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Effects of Economic Crises on Consumer Spending

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ABSTRACT

The Wall Street Crash of 1929 and the Great Depression following threw the United States and the rest of the world into an economic crisis. Through the policies of the New Deal and economic initiatives worldwide, the world was able to largely recover from the Great Depression. However, consumer behavior in the retail and wholesale sectors worldwide changed drastically as a result of the catastrophic increase in deflation. The author combined data on deflation growth with the decline in consumer spending and the decline in personal income per capita to obtain a correlation coefficient and coefficient of determination using a linear regression model. The author then combined data on the decline in consumer spending and the decline in personal income per capita, obtaining a correlation coefficient and coefficient of determination to address other possible explanations for the decline in consumer expenditures.

Introduction

Throughout history, large-scale economic crises have many significant effects on the lives of families and individuals. The Credit Crisis of 1772 made hundreds go bankrupt, the 2008 Housing Crisis made millions go bankrupt, and in the Great Depression of 1929-1933, peoples 'lives across the entire world were impacted in a number of ways.

The Great Depression began following the infamous Stock Market Crash of 1929. During the 1920's stock prices were rising tremendously. In order to avoid stock speculation and to halter the rapid rise of stock prices, the Federal Reserve raised interest rates. As a result, many small events led to a decline in prices, which led to millions of investors losing confidence in the market all at the same time. Investors were thrown into a frenzy, liquidating their positions to avoid big losses. The psychological effects of the crash may have made people feel less wealthy, affecting their "consumer confidence." Consequently, a decline in consumer and business spending ensued, leading to the financial crisis known as the Great Depression.

Effect of Deflation on Consumers

Many may wonder how deflation may lead to consumers spending less. Aside from the obvious answer to this question, that since prices are dropping, consumers spend less because the prices are lower to get what they need. However, there are alternative explanations to consider. One of these explanations can be derived from another one of the effects of deflation, which is lower incomes. Since businesses are selling goods and services at a lower price, they are gaining less profit which is what they use to pay their employees. This can lead to wage cuts and layoffs. As a result, since these consumers are being paid less and have less income, they spend less on goods and services. This leads to a vicious cycle of economic crisis.

On a global scale, one of the most significant impacts of the Great Depression was deflation, the general reduction of prices in the economy. Taking a closer look at the United States, the deflation rate increased to over 10% during the Depression's peak years. This led to the world's most famous and large-scale case of deflation. Consequently, lower incomes and higher unemployment ensued. Meanwhile, the US economy was also being impacted by a significant decrease in the mean spending by individual consumers. In 1932, generally considered one of the worst

years of the Depression, both the deflation rate and the mean consumer spending were at their highest and lowest, respectively. This paper collects and compares data between the two variables to prove if there is a strong, inverse relationship between the growing deflation rate and the decreasing mean consumer spending. It then compares data between the deflation rate and lower incomes to determine if there is a correlation between the two variables. And finally, it compares the data between the decreased incomes and the decreased consumer spending to determine if there is a correlation between them making the ultimate explanatory element. With these three tests for correlation, this paper can draw conclusions on how statistically significant the claim is that deflation led to lower incomes and consumer spending, but also considers the possibility that the lower income has a relationship with the lower consumer spending.

Methodology

All data was taken from the years 1929 through 1933. Data was recorded by the United States Bureau of Labor Statistics, the United States Bureau of Economic Analysis, and the United States Bureau of Census. The years from 1929 to 1933 were chosen because they are historically considered to be the years of the Great Depression. This paper addresses and invalidates potential confounding variables that may also have contributed to the decrease in mean consumer spending from 1922 to 1933.

Data on the deflation rate was taken from the Federal Reserve Bank of Minneapolis. Data on mean consumer spending was taken from the Federal Reserve Bank of St. Louis Fraser database, from Volume 1 of *Historical Statistics of the United States,* the section on Consumer Expenditure Patterns. Data on personal income per capita was taken from the Bureau of Economic Analysis website. The data was collected and organized into a 3 by 6 table with labels marking the first row. Column one listed each year from 1929 to 1933, column two listed the deflation rate in a percentage for each year, and column three listed the percent change of the mean consumer spending for each year. The data was imported into a "Lists and Spreadsheets" document in a Ti-nspire CAS CX II calculator and used to create a dot plot in a "Data and Statistics" document. The author then used the analyze graph function to create the line of best fit and the linear regression equation. The author then used a linear regression test to calculate the Pearson's Product Moment Correlation Coefficient and coefficient of determination using the deflation rate as the explanatory, or "x" variable, and the percent change of mean consumer spending as the response, or "y" variable. As a result of the calculation, the Correlation Coefficient states how strongly positive or negative the relationship is between the two variables, and the coefficient of determination states what percentage of the change in the response variable can be explained by the explanatory variable.

This same process was then repeated to find the correlation coefficient between the deflation rate and the percent change of personal income per capita, as well as between the percent change of personal income per capita and the percent change of mean consumer spending.

Pearson's Product Moment Correlation Coefficient

Pearson's product moment correlation coefficient measures the linear relationship between two variables that are normally distributed. It is a value always between -1 and 1 and is denoted by r. A correlation coefficient of 1 would mean that the two variables have a perfect positive linear relationship, and -1 would translate to a perfect negative linear relationship. Any r values above 0.8 and below -0.8 result in a strong positive or negative linear correlation between the variables. If the r value is between 0.4 and 0.8, there is a moderature positive linear correlation, and if it is between -0.4 and -0.8, there is a moderate negative correlation. Any r values in between 0 and 0.4 conclude a weak positive linear correlation, and any r values between 0 and -0.4 conclude a weak negative linear correlation.

Coefficient of Determination

The coefficient of determination is a statistical measure of the variability of values in a data set. It is essentially how far each value is away from the mean on average. The coefficient of determination can be calculated by raising the Pearson correlation coefficient to the second power. The coefficient is the proportion of the variance in the response variable that can be predicted by the explanatory variable. Since the coefficient of determination is the square of the correlation coefficient, it ranges from 0-1. The value calculated is then multiplied by 100 to determine the percentage of the variance in the response variable that can be explained by the explanatory variable.

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Results

The the linear regression calculation concluded essential information about the relationship between the deflation rate and mean consumer spending. It stated that Pearson's Product Moment Correlation Coefficient, or "r," between the two variables was -0.9081727. It also noted that the correlation coefficient squared, or the coefficient of determination, was 0.824695. This concludes that the deflation rate and the percent change in mean consumer spending have a strong, negative, linear relationship and that 82.4695% of the variance in the percent change of mean consumer spending can be attributed to the growing deflation rate. It then calculated that in the relationship between the deflation rate and the personal income per capita that there was a correlation coefficient of -0.891881 and a coefficient of determination of 0.795452. This deduces that the deflation rate and the personal income per capita also have a strong, negative, linear relationship and that 79.5452% of the variance in the percent change in personal income per capita can be attributed to the deflation rate. Addressing the possibility that the decline in consumer spending was due to the decline in personal

income, the linear regression model stated a correlation coefficient of 0.995978 and a coefficient of determination of 0.991973. This information gives convincing, statistical evidence that the decline in consumer spending can be explained by the decline in personal income when taking a closer look. The correlation coefficient and coefficient of determination illustrates that the decline in personal income, which can be explained by the increase in the deflation rate, has a strong, positive, linear relationship with the decline in mean consumer spending and that 99.1973% of the variance in the mean consumer spending can be explained by the decline in personal income per capita between the years 1929-1933.

Table 1. Three groups broken down with the deflation rate, personal income per capita, and percent change

Year	**Deflation Rate (%)**	**Personal income per capita (% change)**	**Consumer Spending Mean (% change)**
Year	Deflation rate (%)	Personal income per capita (percent change)	Consumer spending mean (percent change)
1929	0	686 (0%)	77222 (0%)
1930	2.7	609 (-11.22449%)	69880 (-9.5077%)
1931	8.9	521 (-14.449918%)	60464 (-13.4745%)
1932	10.3	397 (-23.800384%)	48589 (-19.6398%)
1933	5.2	369 (-7.052897%)	45795 (-5.7503%)

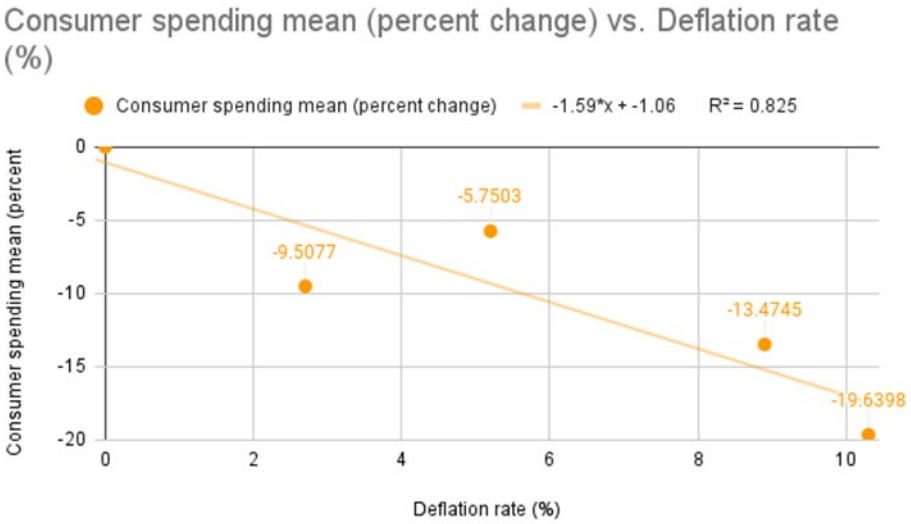

Figure 1. Consumer spending mean (% change) vs. Deflation Rate (%)
Explanatory variable - deflation rate
Response variable - consumer spending mean

Correlation coefficient - -0.908127
Coefficient of determination - 0.824695

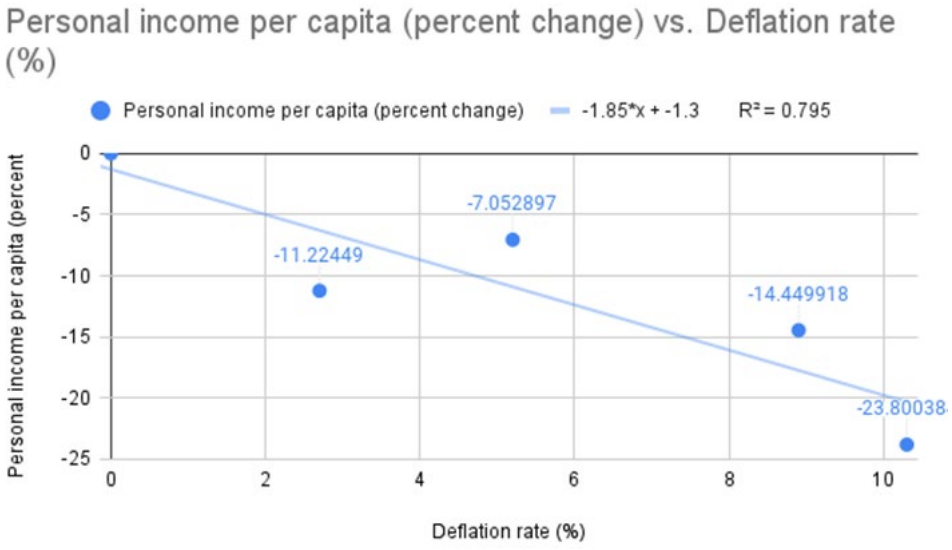

Figure 2. Personal income per capita (% change) vs. Deflation rate (%)
Explanatory variable - deflation rate
Response variable - consumer spending mean
Correlation coefficient - -0.891881
Coefficient of determination - 0.795452

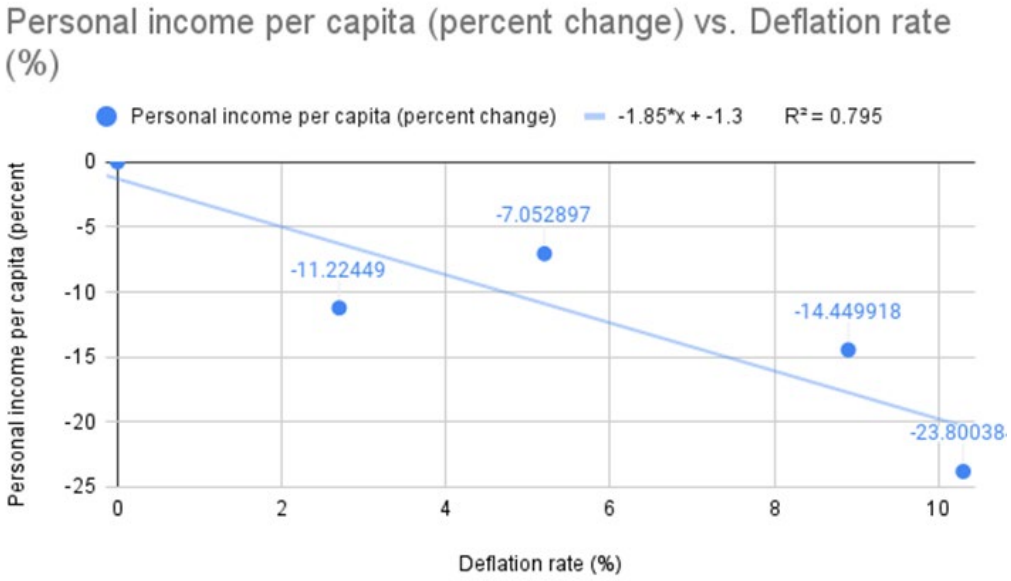

Figure 3. Consumer spending mean (% change) vs. Personal Income per capita (% change)
Explanatory variable - Personal income

Response variable - Mean consumer spending
Correlation coefficient - 0.995978
Coefficient of determination - 0.991973

Discussion

This quantitative investigation reveals that there are relationships between economic crisis, specifically the Great Depression and the deflation that came with it, and changes in consumer behavior and personal income per capita. Even further, this investigation revealed a more specific chain of correlation, discovering that a greater proportion of the variance in consumer spending can be attributed to the change in personal income per capita rather than the deflation from the Great Depression. All three of the linear regression tests performed resulted in a Pearson's Product Moment Correlation Coefficient that is generally considered as a strong, negative, linear relationship between the two variables it was conducted in.

Relevance

These results show the importance of analyzing all aspects of future economic crises to limit further issues such as the ones evaluated in this investigation. These linear regression tests could have been done on a variety of different variables involving the impacts of the depression, helping those trying to prevent further effects of economic crisis know the strength of correlations, as even during an economic crisis there are always many changes happening in the economy that the crisis may not cause. This investigation is necessary to achieve a more extensive understanding of the effects of economic crisis in order to find ways to limit the effects in the future. Substantializing the strength of the correlation between two variables offers a good measuring point to try to bring the numbers down.

Conclusion

These linear regression tests show that economic crisis, specifically the Great Depression, has a significant direct and transitive correlation with the way consumers act. The results indicate that there is a transitive correlation with an increase in deflation and a rise in personal income then a decrease in consumer expenditures, as well as a slightly weaker direct correlation with the decrease in consumer expenditures. However, it cannot be generalized to the whole of economic crises that the whole idea of economic crises leads to a change in consumer behavior, it is possible to generalize deflation to a change in consumer expenditures given that there are more linear regression tests done on other instances of deflation. Many other factors likely played a role in the decrease in consumer spending, but a large majority of it can be attributed to the significant deflation in the years 1929-1933.

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