contradicts Friedman and Schwartz (1963) by saying that studying only monetary policy factors, will yield an incomplete explanation of the Great Depression. Instead, the decline in money growth may expose the underlying forces of the Great Depression. Temin (1976) looks primarily at interest rates to explain the monetary policy changes of the time period.

After examining Friedman and Schwartz (1963), Temin (1976), and other scholars on the subject, the authors of this article conclusively find that the search for one dominantly accurate study on the causes of the severity of the Great Depression is “likely futile” and far from over.

Christiano, Motto and Rostagno (2003) use data from the 1920s and 1930s to estimate an equilibrium model of the economy including eight economic shocks. The results paint a familiar picture of the Great Depression. The authors’ findings are consistent with the Friedman-Schwartz (1963) hypothesis. The authors use quantitative values of “key aspects of the U.S. economy” in the 1920s and 1930s. The authors hypothesize that an alternative, more effective, counterfactual monetary policy would have greatly reduced the severity of the Great Depression. They test this hypothesis using a model containing two parameters of monetary policy: (1) those that govern the evolution of the exogenous shocks and the monetary response to them and (2) the rest. Their predictions use a maximum likelihood approach on what policymakers of the time would have done with the available information. They solve the model with developed counterfactual monetary policy rule of maximum likelihood and determine that, given the eight economic shocks of the time, if the counterfactual policy rule had been in place

during the 1930s, the Great Depression would have just been a mild recession, and thus proving their hypothesis to be accurate.

Romer (1993) studies the Great Depression from a different angle. She claims that economists generally accept that the stock market crash of 1929 and the Great Depression are limitedly related. She then takes a closer look at the relationship by speculating that consumers' fear of the uncertainty of future income caused them to buy less durable goods. Using the standard Keynesian model, Romer (1993) explains that this decline in spending caused a decline in aggregate income. She also explains the psychology of consumers by providing reasons why an event such as a stock market crash would cause consumers to be temporarily uncertain about their future income. This 'uncertainty hypothesis' as she calls it, which predicts that there should be an inverse relationship between consumer spending on durable goods and uncertainty of future income, is backed by statistical evidence in the months following the 1929 crash. Romer (1993) also explores the notion (which is directly opposed by Temin(1976)) that the link between the stock market crash and the Great Depression is propelled by the fact that the crash reduced a large portion of U.S. wealth, subsequently causing a decline in consumption.

Romer's (1993) findings are relevant to my research project because I will be examine broad debates regarding the various speculative causes of the Great Depression regarding consumer behavior, monetary policy, and unfavorable economic shocks. Cecchetti (1997) argues a more recent aggressive Friedman-Schwartz (1963) type stance on the problems during the Great Depression. Cecchetti (1997) states that the most defining characteristic of the time period of the Great Depression is the wholesale collapse of virtually every aspect in the economy. His strongly pessimistic statements on

the subject of the Great Depression make this an interesting paper to read and incorporate into my project. He claims that the severity of the Great Depression can be attributed to a combination of failures in many sectors of the economy. He emphasizes that since the Great Depression, the United States has enjoyed a much more stable economic environment and explains his views on the reasons. He discusses the stock market crash of 1929, the importance of sound financial intermediaries, institutional responses to the depression, understanding the effects of deflation, international aspects of the Great Depression, the gold standard, tariffs, mysteries of the Great Depression, and lessons to be learned from the Great Depression. Cecchetti's (1997) work identifies several potential sources that help illustrate a more complete understanding to the various aspects of the Great Depression.

Chatterjee, Satyajit, and Dean Corbae (2006) review the debates and controversies surrounding the Great Depression. They examine statistics including: GNP, real per capita durables/non-durables consumption, business investment, total employment, total factor productivity, GNP deflator, M1 velocity, per capita monetary base, currency/deposit ratio. They incorporate the findings of various well-known authors on the subject such as: Friedman-Schwartz (1963), Eichengreen (1992), Bernanke and James (1991), Temin (1976), Bordo, Erceg, and Evans (2000), and Ohanian (2002). The paper is a comprehensive summary of the monetary and financial forces that were at work during and after the Great Depression.

Evans, Hasan, and Tallman (2004) explain that the causes of the Great Depression are unknown, and any data that can be collected from 1929 to 1933 are insufficient to determine which one of the causes, discussed above, is the primary factor influencing the

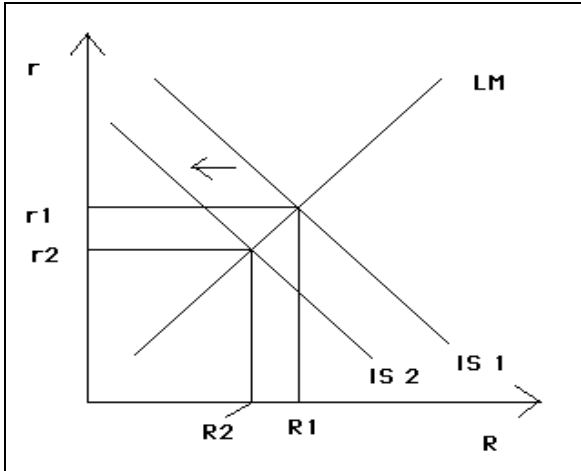
cause of the Great Depression. After examining Friedman and Schwartz (1963), Temin (1976), and others, Evans, Hasan, and Tallman (2004) find that the search for one dominantly accurate study on the causes of the severity of the Great Depression is “likely futile” and far from over.

## Economic Model

The economic model that is most relevant to my research project is the IS/LM model of monetary policy. The horizontal axis represents real GDP ( $Y$ ) or ‘real’ parts of the economy, and the vertical axis represents the interest rate or ‘monetary’ parts of the economy. The IS (investment-savings) curve is downward sloping and is comprised of consumer spending, planned private investment, government purchases, and net exports ( $C+I+G+NX$ ) which in turn equals  $Y$  (an open economy’s total output and income). The LM (liquidity preference/money supply equilibrium) curve is upward sloping and represents finance and money. The intersecting point of these two curves indicates short-run (usually less than five years) equilibrium. In IS/LM equilibrium, both the interest rates and real GDP are determined.

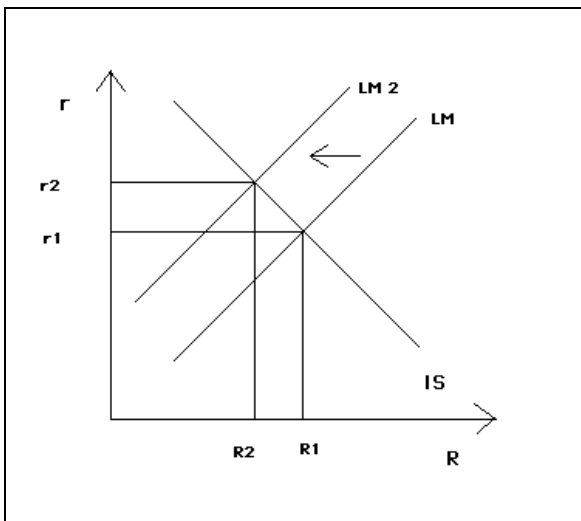
### **Case Study 1:**

The graph on the following page is exhibiting an inward shift in the IS curve causing lower interest rates and a contraction in real GDP. This is consistent with one possible theory of the Great Depression that it was caused by an IS shock (leftward shift in IS curve) possibly caused by a reduction in consumption/business investment. Animal spirits or something more fundamental, like a reduction in consumer wealth or increase in debt burden, could explain this situation.



**Case Study 2:**

The graph below is exhibiting an inward shift in the LM curve. This is the Friedman story. An inward shift of the LM curve means that there is a reduction in the money supply. Friedman and Schwartz (1963) believed this was worsened by an inefficient strategy of monetary policy. This causes higher interest rates and a contraction in real GDP.



# Empirical Methodology

## A. Data

In my research project, I will be using macroeconomic two time series data. The indexes, obtained from the Federal Reserve Bank of St. Louis, are monthly time-series data entries beginning in January of 1921. My dependent variable will be industrial production.

Explanatory variables include: the non-seasonally adjusted consumer price index, the one-year interest rate, monetary base, and the currency-to-deposit ratio. The non-seasonally adjusted consumer price index data was obtained from the Federal Reserve Bank of St. Louis. Both the monetary base data and the currency-to-deposit ratio data were obtained from Friedman and Schwartz (1963).

## B. Stylized Facts

**Table 1A: *Industrial Production***

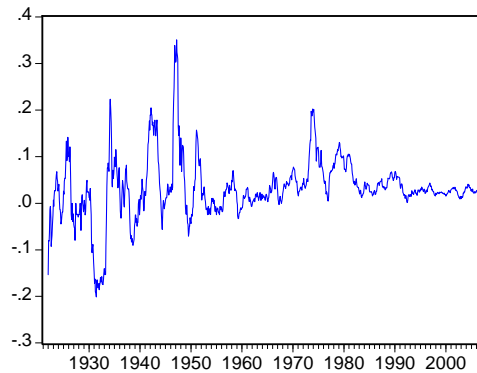
	<b>1921-2006</b>	<b>1929-1933</b>
<b>Mean</b>	4.48%	-4.95%
<b>Median</b>	4.45%	-12.13%
<b>Standard Deviation</b>	11.11%	20.91%

**Table 1B: *Consumer Price Index***

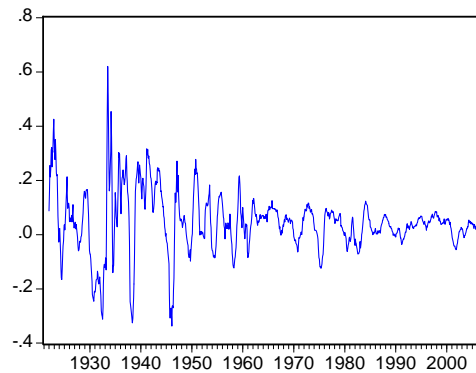
	<b>1921-2006</b>	<b>1929-1933</b>
<b>Mean</b>	3.21%	-8.08%
<b>Median</b>	2.70%	-10.65%
<b>Standard Deviation</b>	6.62%	9.44%

The correlation between the CPI and industrial production growth rates from 1921 to 2006 is 0.34. The correlation between the CPI and industrial production growth rates from 1929 to 1933 is 0.73. Growth rate graphs are consistent with economic theory that the U.S. economy has become more stable since World War II.





CPI-NSA: Growth Rate



Industrial Production: Growth Rate

### C. Relationship

By taking the index of industrial production and comparing it to the consumer price index, it becomes possible to more clearly see the underlying mechanisms at work during the Great Depression. Also, if we look at the consumer price index and industrial production data, then we can apply the information to the IS/LM model of monetary policy. Hopefully, this will help to obtain some concrete data on the most probably shifts in either the IS or LM during the period from 1929 – 1933. From looking at the data that I've collected on industrial production, the consumer price index, and their summary statistics, I've learned that not only were industrial production and the consumer price index highly positively correlated, but also, the years from 1929 to 1933 exhibited huge declines in both variables. By looking at the CPI from 1929 to 1933, it becomes obvious that there was deflation in this time period. Deflation increases debt burden to borrowers, and this could be exhibited by a leftward shift in the IS curve.

### Results

In the following regressions, I took the log of industrial production, high-powered money, and consumer price index data because it is easier understand the results in percentage form.

Equation 1:  $\log(IP) = \beta_0 + \beta_1 \log(HPM) + \beta_2 CD$

Equation 2:  $\log(IP) = \beta_0 + \beta_1 \log(HPM) + \beta_2 CD + \beta_3 \log(CPINS A) + \beta_4 IR + \beta_5 \log(INDPRO(-1))$

Equation 3:  $\log(IP) = \beta_0 + \beta_1 \log(HPM) + \beta_2 CD + \beta_3 \log(CPINS A) + \beta_4 IR + \beta_5 \log(INDPRO(-1)) + \beta_6 \log(INDPRO(-2))$

**Table #1: Regression Results for Industrial Production (1921-1960)**

	1	2	3
Constant	0.72*** (0.029)	0.024* (0.014)	0.010 (0.012)
Monetary Base	0.76*** (0.015)	0.017** (0.007)	0.020** (0.006)
Currency-to-Deposit Ratio	-3.45*** (0.270)	-0.089 (0.055)	-0.078* (0.046)
Consumer Price Index	---	-0.001 (0.009)	-0.001 (0.008)
Interest Rate	---	0.000 (0.003)	0.002 (0.003)
Industrial Production (-1)	---	0.982*** (0.009)	1.505*** (0.039)
Industrial Production (-2)	---	---	-0.531*** (0.039)
R-Squared	0.91	0.997	0.998
Adjusted R-Squared	0.91	0.997	0.998
Durbin-Watson	0.03	0.947	1.930
No. observations	469	468	467

Standard errors are reported in parentheses.

\*, \*\*, \*\*\* indicates significance at the 90%, 95%, and 99% level respectively

In the first regression, I've included only high-powered money (monetary base) and the currency-to-deposit ratio in the equation. Prior to computing the regression, I expected to see that the coefficient of the monetary base ( $\log(HPM)$ ) would be positive because it makes economic sense that the monetary base would increase with industrial production during my sample years (1921 to 1960). I also expected to see the coefficient for the currency-to-deposit ratio to be negatively related to industrial production because as the currency to deposit ratio increases the money multiplier gets smaller. If the money multiplier gets smaller, then banks can lend out less money for every dollar deposited.

Thus, holding the monetary base constant, one could expect the money supply, along with industrial production, to decline as the currency to deposit ratio increases. Both the monetary base, and the currency-to-deposit ratio are statistically significant at the 99% confidence level. Also, both coefficients are large enough to be considered economically significant. That is to say, the effects that these two explanatory variables have on the dependent variables are sizeable enough to matter. By evaluating the R-squared value obtained in this regression, I can determine that the approximately 91% of the variation in the dependent variable is explained by this regression; however, by looking at the Durbin-Watson statistic in this regression (0.031), I can expect that the problem of autocorrelation exists. A time-dependent error has most likely occurred because of an omitted variable that would help to explain the dependent variable. In the case of an index-to-percentage conversion of industrial production, I may need to lag this dependent variable to correct for autocorrelation.

In the second regression, I've included high-powered money (monetary base), currency-to-deposit ratio, non-seasonally adjusted consumer price index, interest rate, and for this regression I've introduced a lag of the dependent variable which may help to correct for the autocorrelation problem in the first regression. Prior to computing the regression, I still expected to see that the coefficient of the monetary base would be positive and that the coefficient for the currency-to-deposit ratio would be negative. Contrary to what I would expect, the consumer price index was negatively related to industrial production. Since the consumer price index was declining rapidly like industrial production during the Great Depression, I would have expected to see the two variables being positively related. However, this coefficient is not statistically significant.

I expected to see that the interest rate variable would be ambiguous. Interest rate is dependent on whether business cycles are defined by spending (IS) or money (LM) shocks. From the table, we see that interest rates are not statistically significant. High-powered money is statistically significant at the 95% confidence level, currency-to-deposit ratio is *almost* statistically significant at the 90% confidence level (89.43%), and both the consumer price index and the interest rate are not statistically significant at any level. Furthermore, the consumer price index and the interest rate are not economically significant either. The coefficients are -0.005 and 0.0009 respectively. These numbers mean that both of these variables have very little influence on the dependent variable. High-powered money and the currency-to-deposit ratio on the other hand are still economically significant with coefficients of 0.02 and -0.09 respectively. By re-evaluating the R-squared value obtained in this regression, I can determine that the approximately 99.7% of the variation in the dependent variable is explained by this regression. Introducing the once-lagged dependent variable significantly increased the Durbin-Watson statistic from 0.03 to 0.95. Unfortunately, this did not completely correct the autocorrelation problem. This suggests that a time-dependent error still exists. In my next regression, I will introduce a second lag to the dependent variable to hopefully correct for this problem.

In my third and final regression, I've included all the same variables from the second regression which were: high-powered money (monetary base), currency-to-deposit ratio, non-seasonally adjusted consumer price index, interest rate, the lagged dependent variable, and I've introduced a second lag to the dependent variable since there was still an autocorrelation problem in the second regression. Prior to computing the

regression, I still expected to see that the coefficient of the monetary base would be positive, that the coefficient for the currency-to-deposit ratio would be negative, and that the interest rate coefficient would be ambiguous. After introducing the second lag for the dependent variable, the coefficient of consumer price index came out to be positive for this regression, which was what was originally expected. Also, the R-squared is now 99.8% which means that 99.8% of the variation in the dependent variable is explained by this regression. Finally, introducing the second lag to the dependent variable almost completely corrected the autocorrelation problem and raised the Durbin-Watson statistic from 0.95 to 1.93.

## Conclusion

Both monetary base and the currency-to-deposit ratio are both found to be statistically and economically significant in this study. This suggests that the variables played an important role in determining the business cycles from 1921 to 1960. Furthermore, neither the consumer price index nor the interest rates had a statistical or economic significance leading me to reject Temin's (1976) notion that we should look primarily at interest rates to examine the business cycles of the time period. This study supports the Friedman-Schwartz (1963) theory that much of the economic distress from 1929 to 1933 could have been alleviated by the Federal Reserve both expanding the monetary base earlier, and incorporating more aggressive bank regulation.

## Data Appendix

The Federal Reserve Bank of St. Louis Website:

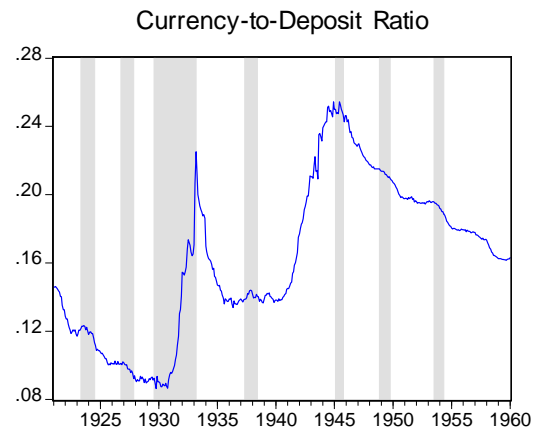
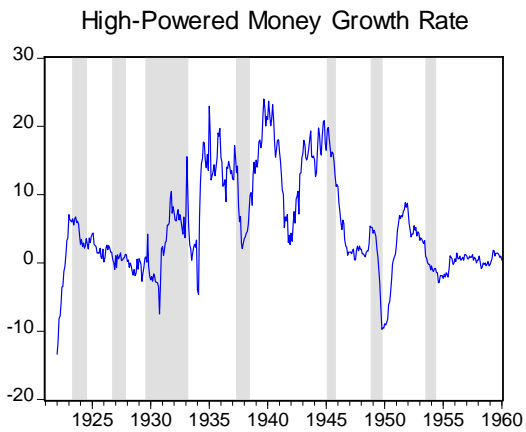
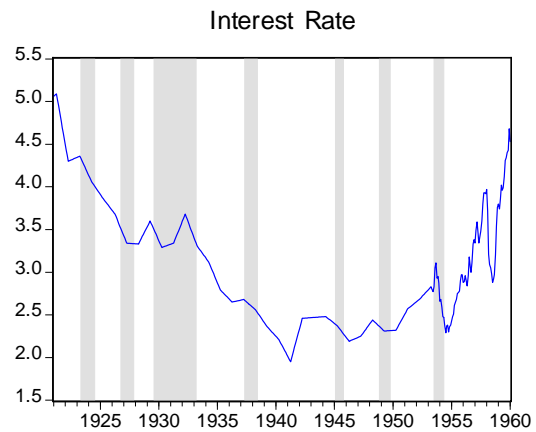
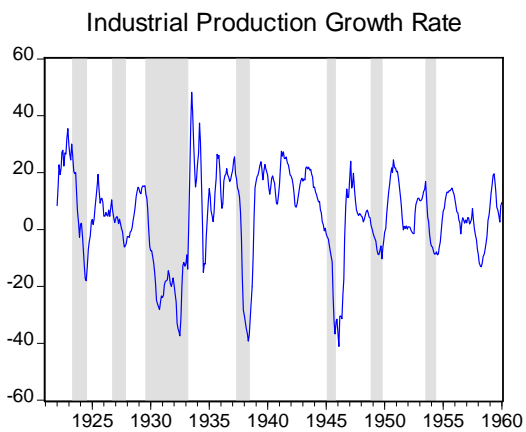
- <http://research.stlouisfed.org/fred2/>

Robert Shiller Website:

- <http://www.econ.yale.edu/~shiller/data.htm>

Friedman-Schwartz (1963)

Graphs:



## References

Evans, P., Hasan, I., Tallman, E. W. (2004). Monetary Explanations of the Great Depression: A Selective Survey of Empirical Evidence. *The Federal Reserve Bank of Atlanta Economic Review*, 89(3), 1-23.

This article explains that the causes of the Great Depression are unknown, and that data is an insufficient method to determine what “went wrong” with monetary policy from 1929-1933. The article offers contrasting views of the Friedman-Schwartz ineffective Federal Reserve monetary policy hypothesis (1963) and Temin’s hypothesis (1976) that unfavorable economic shocks were the main cause.

Christiano, L., Motto, R., Rostangno, M. (2003). The Great Depression and the Friedman-Schwartz Hypothesis. *The Journal of Money, Credit, and Banking* 35(6), 1119-1197.

This paper sides with the Friedman-Schwartz Hypothesis (1963), and seeks to prove that the severity of the Great Depression would have been smaller if the central bank would have used a more “accommodative” monetary policy. The authors explore that money demand and liquidity shocks were a key depressing factor from 1929 to 1933.

Romer, C. (1993). The Nation In Depression. *The Journal of Economic Perspectives* 7, 19-39.

Uses standard Keynesian macroeconomics to explain the role that consumers subconsciously played in connecting the Great Crash to the Great Depression. Uses an “uncertainty hypothesis” which explains an inverse relationship between consumer spending on durable goods and uncertainty of future income.

Cecchetti, S. G. (1997). Understanding the Great Depression: Lessons for Current Policy, *NBER Working Paper 6015*, 1-26.

Aggressive reinterpretation of events and controversy surrounding the Great Depression. Comprehensive overview of what went wrong in this time period, what we could have done to alleviate some economic suffering (consistent Friedman-Schwartz, 1963), and how we should learn from it and move on.

Chatterjee, S., Dean C. (2006). Monetary and Financial Forces in the Great Depression, *Federal Reserve Bank of Philadelphia Working Paper No. 06-12*, 1-9.

Most recent look at the monetary and financial forces present during the Great Depression. Analysis of statistics based on the many different explanations of the cause and severity of the Great Depression.

Friedman, M. (1965). *The Great Contraction 1929-1933*. Princeton: Princeton University Press (for the National Bureau of Economic Research).

Reprint of the section in *A Monetary History of the United States* that deals specifically with the Great Depression. Seminal work studying the relationship between money and output.

Friedman, M & Schwartz, A. J. (1963). *A Monetary History of the United States, 1867-1960*. Princeton: Princeton University Press (for the National Bureau of Economic Research).

Data source for my analysis.