

Impact of Economic and Natural Cycles upon the History of the United States (1981-2001)

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Introduction

This article illustrates the correlation between economic and solar cycles, and between economic, solar cycles and social commotions. I take the United States as an example. The period covered is that between 1981 and 2001, which encompasses the two most recent economic cycles.

The hypothesis that a significant correlation exists between the solar and economic cycles is, of course, not new. In the late 19th century it was originally espoused by English professor William S. Jevons.

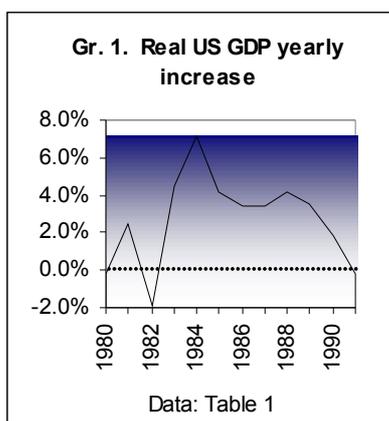
Neither is the thesis linking social movements and economic cycles original --Karl Marx and others studied and wrote about different aspects of it, beginning in the mid 19th century.

Finally, the relationship between solar cycles and social movements has also been dwelled upon previously. Russian professor Alexander L. Tchijevsky showed in 1926 that solar cycle "tops" tend to coincide with periods of heightened social and political tension throughout history.

I am rescuing here those theories and testing them vis-à-vis the United States' empirical experience for the 1981-2001 period. As I demonstrate, their validity seems to hold for that period of time.

I. The 1981-1991 cycle

Between 1980 and 1991 the US economy goes through a somewhat irregular economic cycle, as shown in Graph 1 and Table 1.



The recovery which followed the --relatively brief and slight-- crisis of 1980 was interrupted in 1982, a year in which the gross domestic product shrank 1.9% in real terms, one of the most severe recessions of the post-war era.

The unexpected lengthening of the crisis was mainly due to fiscal and monetary policy. Monetary restrictions enacted by the Federal Reserve Board during the late seventies caused a steep rise in the preferential interest rate. This, one of the main reference rates, increased to 20% in January of 1981, the highest level in recent history.

The Reagan Administration reduced taxes and social expenditures from 1981 onwards. Simultaneously, it increased considerably the military budget. This was financed with loans and caused the national public debt to

double in a few years. Reagan's military program included the "strategic defense initiative", popularly known as "star wars", and which transferred the cold war to outer space. All this spurred economic activity, but at the same time worsened the fiscal deficit and kept interest rates quite high. It also fostered the relative value of the dollar, which led to a wider external commercial deficit.

Recovery began anew in 1983. It became a full-fledged expansion that same year, when the economic growth rate surpassed the historical rate (of about 4%). Expansion leveled off in 1984, when GDP grew 7.2%.

In 1985 economic growth dwindled down to 4.1%, which marked the beginning of the stagnation phase of the economic cycle. It stretched out for four consecutive years, during which the growth rate stayed near the historical average (of 4%). In 1987 the stock market experienced an acute, but short-lived, contraction, which did not have a significant economic impact but which was an omen of the following contraction.

The loss of economic momentum eventually led to a significant economic downturn, beginning in 1990. That year economic growth fell to meager 1.9%. The crisis reached its climax in 1991, when GDP contracted 0.2%.

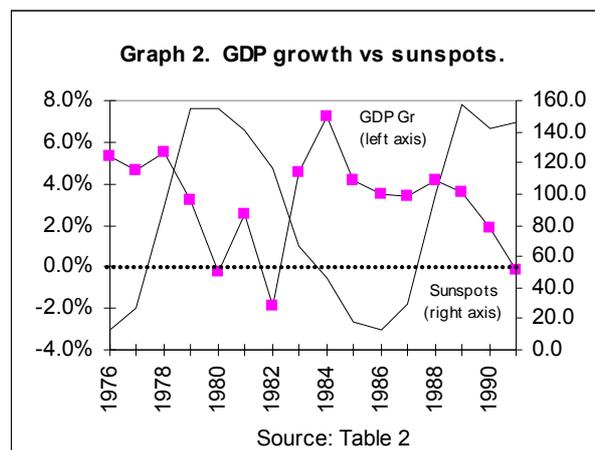
1980	-0.2%
1981	2.5%
1982	-1.9%
1983	4.5%
1984	7.2%
1985	4.1%
1986	3.5%
1987	3.4%
1988	4.1%
1989	3.5%
1990	1.9%

Data: U.S. Commerce Dept.

Solar and economic cycle

The 1980 to 1991 economic cycle was ushered in by a solar cycle which evolved between years 1976 and 1986. Solar activity through this period can be seen in Graph 2 and Table 2.

This solar cycle's phase of deceleration and contraction occur from 1979 onwards and approximately coincide with the expansion phase of the economic cycle.



Graph 2 also shows how in 1986 the solar activity curve

drops down to a minimum (13.4 spots or groups of spots). The point happened almost two years after the economic cycle's maximum point was reached (in 1984).

The ensuing solar cycle's phase of expansion began in 1987. It continued into 1989, when it reached a "peak" or maximum point, which turned out to be one of the most intense of the century.

Expansion of solar activity approximately coincided with those phases of the economic cycle during which the economic growth rate first loses momentum and then drops, as can also be observed from the graphs. Once the solar top is reached in 1989, economic activity starts losing momentum, culminating with the 1990-91 recession.

In conclusion, during the 1980-1991 decade, solar activity seemed to correlate in an approximately negative direction

Table 2. Real US GDP growth and sunspots.

	GDP growth	Sun-spots
1976	5.3%	12.6
1977	4.6%	27.5
1978	5.5%	92.5
1979	3.2%	155.4
1980	-0.2%	154.6
1981	2.5%	140.4
1982	-1.9%	115.9
1983	4.5%	66.6
1984	7.2%	45.9
1985	4.1%	17.9
1986	3.5%	13.4
1987	3.4%	29.4
1988	4.1%	100.2
1989	3.5%	157.6
1990	1.9%	142.6
1991	-0.2%	145.7

Fuente: U.S. Commerce Dept. y NGDC-NOAA.

to economic activity, confirming Jevon's hypothesis.

Economic and natural cycles, and social tensions

The 1980 economic crisis, combined with the high degree of solar activity, seem to have provoked an increase in social tensions, which worsened with the 1982 economic downturn.

An symptom of prevailing discontent were the riots which broke out in "Liberty City" (a Miami, Florida neighborhood) in May of 1980. It was deemed to be the first significant violent outbreak since the civil right strife of the mid 1960s. The state National Guard was called on to deal with the disturbances, in which hundreds of persons participated and which caused 18 deaths, numerous wounded persons, and property damage estimated in over 80 million dollars.

Another symptom were results from the presidential election results of November, 1980. The electorate voted against the government headed by democrat James Carter. The winner, with 50.7% of the vote, was Republican economist, actor and former California governor Ronald Reagan. Aside from Reagan, independent John Anderson, a more moderate conservative, attained 7% of the popular vote.

Even though the Reagan Administration tried hard to distract national attention to the international arena, domestic tension and discontent persisted.

A symptom of this was the big "Solidarity Day" march headed by the union central AFL-CIO on September, 1981, in Washington, D.C. Close to half a million unionized workers participated, demonstrating solidarity with the air traffic controller union, which was in the midst of a strike.

Another sign of underlying dissatisfaction was the massive protest, held in New York City, in June of 1982, and in which over 750,000 persons participated. It was one of the largest demonstrations in U.S. history. Although it was formally directed against nuclear arms proliferation, the large amount of participants undoubtedly reflected the prevailing discontent vis-à-vis other issues, one of them the economic situation.

Another, albeit less trustworthy indicator, which also reflects social unrest and discontent, is the number of participants in labor stoppages. The crisis phase also saw an increase of the strike movement which climaxed in 1983, when 909,000 workers participated in work stoppages.

The economic expansion phase (from 1983 to 1988) and the concurrent drop in solar activity coincided with a substantial diminution of social tensions in the country. No major social or political conflicts were reported in the U.S. during this period.

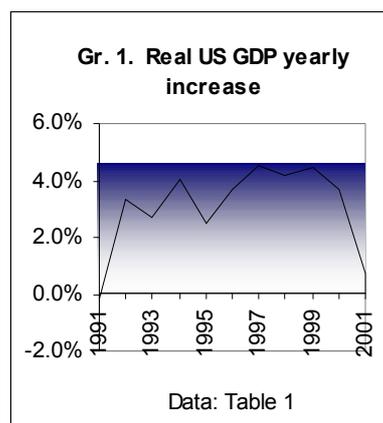
Worker participation in strikes also diminished, falling to a historical minimum of 118,000 workers in year 1988.

The reelection of Republican Ronald Reagan to the presidency in 1984, by a relatively wide margin (he received 59% of the popular vote), confirmed the lowering of social tensions and reflected to an important extent the people's conformity to the economic situation.

In contrast, and as I detail in the next section of this work, during the ensuing economic deceleration phase which began in 1990, and even more during the contraction phase which followed it (and which concurred with a period of increasing solar activity) a new increase of social and economic dissatisfaction, and hence of heightening tensions and conflicts, became evident in the country.

II. The 1991-2001 cycle.

Between 1991 and 2001, the U.S. economy goes through its most recent economic cycle, as Table 1 and Graph 1 show.



Compared to available data, intensity of the cycle's phases of reanimation and expansion (1992-1997) was average. Expansion climaxed in 1997, when economic growth averaged 4.5%, a figure which is only slightly higher than the 4.2% historical yearly growth rate, computed from year 1790 to date.

Expansion was mainly propelled by growth in the data processing and telecommunications sectors (personal computers, data processing applications plus the Internet) and thanks to the increase of military expenditures.

Financial activities also grew significantly. Stock market averages grew extraordinarily up until 1998, when growth was briefly interrupted, only to renew its ascent again until year 2000, when a sharp contraction began.

Table 1. Real US GDP yearly increase.

1991	-0.2%
1992	3.3%
1993	2.7%
1994	4.0%
1995	2.5%
1996	3.7%
1997	4.5%
1998	4.2%
1999	4.4%
2000	3.7%
2001	0.8%

Data: U.S. Commerce Dept.

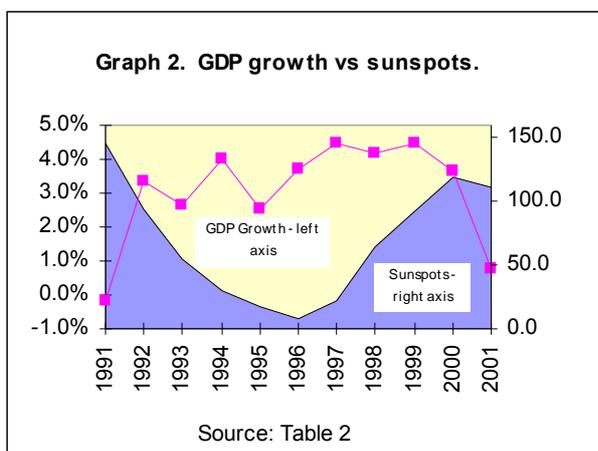
In year 1998 growth rates began falling in comparison to the cycle's high point year; in other words, the economy entered a deceleration phase followed by a brief contraction period which climaxed on year 2001.

This latter year the US' GDP only grew 0.8%, which is significantly lower than the (previously cited) historical growth rate. But compared to the historical average (of minus 4%) experienced during previous contraction phases, the intensity of the 2001 recession must be classified as "low".

Solar and economic cycle

A solar cycle spans between 1986 and 1996. Solar activity (measured as sunspots or groups of sunspots) contracted between 1989 and 1996. It was a very acute downturn – in 1996, the year when solar activity reaches its lowest point, only 8.6 spots or groups of spots were observed, well below the historical average of 50 spots and the lowest level registered since 1954, a year when 4.4 spots were recorded.

As seen in Table 2 and Graph 2, the contraction phase of the solar cycle coincided with the expansionist phase of the economic cycle. It can also be seen that the low point of solar activity coincided approximately with the high point of the economic cycle which, as stated above, was reached in 1997, when GDP rose 4.5%.



From Table 1 we see next that in 1997 the expansionist phase of the following solar cycle started. It extended until year 2000. That year solar activity reached its peak with 119.6 spots recorded. This figure doubles the historical

average (of about 50 spots per year), but is significantly below the maximum point reached in the post-war era, which was reached in 1958, when 190 sunspots were registered.

Solar expansion thus coincided, approximately, with the beginning of the deceleration and contraction phases of the economic cycle, as the reader can infer from Table 2 and Graph 2, above.

Summing up, during decade 1991-2001 solar activity, measured in terms of sunspots, correlated in an approximately inverse fashion to economic activity.

Table 2. Real US GDP growth and sunspots.

	GDP growth	Sunspots
1991	-0.2%	145.7
1992	3.3%	94.3
1993	2.7%	54.6
1994	4.0%	29.9
1995	2.5%	17.5
1996	3.7%	8.6
1997	4.5%	21.5
1998	4.2%	64.3
1999	4.4%	93.3
2000	3.7%	119.6
2001	0.8%	111.0

Data: U.S. Commerce Dept. and NGDC-NOAA.

Economic cycle and social tensions

As indicated, during the 1991-1992 period, the economic situation goes from crisis to reanimation and solar activity remains at a very high level. Also during this span of time, social tension grew considerably, and degenerated in acute social and political conflicts.

For instance, in early 1992 serious upheavals occurred in several important cities of the United States. The main conflict took root for several days in the center and southern areas of Los Angeles (California), where 55 persons died and over one thousand buildings were either damaged or burnt. The seriousness of the situation led local authorities to request the intervention of the National Guard and federal troops.

Lesser unrest episodes also developed in other cities, notably Las Vegas, Atlanta, San Francisco, Oakland, New York, Seattle, Chicago, and Phoenix. These events represented the climax of unrest begun in Crown Heights (Brooklyn, New York) the previous year, provoked by a judicial decision with racist overtones. These were the most serious racial disturbances in many years.

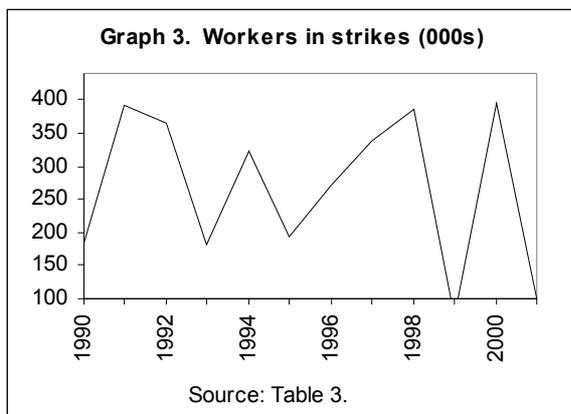
Results of the 1992 presidential election also reflected the prevailing feeling of discontent in the country.

According to Electoral College figures, participants in the election voted massively against republican lawyer George Bush, who sought reelection. Bush received only 38% of the votes cast. Winner was democrat lawyer William Clinton, who received 43%. A third candidate, millionaire populist Ross Perot, received 19%.¹ Clinton's slogan, "it is the economy, stupid", also indicated that the ultimate cause of prevailing discontent was the economic situation.

The number of workers participating in work stoppages also

¹ US Electoral College, "Historical Election Results"; Internet: http://www.archives.gov/federal_register/electoral_college/scores.html#1992.

rose between 1990 and 1992, as seen in Table 3 and Graph 3:



Social tensions diminished during years 1994 to 1998, in coincidence with economic expansion (and a parallel drop of solar activity). No important social or political conflicts happened in the U.S. during this span of time.

1990	185
1991	392
1992	364
1993	182
1994	322
1995	192
1996	273
1997	339
1998	387
1999	73
2000	394
2001	99

Data: US Dep. of Labor.

Another indication of the lessening of social tensions was the reelection of William Clinton to the presidency in 1996. Clinton received 49.6% of the popular vote (6 percentage points more than in the previous election)², which reflected in part the people's acceptance of existing situation.

Participation in labor stoppages also fell between 1994 and 1996, although the trend was interrupted in 1997, when 339,000 workers took part in strikes. In 1998 there was another spike upwards in labor strife, as we can see in Table z-3 (above).

This temporary breach of correlation between work stoppages and economic activity pointed towards the existence of a "chaotic" or "disturbance" factor, and which can be summarized saying that, aside from the economy (and solar movements) other factors do condition, sometimes to an important extent, the labor climate.

In contrast, when the economy goes through its deceleration and contraction phases (which coincide with an increase of solar activity) I find a new increase of social and political tensions and unrest, although of a lesser magnitude, than the one caused by the 1991 crisis.

A symptom of existing discontent were the results of the 2000 presidential election.

Popular dissatisfaction slightly eroded the popularity of the Democratic government which caused a drop of sympathy towards Presidential democratic candidate Al Gore, a lawyer.

The final result was an electoral "tie": Gore received 48.4% of the popular vote, against 47.9% of republican businessman George W. Bush (junior). In the end, Gore lost the election for having received less "electoral votes".

The closeness of election results, irregularities registered during the vote counting, as well as the final decision, moved some persons to claim fraud had been committed; but thanks to the absence of a significant degree of popular discontent, the situation did not push the country into an important political conflict.

Popular dissatisfaction continued well into year 2001, when the September terrorist attacks against the World Trade Center introduced an unexpected factor which, from then on, and for the following months, absorbed national attention and directed it outwards, and thus wrested strength from domestic conflicts.

Conclusions

Economic, social and political data for the United States corresponding to the 1991-2001 period seem to confirm, first, the existence of an inverse correlation between economic and solar cycles. In the years when solar activity reaches a peak, the economy tends to lose momentum, and to enter, within the span of months or a few years, in a contraction phase.

It also seems to confirm the existence of a direct correlation between economic cycles and social tension, which leads into political and social conflicts. In years of economic contraction, or of relative stagnation (as occurs in the first stage of the reanimation phase) tensions tend to increase and also the number and intensity of conflicts rise. In years of economic expansion, the opposite tends to occur.

Finally, an indirect relationship between the solar cycle and social tensions (and hence conflicts) is thus apparent. And, as suggested by Tchijevsky, a direct influence may also be present, as studies seem to point to the fact that increasing sun spot activity influences human emotions.

Sources

U.S. Commerce Department.; *Historical Statistics of the United States* (From Colonial Times to 1970); serie F-14; Bureau of the Census; Washington: 1973. Data reproduced digitally by: Global Financial Data, GFD; Internet: <http://www.globalfinancialdata.com>.

Bureau of Economic Analysis, an agency of the U.S. Department of Commerce; "National Income and Product Accounts Tables"; Internet: <http://www.bea.doc.gov/bea/dn/nipaweb/SelectTable.asp>.

National Geophysical Data Center (NGDC); NGDC -*Data pertaining to solar activity and the upper atmosphere*; Internet: <http://www.ngdc.noaa.gov/stp/SOLAR/solar.html> y <ftp://sunspotnumber.html>.

US Electoral College, "Historical Election Results"; Internet: <http://www.archives.gov>.

U.S. Department of Labor, Bureau of Labor Statistics; Internet: <http://www.bls.gov>.