

## Cause of the Current Economic Depressionary Period (2008-)

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Now (March, 2009), the DOW is reaching 5000, the unemployment rate is up to 8.1%, home foreclosures and bank and company defaults are at record highs, as are personal bankruptcies. This is the worst recession in 40 years. However, labor productivity growth continues at the 2.7 percent level of the past decade. Why is this economic depressionary period starting now, how long will it last, and what will be its characteristics?

This economic depressionary period is starting now because there is a pattern in American history of economic depressionary periods at about 40 or 50 year intervals. During the 1800s, the depressionary periods were spread about 50 years apart which is why economists such as Kondratiev and Schumpeter talked of a “half-century” cycle or wave of economic activity. But during the 1900s, the economic depressionary periods were 40 years apart. These economic depressionary periods arise because there is a pattern of industrial revolutions occurring at about 80 intervals. This has caused labor productivity growth to have a wave pattern with an 80 year periodicity since 1800. There were periods of highest productivity growth about the decade of the 1950s and about the decade of the 1860s, and the labor productivity growth troughs were about the decade of the 1800s, the decade of the 1890s, and the decade of the 1970s and early 1980s. The economic depressionary periods started about 1790, 1837, 1893, 1929, 1973, and 2008. There were two kinds of economic depressionary periods. The 1837, 1929 and 2008 depressionary periods were associated with high labor productivity growth rates and the switch in major industries from product innovation to process innovation which involved the emphasis on price competition, oligopoly formation in each industry, and increased productivity through economies of scale and automation. The companies within each industry, lacking new innovations, had to compete with the other companies in their fields in price competition. So oligopolies began to form as companies focused on growth for economies of scale, automation for labor reduction, advertising, corporate survival and mergers and acquisitions. So productivity growth suddenly increased about 1998 – there was a productivity growth acceleration. The last 10 years may be called a “technological acceleration” period using a term used by Paul Waters in his book *Technological Acceleration and the Great Depression*, in which he explained some of the causes for the Great Depression of the 1930s. The 3 economic depressionary periods of the 1830s and 1840s, 1930s, and late 2000s and 2010s have similar characteristics and similar causes.

### Scientific Revolutions

The industrial revolutions happen at 80 year intervals, more or less, because scientific revolutions precede them about 50 to 75 years. Scientific paradigms in physics have historically happened at about 80 year intervals since at least 1506, though there is evidence that the periodicity was even earlier. The scientific revolutions happen at about 80 year intervals because there are constraints on human development of physics. Humans haven't been able to have a revolution in physics every year. Physics, a physical paradigm, is a social construct, requiring the work of many people so that a paradigm formulator's theory is first developed accurately, and then tested accurately using technology invented utilizing the technology of the scientific paradigm. Since when people are older or experienced with a paradigm they cannot themselves help to develop a paradigm different from the one they believe, the theoretical formulator's contemporaries in his own generation do not contribute to the development of his own theory. When he teaches his theory to younger people in the next generation, they develop the paradigm's theory. Since this generation of theoreticians themselves cannot develop the technology themselves that would allow them to accurately test the theory and detect anomalies, once they teach the theory to a younger generation of technicians and experimental physicists, and this generation matures, they perform the significant experiments that discern the anomalies of the paradigm's theory. This whole process from discovery of anomalies to theory formulation to theory development to the discovery of more anomalies takes about 80 years on average.

So that physics is a generational process covering three generations, that of the formulator, that of the developers of the theory (the original formulator has never fully developed a physical paradigm himself), and that of the generation of experimenters and inventors. These constraints are as follows:

- (I) Older, more experienced people learn new ideas slowly or not at all, especially when the ideas are very different from their own[1]. I call this constraint *the inhibition of apprehension*.
- (II) The theoreticians of the second generation are not usually the best experimenters or technicians, and don't themselves experimentally discover the anomalies to the theory they developed. I call this constraint *the difference between theoreticians and technicians*.

There are two other constraints that are obvious. One is that it requires a period of time for a person to be educated and develop the skills necessary to make an important contribution. For theorists and experimenters (and inventors) both, this is about 40 years after birth. The late 30s, 40s and early 50s are the years of highest productivity in the human life-time. The other constraint is the time required for a theorist to publish his ideas and for those of the next generation to accept his ideas. For Franklin and Einstein, this happened quickly, but in Faradays case, perhaps because he kept his theoretical ideas mainly to himself until he was old, this happened

more slowly.

Due to these constraints, the drive to press forward the development of physics has made the eighty year periodicity of paradigm change continue unbroken for 500 years or more. A young or inexperienced man learns about the anomalies found by usually middle-aged experimenters and formulates a theory which he is doesn't fully develop himself. But he teaches his ideas, and it is mainly young people of the next generation who accepts his ideas and develops the theory of paradigm. But these theorists can't themselves discover the anomalies, but they teach their newly developed theory, and when experimenters in the next generation mature and reach middle age about twenty years later, they discover the anomalies.

Chart 1

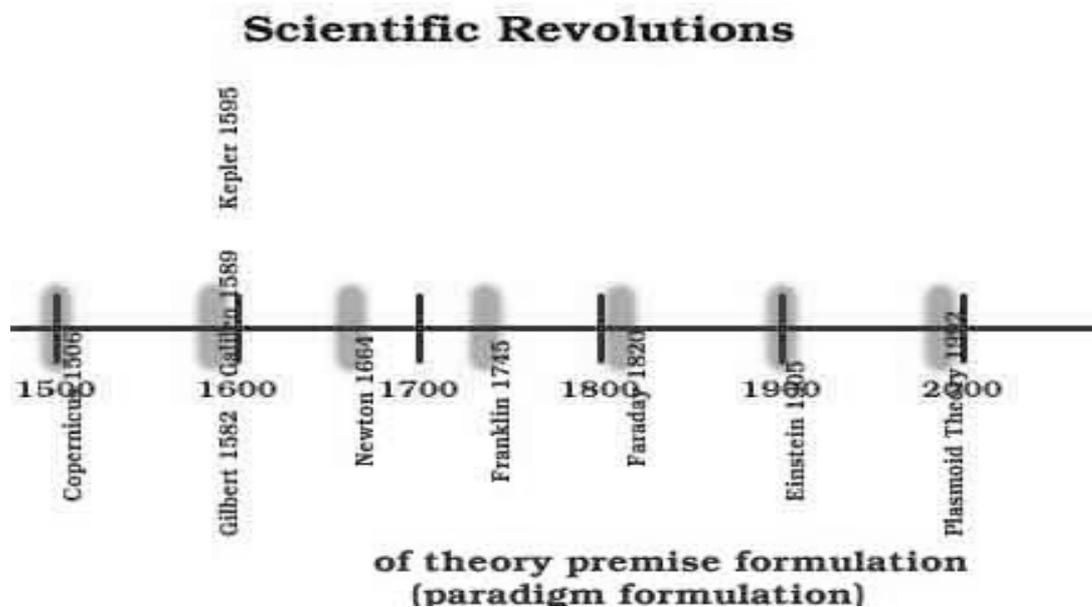


Chart 1. The scientific revolutions in physics fell approximately 80 years apart.

## Two Kinds of Economic Depressions

There are two different kinds of depressions or deep recessions that arise out of the development of the industries of each scientific paradigm. One kind occurs during the industrial revolutions associated with low productivity growth rates, and the other occurs about 30 years after they end associated with accelerating productivity growth rates. So each scientific revolution causes two economic depressions, following about 70 and 100 years afterwards.

Chart 2

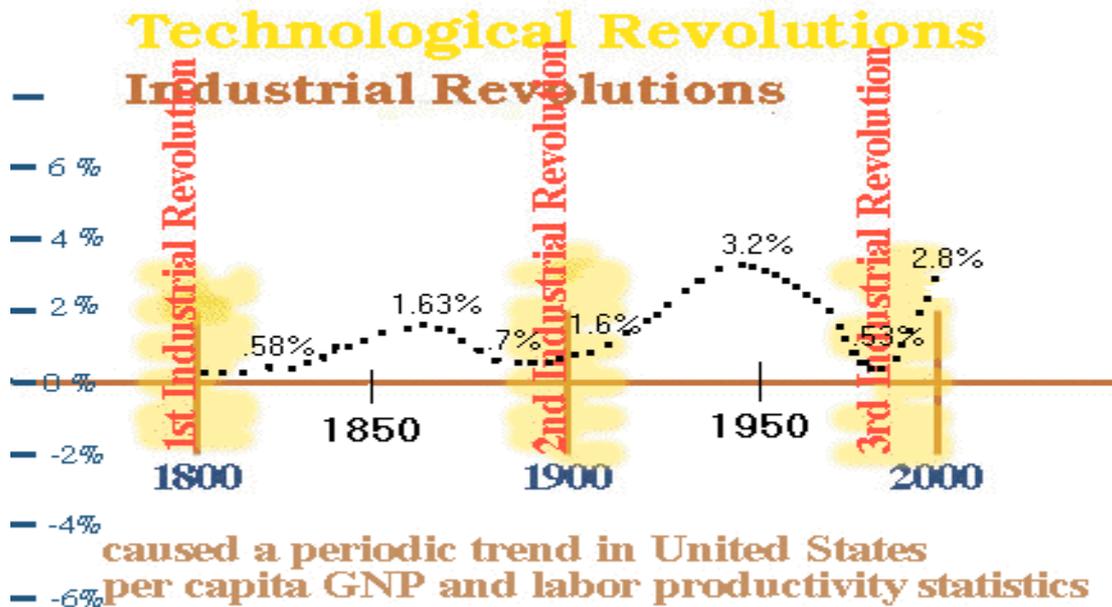


Chart 2. The economic depressionary periods fall on the points of productivity growth dips during the industrial revolutions and the points of productivity growth acceleration during the stage of technological acceleration. The next depressionary period may therefore last from now (end of 2008) until about 2018. During this time, perhaps paradoxically to some people, there will be increasing productivity growth, perhaps around 3.8 percent per year by the end, and I am predicting that it will continue to grow after that unless there is some sort of devastating war or disaster.

As shown in Chart 2, productivity has grown in three major waves, with major recessions or depressions at the troughs and at the points of acceleration (points of highest slope in the curve). Labor productivity growth statistics show that there were productivity growth dips in the U.S. economy that occurred during the beginning of each of the industrial revolutions, around the years 1795, 1892, and 1972. From 1995 to 2000, the productivity growth rate in the U.S. averaged 2.7%, which is about double the average rate during the preceding 22 years. In the U.S. economy, there were similar doublings of growth rates about 1919 and 1829.

### Technological Acceleration Depressionary Periods

1837, 1929, 2008

During the technological acceleration periods (see Chart 2), oligopolies and

monopolies develop in industries through corporate bankruptcies, mergers and acquisitions that in turn lead to labor layoffs. For example, there was a peak in the number of industrial and commercial failures in the late 1920s. From 1920 until 1923, the average number of industrial and commercial failures was 17,732 annually. In comparison, in the four years from 1926 to 1929, there was an average of 22,917 such failures annually. The average number of mergers and acquisitions in manufacturing and mining for the five years from 1920 to 1924 was 461, and from 1925 to 1929 was 917 – almost double. The resulting labor layoffs and efficiencies of scale increased labor productivity greatly.

When innovation of novel demand-spurring products seems infeasible once an industry matures, companies in an oligopoly compete for market share via price competition, modeling, packaging and advertising of products, credit incentives and other ways. Increasing market share enables an oligopoly company to garner a greater advantage of economies of scale, decreasing product costs. Automated machinery and the perfection of mass production techniques enable management to substitute machinery for comparatively expensive human labor.

In order to establish themselves in an oligopoly industry, corporations and businesses have historically taken remarkably high debt to finance the construction of efficient factories, buy out or drive out competitors, and market their products. The years just before the Great Depression and during the Great Depression were when American corporations bore the highest corporate debt from the end of the first World War until 1970. Now corporations again have record corporate debt loads.

In “Technological Acceleration and the Great Depression,” Waters[2] explained how the rise of the consumer credit industry in the US, the availability of a number of important novel consumer durables such as radios and automobiles at affordable prices, and the innovative credit financing techniques introduced by banks, corporations, and retailers resulted in the financial crises and bank failures of the Great Depression. Consumer debt grew rapidly in the 1920s, just as it did during the 1990s and the 2000s, and before the 1837 depression. Rapid productivity growth and increased automation led to disemployment of labor, as described by Ester Fano(17).

As happened in the late 1920s, the United States has record business and private debt. 2005 and 2006 were record years for mergers and acquisitions in the U.S., and this year tops them. Mergers and acquisitions and commercial bankruptcies are at the highest level since the Great Depression. Total corporate debt outstanding is at the highest level since the Great Depression. As in 1929, during the period 2006-2008, wage growth was slow. Total American consumer debt reached 2.2 trillion dollars in 2005, up from 1 trillion in 1994. 2005 was a record year for personal bankruptcies. In 2005, the personal savings rate in the U.S. went below zero for the first time since the Great Depression. Productivity growth is increasing, now about 2.8 percent per year,

and the theory predicts that it will continue to grow for several decades, mirroring what happened during and after the Great Depression unless there is a disaster.

## Industrial Revolution Depressionary Periods

1793, 1893, 1973

There were also two economic depressions and a major recession in the US economy around the years 1783-1800, 1893-1900, and 1973-1982. The industrial revolution depressions or deep recessions have been less severe than the technological acceleration depressionary periods, and marked by the lowest productivity growth as old paradigm industries close and workers retire, migrate to new regions and retrain to utilize the new technologies. During the times of the industrial revolutions, production and consumption dropped for a period of about a decade or two. Older industries closed in the environment of stiffer foreign competition from emerging countries, and competition from the new industries. The new paradigm industries though rapidly growing and highly productive, were small at their beginnings, so they did not contribute much to either increasing employment or the overall productivity growth in the economy.

## Characteristics of This Depressionary Period of the Late 2000s and 2010s

Since this depressionary period has similar causes as the 1929 and 1837 depressions, we can predict that it may be similar to those depressions. That is, the financial crisis will continue and maybe worsen, the stock market will continue to fall and will not rise again to its former height for a long time, unemployment will continue to rise, and more companies and banks will default or be acquired by the dominant oligopoly companies. Since those depressions lasted from 7 to 10 years, this one may as well. We can expect however, that labor productivity may continue to increase for the next two decades, just as it did during the past two technological acceleration depressions.

## Conclusion

Scientific history shows that revolutions in physics happen at about 80 year intervals, and that scientific paradigm change leads to industrial revolutions about 50 to 75 years afterwards. The revolutions are associated with a certain type of economic depressionary period that is different from the technological acceleration depressionary periods. Since the economy of today is following the past pattern, we can predict that this depressionary period that is starting now may be similar to the 1929 and 1837 depressionary periods. Like those depressionary periods, this deep recession or economic depression started after a 10 year economic boom during which both consumers and businesses took on record debt levels for their industrial eras,

companies focused on automation and economies of scale for cheaper manufacture of standardized industrial products, and a comparatively large part of the labor force was disemployed. The life-cycle of industries of each paradigm is the cause the Kondratiev (Kondratieff in French) long wave. More information about these topics can be found at my website: [cust38.metawerx.com.au](http://cust38.metawerx.com.au)

[1] T. Kuhn, *The Structure of Scientific Revolutions*, Chicago, U. of Chicago Press, 1970.

[2] J. Waters, *Technological Acceleration and the Great Depression*, New York, Arno Press, 1977.