

**Recipe for a Depression:
A Re-interpretation of Economics in the 1920s**

Stephen J. Church
President

Piscataqua Research, Inc.
Portsmouth, NH 03801

With Review and Assistance by:

William S. Strauss
Department of Economics, University of New Hampshire
(PhD. in progress)

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Author's Note

This is a study of the causes of the Great Depression. I became interested in Federal Reserve monetary policy in the Great Depression because of an article that discussed policy conflicts at the Federal Reserve during the 1920s. The article implied that recent Federal Reserve policy questions were similar to policy issues during the 1920s and 1930s. I found the implications intriguing.

So, I bought a copy of Allan Meltzer's book: [The History of the Federal Reserve: Part I](#). It contains a great deal of interesting information about the 1920s and 1930s. As I read it, I found that:

- The author asserted that appropriate measures would have prevented the Great Depression; and
- The Federal Reserve's recent policies were identified right before my eyes.

You can imagine my surprise when I realized that the Federal Reserve may have been running plays from the Great Depression Prevention handbook during the last few years. Since the author references Ben Bernanke's research and Alan Greenspan wrote the foreword, it appears that the Federal Reserve fully understands this history and probably agrees with the author's conclusions.

This realization started me on a path of discovery. The answers that I found are in this paper.

I will understand if you do not read the entire paper. However, I encourage you to read and understand the first two paragraphs on page 4, page 12, and the "Real Interest Rates" section on pages 14 through 16. These sections represent the core of my answer.

In the first chart on page 15, standard real interest rates show that the widely held interpretation of the 1920s and of the Depression is reasonable but leaves unanswered questions. In the chart where real interest rates are adjusted for effects of manufacturing productivity, the current interpretation of the 1930s remains reasonable, but this chart leads to a markedly different interpretation of the 1920s. The altered interpretation provides the basis for the observed financing and market "bubbles" as well as the roaring growth of the 1920s.

The Great Depression may have resulted from an over-invested and over-financed economy. The roaring 1920s could simply have been the creation of the Federal Reserve handing out free financing for years.

I also want to thank my friend and colleague, Bill Strauss, for his help and encouragement on this re-interpretation of the economic history of the 1920s. Without his help, I could not have developed the information or the thesis of this paper.

Summary

This paper will investigate the causes of the Great Depression. The conclusions challenge accepted wisdom, support some not-so-accepted wisdom, and produce a new description of inflation.

To this researcher, the Great Depression appears to have been an accident waiting to happen. The economic environment of the 1920s offered a tremendous level of economic investment opportunity in productivity-enhancing investments. Not only would there appear to be a seemingly endless stream of economic investment opportunities, but the productivity-enhancing nature of the opportunities would create price deflation.

Into this environment, a fledgling Federal Reserve mistakenly provided low cost money for many years. The low cost money accelerated the economy, utilized the economic investment opportunities at a quick pace and created a high stream of economic profits.

The low cost money also transformed the financial community from a mechanism oriented to providing financing needed for real economic activity into one providing debt-based financing for asset-based price appreciation activities. The asset-based financing created an economy with an unusually high debt load.

Finally, the Federal Reserve unintentionally slowed the real economy while trying to slow the financial economy. This started a process of collapsing asset-based debt that further constrained the real economy. The resulting conflagration is known as the Great Depression.

The reason for the mistakenly low cost money was a misunderstanding of the economic environment. The 1920s were a period of huge economic change, substantial productivity gains, and low observed inflation. Electricity, automobiles, radio, telephone and healthcare advances all contributed to major change.

From an economic perspective, these new technologies outmoded many existing investments. The outmoding of society's existing capital stock created an unusual investment environment. The U.S. economy was faced with years of highly profitable investment opportunities and deflationary productivity results.

The obvious effects of large, highly profitable, productivity-enhancing investment opportunities are the large, new industries that are created as old industries diminish, disappear or become recreated. The unobvious transformations are:

- A long period of higher than average and more stable than average economic growth;
- A large increase in productivity;
- Sustained high profits; and
- **Natural price deflation.**

If the size of the productivity-enhancing investment opportunity set is sufficiently large, the unusual longevity of the opportunity eventually becomes perceived as the norm. People adapt their expectations and fail to realize that they are only eating through an unusually large set of high profit investment opportunities.

Eventually, however, those high profit investment opportunities are exploited. The set of investment opportunities returns to a more “normal” level. The economy returns to lower and less stable growth, lower profits, smaller changes in living standards and non-deflationary prices.

The simple premise of my analysis is:

The Federal Reserve of the 1920s misinterpreted price signals and economic performance in a deflationary economic environment. This misinterpretation led the Federal Reserve to unwittingly maintain very accommodative monetary policy for many years.

Why would the Federal Reserve pursue aggressive monetary policy for seven years? Though Mr. Allan Meltzer’s book documents that the reasons were complex, the Federal Reserve viewed itself as highly successful in providing a new era of **stable prices and high economic growth**.

Unfortunately, the Federal Reserve did not understand that the stable prices were a result of an inherently deflationary environment caused by a high level of productivity investment opportunities. It congratulated itself for something that it had not caused.

The Federal Reserve also did not understand that the high economic growth was a result of aggressive monetary policy. If it had, it would have understood all of the side effects and would have understood exactly what would happen when it adopted a restrictive monetary policy after such a long period of aggressive monetary policy.

The other effects of excessive monetary expansion were: excessive credit growth, extraordinary levels of GDP derived from investment, exceptional profit levels and unusual asset price inflation. The Federal Reserve recognized that the excessive credit growth and asset price inflation were unusual, but they were unable to identify the cause as expansive money policy.

My conclusion is that monetary expansion was much higher than appropriate during the 1920s. The expansionary monetary policy drove a wave of excessive investment; prevented price deflation; and encouraged excessive debt accumulation. The excessive investment of the 1920s set the environment for the economic contraction of the early 1930s. The excessive debt accumulation set the environment for the price deflation and asset-based losses of the 1930s.

Productivity

This paper asserts that the level of productivity improvement is an important aspect of inflation analysis and that it is probably the most important aspect of analyzing the monetary policy of the 1920s. In essence, a high productivity environment is a deflationary environment. The 1920s were a high productivity environment.

The productivity difference has important implications for monetary policy. The Federal Reserve of the 1920s did not understand the difference. The misunderstanding caused a decade of flawed monetary policy.

This section will investigate what productivity is and how it affects an economy. Productivity gains improve living standards by creating price deflation while protecting the income levels of labor and capital.

What is Productivity?

Algebraically, productivity is the sum of output growth minus employment growth minus growth of hours worked. Output growth must exceed growth in the total inputs of labor in order for there to be “productivity” growth.

Where does productivity come from? Productivity is the result of a productivity-enhancing investment. Productivity-enhancing investments increase the output of labor per unit of time. Productivity gains initially increase profits and incomes.

Productivity is the result of an investment either in labor itself or on the part of a business in labor-enhancing tools. Though productivity-enhancing investments initially increase profits and incomes, they ultimately lead to price deflation in a competitive economy.

How does Productivity Effect the Economy?

In a general sense, productivity means that we produce more goods with the same amount of labor or have the same amount of goods with less labor. In a specific sense, productivity creates higher standards of living by lowering price levels without lowering income and profit levels.

Productivity in a One Product, Closed Economy

Let's examine an economy composed of 100 employees working 40 hours per week and producing 100 widgets per week. It takes 40 hours of work to produce a widget. If a productivity-enhancing investment makes it possible to produce a widget in 20 hours, then the economy can produce 200 widgets per week. Productivity has increased by 100%: the change in output of 100% minus the change in labor inputs of 0%.

Assuming that money supply and velocity does not change under the standard definition of the Quantitative Theory of Money ($M*V=Q*P$), what happens in this economy? The

quantity of widgets increases by 100% and the prices are reduced by 50%. Labor's income and capital's profits are unchanged. The economy experiences price deflation and incomes and profits are numerically unchanged.

Productivity in a Closed Economy

Now, assume that the previous enterprise is just one company in a closed economy. The affect of the productivity on the enterprise and economy is as follows:

A productivity-enhancement creates a lower cost of production. The enterprise is initially able to lower prices and sell more goods. Money flows toward the enterprise in the forms of revenue, profits and capital. This money flow reduces revenue, profits and capital available to the rest of the economy. Finally, the economy redistributes capital and labor until all labor earns comparable wages and all capital earns comparable returns.

Once the process of redistributing resources is finished, the enterprise should be larger and have a greater share of national product. Prices in the economy should be lower as more products are purchased with the same amount of money. Everyone will be better off with a lower price level and the same combined income and profits.

So far, productivity changes in a closed economy produce price deflation and higher standards of living. In a closed economy where a productivity change is large relative to the overall economy, it will cause a measurable reduction in prices.

Productivity in an Open, Competitive Economy

The effect of productivity in an open, competitive economy is the same as within a closed economy. The price deflation and productivity effects will also cause money to flow between economies as trade or investment flows. Though this money flow occurred between enterprises in the closed economy, it also moved labor and capital resources between enterprises.

In an open economy, the only way to adjust productivity effects is for money supply, labor and capital to flow toward the economy with increased productivity. Money supply will tend to increase in the economy that creates the productivity change and to decrease in other economies.

The money supply flow will mean that the deflationary effect will also be transmitted to other economies as their money supplies are reduced. In the partner economies, the lower money supplies will cause price deflation.

In the partner economies, the price deflation will be viewed as a negative because the numerically lower profits and incomes will be associated with a loss of money. In the initiating economy, it will be viewed as a positive because incomes and profits will have increased contemporaneously with lower prices and higher money supply. Eventually,

the terms of trade will adjust and everybody will be better off because of the higher productivity and lower prices.

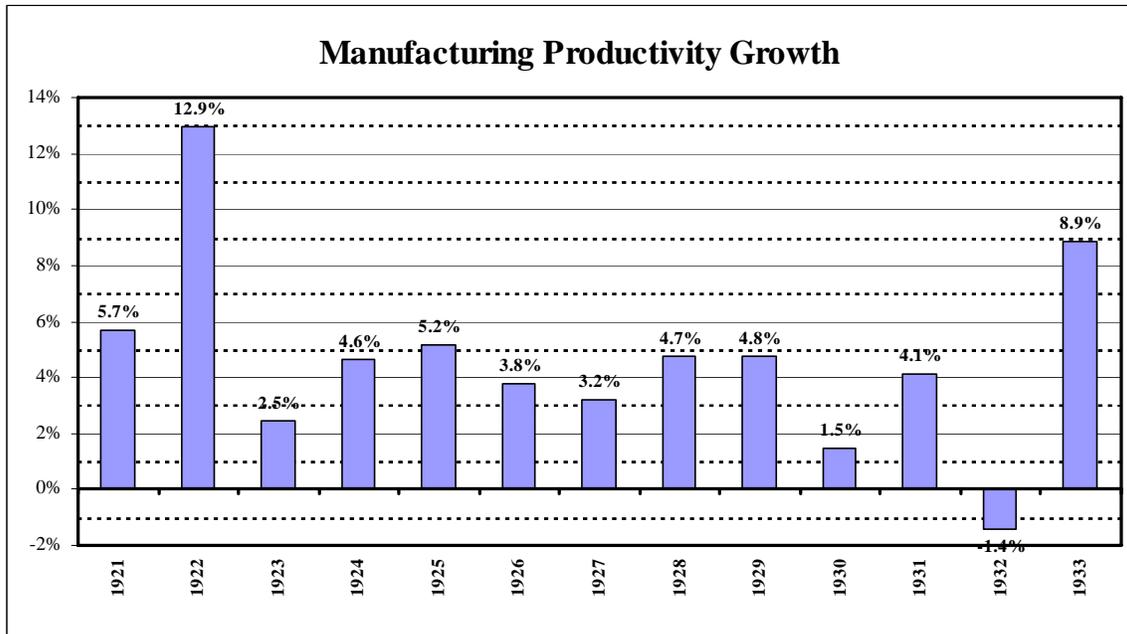
Why is Productivity Important in Analyzing the 1920s?

The 1920s were a decade of huge worldwide productivity gains following from electricity, automobiles, telephones, radios, and medical advances among others. The productivity “opportunities” created a tremendous set of high profit investments.

The simple existence of these investment opportunities meant that the investment portion of the world economy was going to be high and stay high. Private investments would be a seemingly unending source of economic growth. In fact, economic investment activities averaged about 18% of U.S GDP in the 1925 to 1929 period.

At the same time, profits and incomes would remain high because of the consistently high economic activity associated with a high level of investment. The high investment level caused high profits as corporate profits rose to 12% of national income in 1928.

Manufacturing productivity information is available for the U.S. during this period. Since manufacturing was a significant component of the economy, we will use this as a proxy for overall business productivity. The following chart shows the annual average levels of manufacturing productivity growth from 1921 to 1933.



Source: National Bureau of Economic Research Data Series 1300a

Productivity-enhancing investments are the entire story of the 1920s. The observed economic and financial effects are expected in an era marked by a tidal wave of productivity-enhancing investments accelerated by expansionary monetary policy.

The Real Economy: 1921 to 1933

This section will show the development of the real economy during the 1920s and early 1930s. For the purposes of this analysis, we have extended the National Income and Product Accounts from 1929 to 1921. The extended Accounts provide powerful insights into the development of the real economy and the interaction with the financial economy.

The following table shows an extension of the Gross Domestic Product accounts. The accounts rely on data series available from the National Bureau of Economic Research prior to 1929. We have also sought confirmation of the estimates by comparison to other known analyses including work by Robert Gordon of the NBER and information presented by Mr. Meltzer in his analysis of the Federal Reserve.

Year	Gross Domestic Product ¹	Personal Consumption Expenditures ²	Non-Residential Structures ³	Equipment and Software ⁴	Residential ⁵	Change in Private Inventories ⁶	Net Exports ⁷	Government ⁸	PCE as % of GDP	Total Private Investment as % of GDP
1921	68.0	50.7	2.9	3.5	2.4	0.0	2.0	6.5	74.6%	12.9%
1922	69.5	53.2	3.3	2.3	3.8	0.0	0.7	6.2	76.5%	13.5%
1923	79.0	60.0	4.0	3.0	5.0	0.0	0.4	6.6	75.9%	15.2%
1924	84.3	63.5	4.2	2.7	5.7	0.0	1.0	7.2	75.3%	14.9%
1925	89.4	65.5	4.7	4.7	6.1	0.0	0.7	7.7	73.3%	17.3%
1926	93.6	70.6	5.4	3.0	6.1	0.0	0.4	8.1	75.4%	15.5%
1927	94.2	69.9	5.3	4.5	5.5	0.0	0.7	8.3	74.2%	16.2%
1928	98.7	72.6	5.1	5.8	5.4	0.0	1.0	8.8	73.6%	16.5%
1929	103.6	77.4	5.5	5.5	4.0	1.5	0.4	9.3	74.7%	15.9%
1930	91.2	70.1	4.4	4.2	2.4	-0.2	0.3	10.0	76.9%	11.8%
1931	76.5	60.7	2.6	2.6	1.8	-1.1	0.0	9.9	79.3%	7.7%
1932	58.7	48.7	1.4	1.5	0.8	-2.4	0.0	8.7	83.0%	2.2%
1933	56.4	45.9	1.1	1.4	0.6	-1.4	0.1	8.7	81.4%	3.0%

¹ 1929-1933 from National Product Accounts, Bureau of Economic Analysis; 1921-1928 from National Bureau of Economic Research Data Series 08295-Total Final Sales-Barger plus Net Exports
² 1929-1933 from National Product Accounts, Bureau of Economic Analysis; 1921-1928 equals Personal Outlays from Personal Income Analysis
³ 1929-1933 from National Product Accounts, Bureau of Economic Analysis; 1921-1928 based on National Bureau of Economic Research Data Series 02150-Kuznets with adjustments
⁴ 1929-1933 from National Income Accounts, Bureau of Economic Analysis; 1921-1928 from National Bureau of Economic Research Data Series 10096-Chawner adjusted to balance Footnote 8
⁵ 1929-1933 from National Product Accounts, Bureau of Economic Analysis; 1921-1928 based on National Bureau of Economic Research Data Series 02149-Kuznets with adjustments
⁶ 1929-1933 from National Product Accounts, Bureau of Economic Analysis; 1921-1928 at assumed \$0B consistent with using adjusted Final Sales for GDP
⁷ 1929-1933 from National Product Accounts, Bureau of Economic Analysis; 1921-1928 based on National Bureau of Economic Research Data Series 07023 and 07028 netted-US Commerce Dept
⁸ 1929-1933 from National Product Accounts, Bureau of Economic Analysis; as estimated to reflect Footnote 4 and about 9% of GDP

The sources of the information are identified in the Footnotes presented below each table. The basic patterns of this analysis are reasonably reliable except for the portion on the Change in Private Inventories.

We should assume that inventory growth was substantial during the 1925 to 1928 period. The auto industry was an industry that expanded rapidly during the 1920s and would have continuously built inventories. Based on this particular shortcoming, the right-hand column showing the percent of the economy created by private investment should probably be about 1% to 1.5% higher during the years from 1924 to 1928.

The table at the top of the next page shows the development of National Income. These accounts are derived almost directly from data series available at the NBER. In both the Product Accounts and the Income Accounts, the information becomes more reliable as the reader moves closer to 1929.

Estimated National Income Accounts for 1921 to 1933(\$ billions)											
Year	National Income ¹	Other Income and Corporate Profits ²	Personal Income ³	Personal Taxes ⁴	Disposable Income ⁵	Personal Outlays ⁶	Personal Savings ⁷	Savings as % of Disp. Inc.	Personal Outlays as % of Disp. Inc.	Corp. Profits as % of National Income	
1921	61	7.2	53.8	2.3	51.5	50.7	0.8	1.6%	98.4%	11.8%	
1922	62.2	3.5	58.7	2.0	56.7	53.2	3.5	6.2%	93.8%	5.7%	
1923	71.4	4.4	67.0	2.0	65.0	60.0	5.0	7.7%	92.3%	6.2%	
1924	76.6	8.2	68.4	2.0	66.4	63.5	2.9	4.4%	95.6%	10.7%	
1925	81.4	8.3	73.1	2.1	71.0	65.5	5.4	7.6%	92.4%	10.2%	
1926	85	9.2	75.8	2.2	73.6	70.6	2.9	4.0%	96.0%	10.8%	
1927	85.6	9.1	76.5	2.2	74.3	69.9	4.3	5.8%	94.2%	10.6%	
1928	90	11.1	78.9	2.4	76.5	72.5	4.0	5.2%	94.8%	12.3%	
1929	94.2	9.1	85.1	1.7	83.4	79.6	3.8	4.6%	95.4%	9.7%	
1930	83.1	6.8	76.3	1.6	74.7	71.6	3.1	4.1%	95.9%	8.2%	
1931	67.6	2.3	65.3	1.0	64.3	61.8	2.5	3.9%	96.1%	3.4%	
1932	51.3	1.4	49.9	0.7	49.2	49.7	-0.5	-1.0%	101.0%	2.7%	
1933	48.9	2.0	46.9	0.8	46.1	46.8	-0.7	-1.5%	101.5%	4.1%	

From National Income Accounts, Bureau of Economic Analysis; 1921-1928 from National Bureau of Economic Research Data Series 10054-Kuznets as adjusted in relation to GDP
 1929-1933 from National Income Accounts, Bureau of Economic Analysis; 1921-1928 is difference between National Income and Personal Income
 1929-1933 from National Income Accounts, Bureau of Economic Analysis; 1921-1928 from National Bureau of Economic Research Data Series 08168-Barger and Klein
 Personal Taxes are the difference between Personal Income and Disposable Income
 1929-1933 from National Income Accounts, Bureau of Economic Analysis; 1921-1928 from National Bureau of Economic Research Data Series 08282-Barger
 Personal Outlays is the difference between Disposable Income and Personal Savings
 1929-1933 from National Income Accounts, Bureau of Economic Analysis; 1921-1928 from National Bureau of Economic Research Data Series 10041-Kuznets

The least reliable information in this table is the savings rates. However, with the possible exceptions of 1924 and 1926, the savings rates seem reasonably consistent with the known economic environment and surrounding information.

These accounts also demonstrate that there was a substantial apparent increase in corporate profit levels that gained momentum and spiked to an unprecedented level in 1928. This fact should be related to the incredible increase in stock market values during the late 1920s and the high level of corporate investment identified in 1927 and 1928.

The other piece of interesting information is the incredible decline in National Income that began in late 1929. It is clear that the Depression began well before the Federal Reserve lost control of the banking system as it collapsed in late 1932 and 1933.

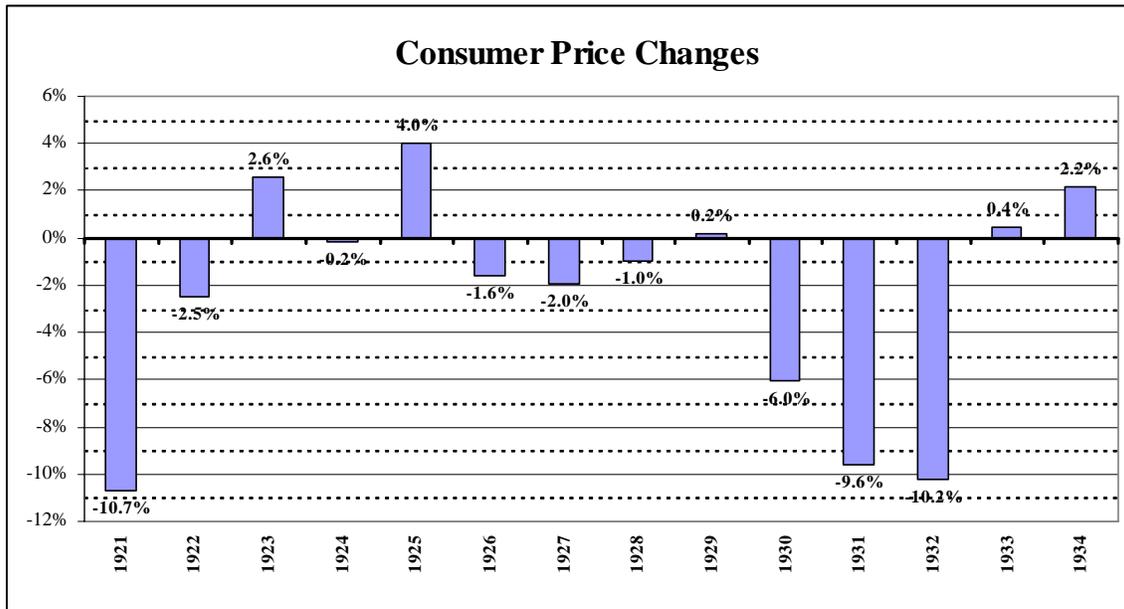
If we combine the known interest rate information on page 14 with the Product Accounts, we see the expected relationships. Interest rates declined from 7% at the end of 1920 to 4.5% at the end of 1921. 1922 shows an increase in housing investment and consumption activity just as would be expected.

In the last part of 1922, the Federal Reserve cut interest rates again giving additional impetus to a growing economy. 1923 shows a significant increase in both residential and non-residential investment in structures. 1923 also shows a large increase in personal income and consumption.

In spring of 1923, the Federal Reserve raised interest rates and the expansion slowed to a controlled pace. As a slowdown developed in early 1924, the Federal Reserve dramatically cut interest rates from 4.5% to 3%. This ignited housing investment to an unprecedented level in 1924. This second shot of monetary stimulus also convinced corporations to dramatically increase investment in plant and equipment as profits increased dramatically in 1924.

The growing investment levels combined with the Federal Reserve holding interest rates at or below 4% until 1928 created an extended boom in residential and corporate investment. The high investment levels created a major expansion at the macroeconomic level as economic investing activities maintained about an 18% portion of total GDP.

The developing boom would normally have produced significant inflation because the boom was primarily created by aggressive monetary policy. However, price levels remained essentially unchanged from 1921 to 1929. These controlled price levels gave the Federal Reserve the confidence to keep interest rates low. The next chart shows Consumer Price changes as calculated by the Bureau of Labor Statistics and shown in the National Bureau of Economic Research's data series 04128.



Source: National Bureau of Economic Research Data Series 04128

As 1926 progressed, credit expansion outside of the direct control of the Federal Reserve became a question. The credit expansion became part of an increasingly active financial economy financing not only the expansion of the real economy, but also the expansion of the stock market, consumer debt and other speculative activities.

The growing, and seemingly reliable, profits caused by the economic boom became a magnet for stock investing. The Dow Jones Industrials price index increased by 34% in 1925, 3% in 1926 and 24% in 1927. With dividends, the rates of return were exceptional.

Finally, the credit expansion and the increasingly speculative activity in the stock market forced the Federal Reserve to begin raising interest rates in 1928. The Dow Jones Industrial price index increased by 41% in 1928. Stock issuance soared three fold from 1927 to 1928.

In 1929, higher interest rates reduced the investment in residential construction and reduced the use of debt by corporations. Corporations increasingly used equity financing in 1928 and 1929 to fund their investment plans for plant and equipment.

The economy peaked in August, 1929 according to the NBER. However, the Federal Reserve had already noted in the spring of 1929 that auto production was outstripping final sales. Inventories were accumulating and it was only a matter of time before the slowdown in purchases of homes and autos would cause an economic slowdown. That slowdown hit almost exactly when the Federal Reserve completed raising interest rates to their highest level since 1921.

In the third quarter of 1929, corporate profits were unchanged from the second quarter of 1929. In the fourth quarter, profits dropped nearly 30%. The economy was well into a contraction when the stock market finally plunged in reaction in late October, 1929. Even though the stock market was up 30% at the end of September, 1929, it completed the year down by 11%.

Corporate investment diminished over the next year as pre-planned investments were completed in 1930. Corporations cut production dramatically in late 1929. The production and residential investment reductions caused a drop in personal income.

Personal income peaked in the middle of 1929 and began dropping in late 1929. The drop in personal income was immediately felt in lower consumer purchases. From late 1929 through 1932, personal income fell at a faster rate than production and total private investment fell to only 3% of GDP.

Price deflation began in earnest in 1930. The price deflation was shared between the loss of profits and the loss of personal income. However, the price deflation meant that output did not fall as fast as the dollar earnings of labor or capital.

From 1929 to 1932, the accumulated productivity gains enabled corporations to reduce costs fast enough to withstand a nearly 30% drop in overall production and maintain minimal profits. In fact, corporations were able to increase profits during 1933 while personal income continued to fall and a banking holiday was declared!

In an attempt to prevent further deterioration in the economy, the Federal Reserve lowered interest rates to 1.5% in early 1931. However, with companies able to produce productivity gains without significant additional investment and with falling personal incomes, there was essentially no real loan demand in either the corporate or in the consumer areas. The incredibly low interest rates had little effect on economic activity.

The economy finally bottomed near the end of 1932 as consumers used accumulated savings to provide for current consumption and corporations finally achieved most of the productivity gains that could be accomplished without some new investments.

The National Income and Product Accounts tell a tale of loss of income and profits during the Great Depression. This loss of income and profits came from two sources: higher real interest rates causing reduced levels of economic investment; and price deflation caused by the excess capacity resulting from the investments of the 1920s.

The initial economic slowdown was caused by contractionary Federal Reserve policy. Corporations, in an attempt to preserve their extraordinary profits during 1929 and 1930, made dramatic cuts in employees to take advantage of the available productivity gains resulting from their previous investments.

However, the initial employment cutbacks caused a dramatic decrease in personal income and personal consumption during 1930. This forced corporations into further production and employment cuts. Corporations were also forced to reduce their profits through dramatic price reductions in 1930 and 1931.

The additional productivity gains in 1931 caused another fall in personal incomes that fed into another round of production, employment, and price cuts in 1932. Profits were finally reduced to minimal levels in 1932.

One more round of productivity gains through additional cost reductions began to increase profits in 1933. However, the employment reductions from 1929 through 1932 brought the American workforce to its most minimal ability to consume. The bottom of the Depression was realized in early 1933.

The Income and Product accounts clearly show the results of tremendous productivity gains throughout the 1920s and 1930s. During the 1920s, the productivity gains allowed economic expansion at a continuously high pace supported by exceptionally low real interest rates. The high level of productivity also allowed both higher profits and higher earnings without any price effects.

From 1929 to 1933, the accumulated corporate investments enabled companies to increasingly better utilize their plant and equipment by lowering costs faster than they lowered production. The higher profits and earnings were essentially given back from 1929 to 1933 and represented the full deflationary circle of productivity gains and the over-capacity caused by over-stimulated economic investing.

Monetary Policy in the 1920s and 1930s

The Federal Reserve of the 1920s was a work in progress. This section will hit the high points of Mr. Allan Meltzer's research without providing many details. It will also compare our thesis of "real inflation" to the conclusions of Mr. Meltzer's research.

The Federal Reserve Act of 1913 created the Federal Reserve System. Though many of us conceive of the Federal Reserve System as fully formed at birth, the truth is more mundane. For all intents and purposes, the Federal Reserve was still setting up shop during the 1920s.

By 1924, the Federal Reserve had already gone through high inflation in World War I and a serious deflationary recession in 1920/1921. The Federal Reserve's first decade had not been particularly successful and was floundering as it implemented the founding legislation. The Federal Reserve's tools were still undergoing refinement and definition during the 1920s. In addition, the powers and authorities were also being defined internally and externally for the System.

Mr. Meltzer illustrates the state of knowledge at the Federal Reserve and blames the Great Depression on the Federal Reserve for their actions in 1930, 1931 and 1932. Mr. Meltzer also concludes that the Federal Reserve policy of the mid-1920s was reasonable because it did not produce inflation.

He suggests that the Depression was caused by monetary errors tied to a failure to distinguish between the effects of real and nominal **interest** rates. In essence, he suggests that the Federal Reserve thought they had expansionary monetary policy in the early 1930s when they actually had contractionary policy.

I suggest that the primary cause of the Great Depression was excessive monetary expansion from 1921 to 1928. The excessive monetary expansion was caused by the failure of the Federal Reserve to distinguish between real and nominal **inflation** rates. The Federal Reserve thought they had low inflation when they actually had high inflation rates offsetting a natural, underlying deflation.

The cause of the underlying deflation was the high rate of productivity gain. If inflation is adjusted for the deflationary effects of productivity, the short-term real interest rate was essentially negative from 1922 to 1929. The negative real rates stimulated excessive economic investment, excessive debt accumulation and excessive financial speculation.

The Monetary History

The 1920s started with high interest rates and a severe recession that combined substantial deflation with high unemployment. Though wartime price excesses needed reduction, this recession caused significant political pressure on the Federal Reserve.

In 1921, the Federal Reserve dramatically lowered interest rates and encouraged a growing recovery.

In late 1923, another recession started. The Federal Reserve implemented new internal procedures and began a monetary expansion. By early 1924, the Federal Reserve had created a substantial easing of credit conditions and the economy was expanding.

In late 1925, the U.S. entered a small recession. The Federal Reserve quickly instituted expansionary policy. The Federal Reserve reduced interest rates to 3.5% to help maintain a vigorous economy.

During 1926 and 1927, the Federal Reserve noted an accelerating credit expansion outside of the control of the Federal Reserve. Credit expansion in the financial economy was far outstripping output expansion in the real economy. Banks created money supply by arbitraging reserve requirements. Banks also loaned money to financial intermediaries for further loan expansion.

In 1928, the Federal Reserve decided to reduce the credit expansion in the financial economy. From the middle of 1928 into early 1929, the Federal Reserve raised interest rates aggressively. Discount rates at most Federal Reserve Banks were up to 6%.

In early 1929, the credit expansion still had not been contained. Some argued that the Federal Reserve needed to raise rates dramatically, as high as 8%, in order to effectively shut down the speculative carry trade in the financial economy.

Interest rates at the Federal Reserve Bank of New York peaked at 6% in August, 1929. Finally, in October 1929, the stock market dropped precipitously. The Federal Reserve Bank of New York responded promptly and stabilized the flow of funds by providing all of the credit necessary to allow unwinding of the stock market carry trade.

As it became clear that the economy was slowing, the Federal Reserve aggressively cut interest rates in 1930 and 1931. Interest rates first settled at 2.5%. In 1931, the discount rate was as low as 1.5% as the Federal Reserve tried to create credit expansion.

In 1932, the economy continued its downward path. The Federal Reserve effectively stopped adding reserves to the System because it perceived no demand for the reserves. The banks were unable or unwilling to use extra reserves to make additional loans.

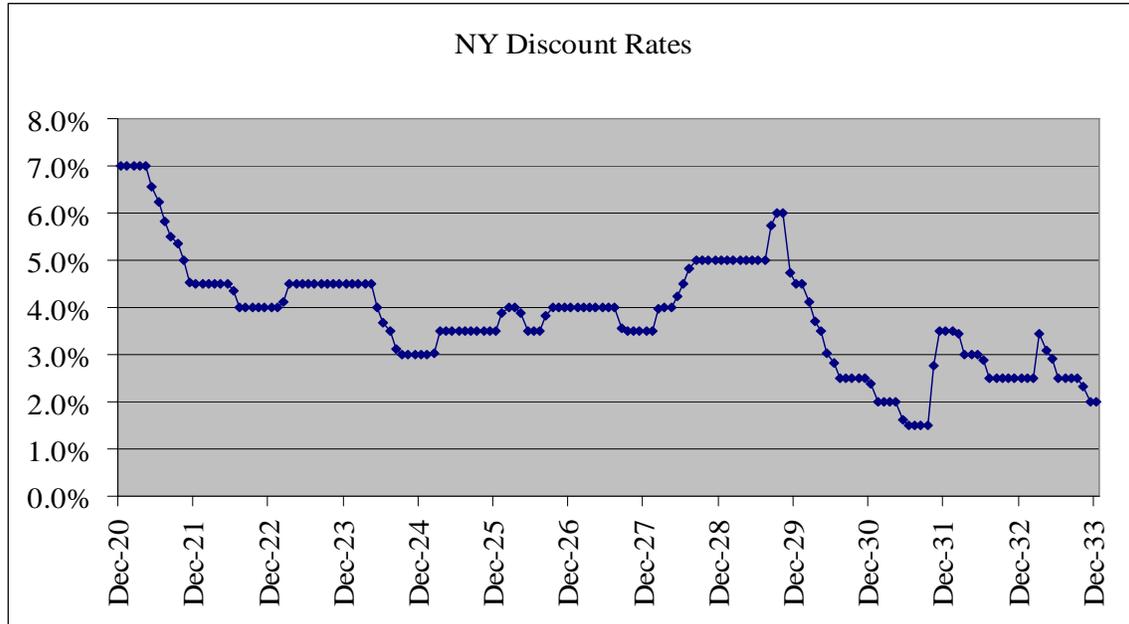
The banking system started to come apart. The number of bank failures rose. The number of banks approaching failure increased dramatically. The demand for cash skyrocketed as confidence fell in banks as a group. The Federal Reserve failed to pump funds into the System to help meet this need.

Finally, in March, 1933 after his inauguration, Franklin D. Roosevelt declared a banking holiday. The System was re-organized and overhauled over the next few years.

Interest Rates

The chart below shows the path of discount rates at the Federal Reserve Bank of New York during the 1920s. The rates started high and decreased at every need to increase economic momentum during the early 1920s.

The history from 1928 to 1931 shows a Federal Reserve trying to constrain the financial credit expansion and then rapidly trying to cushion a significant recession. During 1932 and 1933, interest rates appear to wander with no apparent direction.



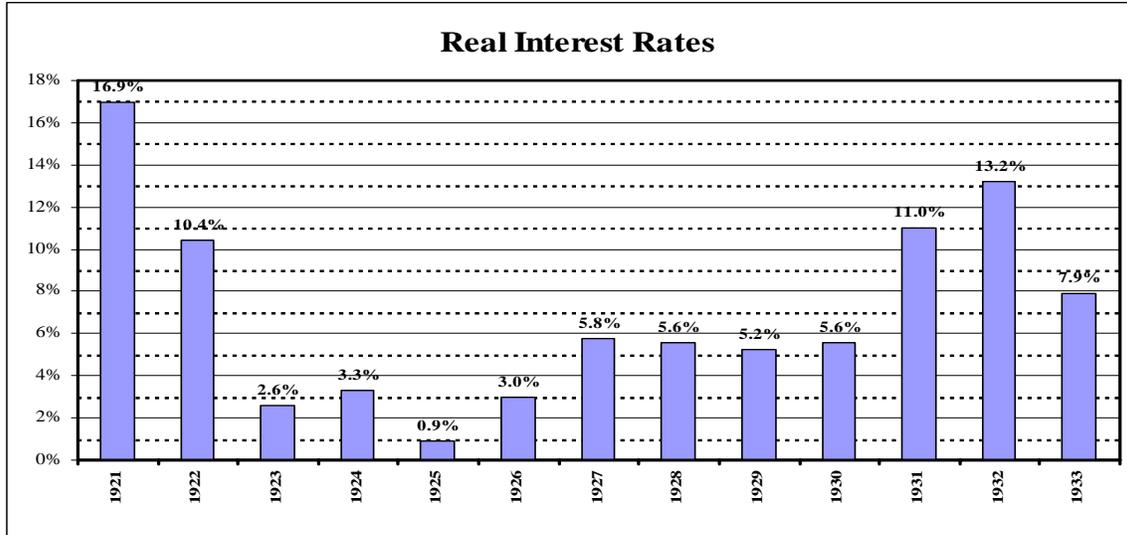
Source: National Bureau of Economic Research Data Series 13009

Real Interest Rates

Real interest rates are the key to a review of the 1920s and 1930s. Mr. Meltzer rests his case on the point that the Federal Reserve created high real interest rates in the early 1930s. He asserts that this was a significant reason for the Great Depression.

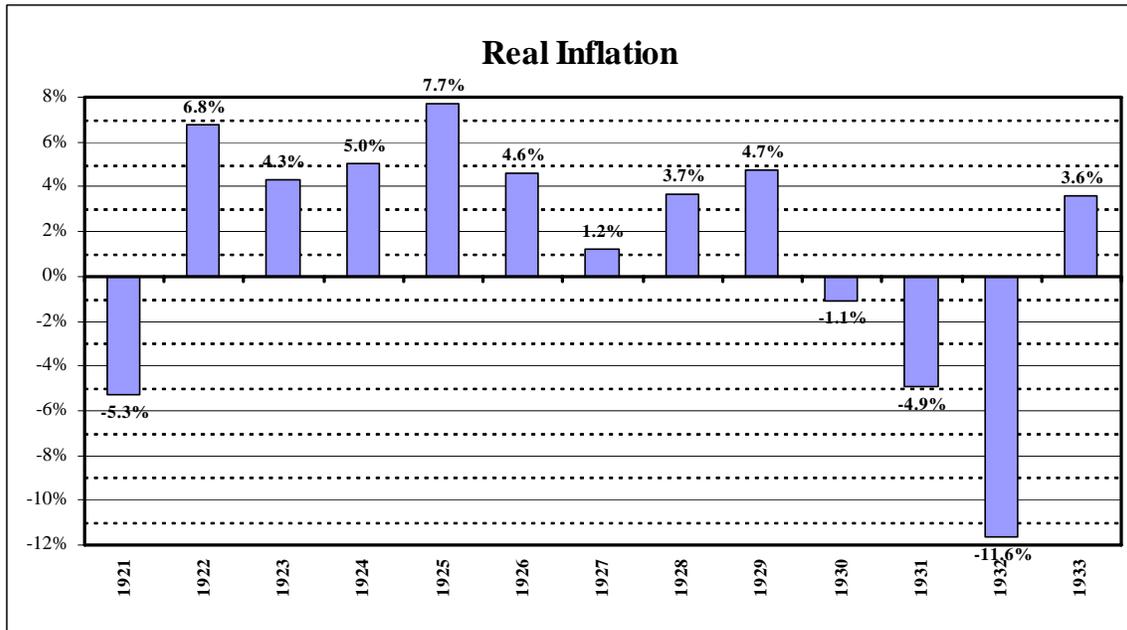
Though this paper supports that conclusion, this paper also asserts that real interest rates were inappropriately low during the 1920s. The low real interest rates of the 1920s created the opportunity for the situation of the 1930s to develop in the first place.

The real interest rate is the difference between short-term interest rates and price inflation. The next chart shows the annual average of short-term interest rates minus the price inflation rates shown on page 9.



The real interest rates in this chart support Mr. Meltzer's interpretation of the Great Depression. Based on the normal calculation of real interest rates, they were at reasonable levels for most of the 1920s. From 1931 through 1933, the Federal Reserve allowed real interest rates to become too high and caused the Great Depression.

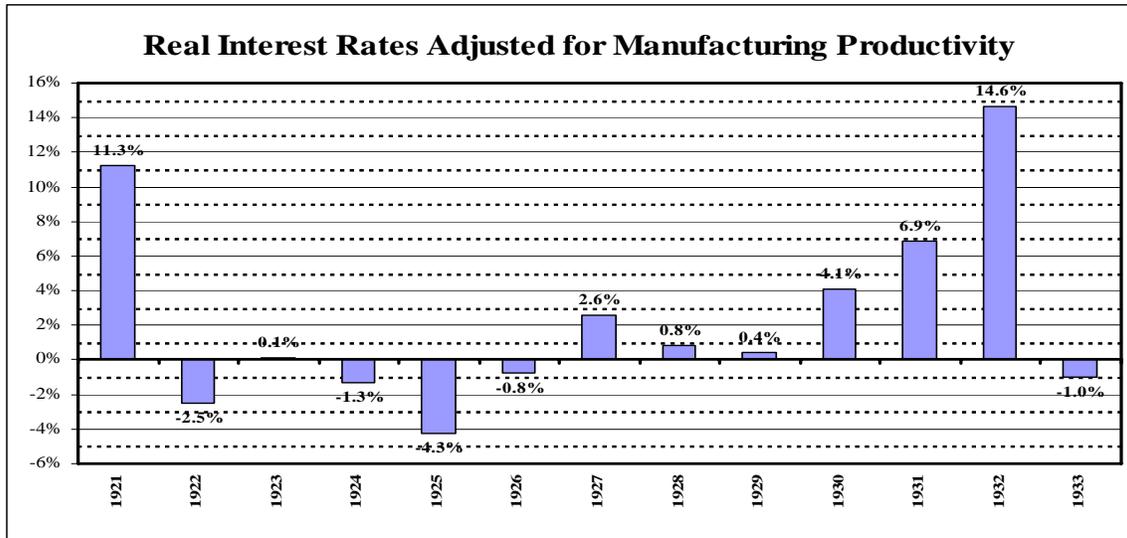
The next chart utilizes this paper's concept of **real** inflation: the sum of observed price inflation and the level of productivity. When the money supply is held constant under the Quantity Theory of Money, the price level should fall by an amount equal to the level of productivity. We have added observed manufacturing productivity to observed consumer price changes to produce the next chart.



Clearly, this level of price change would have sent very different signals to the Federal Reserve of the 1920s than the observed price changes in the chart shown on page 9. It

would also be more consistent with the dramatic level of investment and growth experienced during the 1920s if the level of investment and growth were the result of an aggressive monetary policy.

Using the “real inflation” rates shown in the previous chart, we calculated the real interest rates that would have been observed during the 1920s. In periods of low productivity, observed price inflation is comparable to real inflation. However, in periods of high productivity, real inflation will be substantially higher than observed inflation.



This chart supports the contention of a very different interpretation of the 1920s. This chart shows that monetary policy maintained negative real interest rates for much of the 1920s. It also supports the assertion that monetary policy was restrictive during the Great Depression. This pattern of real interest rates is very consistent with the observed effects in the real economy and in the financial economy.

In our opinion, the “real inflation” hypothesis leads to a very different interpretation of the 1920s. The hypothesis provides a straight-forward rationale for the observed effects in the “real” economy and in the “financial” economy.

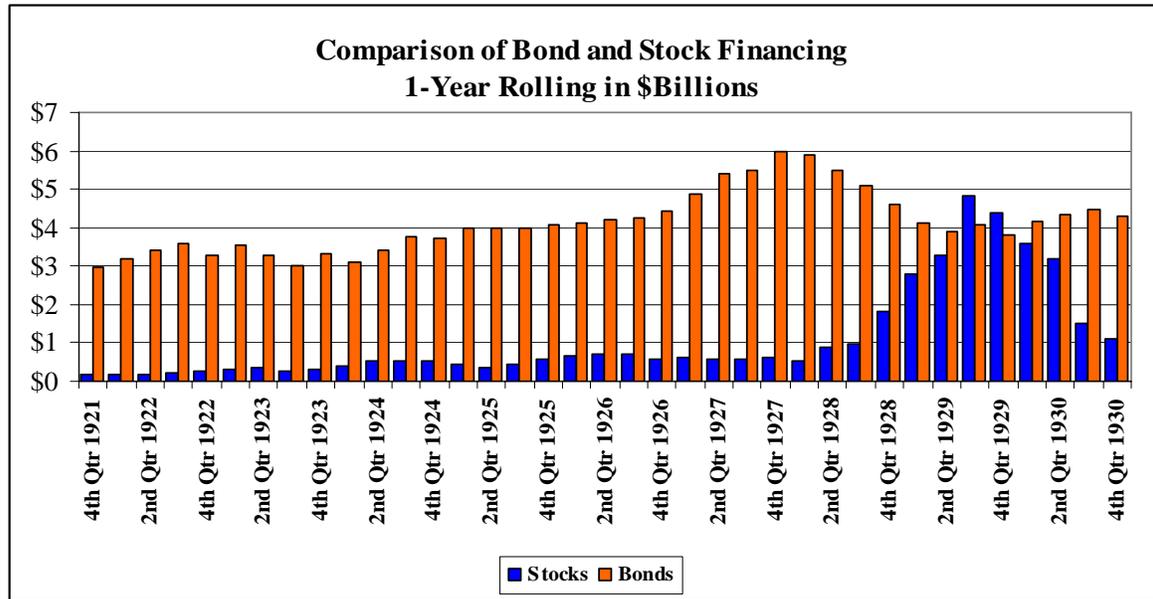
The “real inflation” hypothesis also produces an interpretation of the early 1930s consistent with widely accepted analyses. Real interest rates reached extraordinary levels during the early 1930s. The pattern of real interest rates using “real inflation” appears more consistent with observed economic behavior even during the 1930s.

Negative real interest rates would cause a quickly expanding economy during an environment full of productivity-enhancing investment opportunity. The side effects of easy money would also produce dramatic financial credit growth under such an environment. High real interest rates would also cause a dramatic economic slowdown. The standard approach to real interest rates does not provide an equally descriptive analysis.

The Stock Market and Credit

This section will present information on stock prices, stock issuance and bond issuance during the 1920s. The information is derived from information available through the National Bureau for Economic Research.

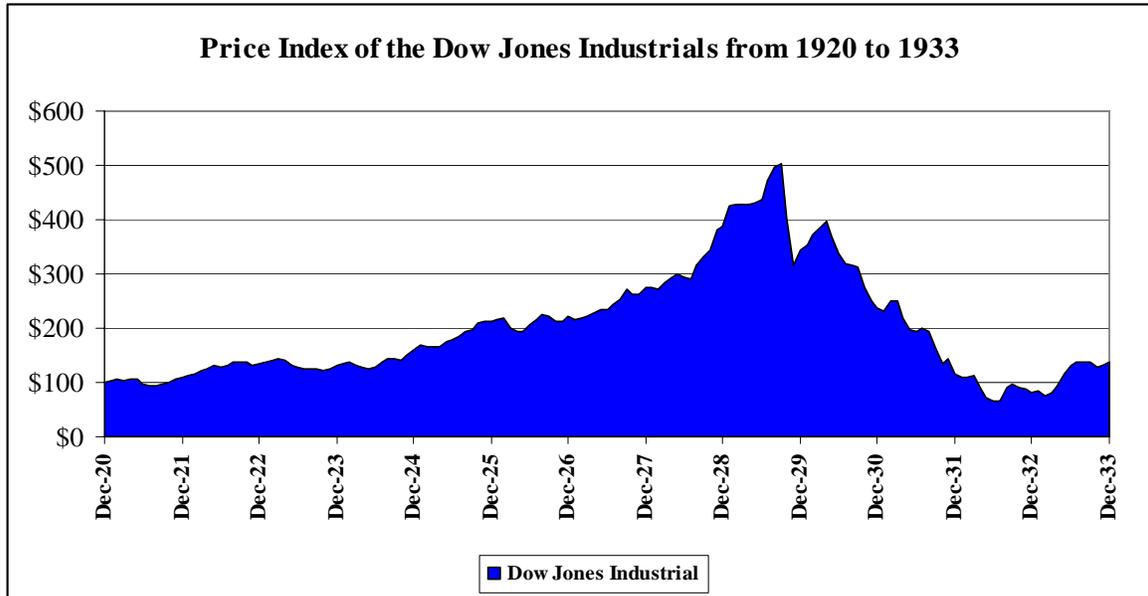
The financing environment was very strong during the 1920s. The next chart shows the rolling 1-year rates of issuance for debt and stock during the 1920s.



The chart shows that the issuance of bonds was steady and strong during the 1920s. While interest rates were low from 1924 to 1927, the rate of bond issuance was high and increased as the strength of the economy increased. The rate of debt issuance began to decline during 1928 and probably reflects a combination of the high stock market and the Federal Reserve beginning to raise interest rates from the lows of the 1924 to 1927 period.

Stock issuance multiplied many times over in late 1928 and into 1929. Essentially, this was a blow-off equity financing environment where liquidity was available, profits were high, and the stock market was high. From the end of 1927 to the third quarter of 1929, stock issuance increased from \$600 million in 1927 to \$4.8 billion in the 12 months ending September, 1929. Stock issuance rose in 1929 to eight times issuance in 1927.

The chart on the next page shows the price performance of the Dow Jones Industrial Index from 1921 to 1933. The chart shows that stock prices peaked in the third quarter of 1929 and declined consistently thereafter. The stock price peak overlaps with the stock issuance peak.



The increase in stock issuance indicates that companies viewed their own stocks as excessively priced and the cost of equity capital as exceedingly low. The level of debt financing combined with the increase in equity financing showed that financing desires were still strong in 1929 and 1930.

Equity financing did not begin to dissipate until the middle of 1930. Prior to that point, corporations behaved as if stock prices were still high and investment opportunities were still plentiful.

The history of the public debt markets is consistent with the known economic and financing environment. The demand for credit was strong during the 1920s. The supply of stock was high when stock prices reached unusual levels.

Mr. Meltzer offers additional information. Based on his information, credit expansion associated with the banking system became extraordinary starting in 1926 as credit expanded at 12% while the economy expanded 4%. In 1927, credit expansion reached 20% while the economy grew 6%.

Mr. Meltzer documents that credit expansion in the financial economy far exceeded the financing needs of the real economy during 1926 and 1927. Usually, this indicates a high level of speculative financing and would be consistent with negative real interest rates.

The financial community knows when free money is available. High levels of speculative financing do not usually occur during times of high real interest rates. The financial credit expansion is consistent with the presence of low real interest rates during the 1920s.

Interactions between the Real and Financial Economies

The interactions between the real and the financial economies progressed as would be expected in an era of high investment opportunity and expansionary monetary policy. The process was simple and predictable.

Excessive monetary expansion through low absolute and real interest rates has predictable side effects. The side effects are increased economic investment activity coupled with increased financial investment activity. The financial investment activity starts as debt investments and morphs into equity investments as economic investments generate growth and profits.

The final phase is usually debt-financed equity investments and maturity arbitrage with short-term debt financing long-term debt investments. The final phase is known as the carry trade where current returns on investments more than cover the currently low cost of short-term borrowings.

The 1920s follow this predictable pattern of excessive monetary expansion. The reduction of interest rates in 1921 started a strong economic expansion. As the expansion subsided, another significant reduction in interest rates in 1924 ignited investment activity in the residential housing and the corporate plant and equipment markets.

As the level of economic investing increased, financial investment activity increased. The high level of economic activity caused higher profits and returns to equity capital. Through 1928, stock market returns were enormous as profits increased at a growing rate.

Since the level of dividends continually exceeded interest rates, the carry trade flourished to the point that the cost of equity capital fell to the point where corporations were willing to issue equity instead of take on debt for the financing of expansionary projects. Corporations converted from debt issuance to equity issuance during 1928 and 1929.

The carry trade was completely rational based on the profit growth from economic investment expectations and the current financing costs of low real interest rates. The predictable result of carry-trade financed equity issuance occurred. Since the capital used for the most recent economic investments was virtually costless, the investments produced excess capacity and stock dilution. Profits began to decline dramatically. The carry trade was forced to unwind as the market violently lowered stock prices.

The net result: get out of the market while the getting was good. In 1929, the New York Federal Reserve provided the funds necessary to allow the unwinding of the stock carry trade during late October and early November. Approximately 50% of stock market related loans were paid off in about two weeks.

A Summary of the Key Economic and Financial Points in the Great Depression Process

The Great Depression resulted from the combination of a decade of monetary policy mistakes and a high productivity environment predisposed to deflationary price pressures.

The 1920s began with a significant recession accompanied by dramatic price deflation. The economy was exiting the artificial stimulus of a major war and entering a decade of dramatic change.

The intersection of the new technologies developed in the previous 50 years and the plentiful access to energy resulted in a huge inventory of productivity-enhancing investment opportunities. The productivity-enhancing investment opportunities provided an exceptional environment for economic growth and created a non-inflationary environment at the same time.

The environment was ripe for misunderstanding even prior to the interjection of monetary policy questions. The Federal Reserve, still in its infancy, stumbled into the process and unwittingly created a highly stimulative monetary environment. Effectively, the Federal Reserve maintained negative real interest rates during most of the decade.

The stimulus of low interest rates coupled with a plenitude of investment opportunities created the roaring '20s. The economy entered what seemed to be a golden age: high growth, expanding incomes, high profits and no inflation.

Low interest rates encouraged exceptional investment levels in plant and equipment, structures and housing. The growth of income made debt-based investing a nearly riskless opportunity. The extended period of increasingly high profits caused by an accelerated investment process seemed to justify expectations of future earnings growth.

Eventually, the negative real interest rates had their expected effect. Credit expansion began to exceed economic growth by a substantial margin. Shortly thereafter, asset prices began to rise at an excessive rate. Finally, borrowing to purchase risky assets on the expectation of price appreciation proliferated into every asset category.

The 1920s ended when the productivity-enhancing investment opportunity set began to diminish and the Federal Reserve determined to do something about the excessive credit expansion. The asset price deflation process morphed into an income deflation process. Price deflation accelerated during the normal economic slowing. Profits declined quickly. Incomes declined quickly. Consumption declined rapidly.

Ultimately, the Great Depression resulted from the excessively low real interest rates maintained by the Federal Reserve during a time of high levels of productivity-enhancing investments. The low real interest rates encouraged over-investment and excessive debt creation. When the Federal Reserve tried to slow the process, the underlying economic weakness was exposed.