A Forecasting Model That Integrates
Multiple Business and Stock-Market Cycles

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Abstract

This paper shows that classical business cycles can be integrated with stock-market cycles in an effective forecasting model. The Stock-Market and Economic Cycles Template (SMECT) demonstrates that these cycles are linked in a binary harmonic sequencing that is primarily trough-synchronized. Bronson's BAAC Supercycle provides the crucial missing link in this series of nested cycles [http://en.wikipedia.org/wiki/Kondratiev_wave] , as well as distinguishes periods of significantly higher and lower economic growth and stock market performance. SMECT shows that the interrelationships between these cycles have continued to become stronger, especially during the Modern Policymaking Era.[1] SMECT provides more refined timing for the more frequent and/or more severe bear stock markets, as well as the recessions they anticipate, that we have been forecasting since October 1997 for the current Supercycle Winter Bear Market Period. Finally, SMECT illustrates the applicability of Bronson's Growth Cycle to business and stock-market cycles.

Introduction

Since there is an obvious interrelationship between short-term business cycles and short-term stock-market cycles, it is useful to discover their common elements in order to develop a theory that explains the underlying connections between them and, in our case, to form meaningful, differentiating forecasts, especially over longer-term horizons. By pulling back from the close-up differences and viewing the cycles from a longer-term perspective, their commonalities become more apparent – analogous to the Heisenberg Uncertainty principle, but for different feedback reasons.

It is a well-recognized fact that the stock market, as the single best leading (short-term) economic indicator, anticipates short-term business cycles. Although there have been bear markets that were not followed by recessions, for the past 75 years there has not been a U.S. recession that was not preceded by a bear market. Since 1854, there have been 33 recessions,[2] as determined by the National Bureau of Economic Research (NBER)[3] – each preceded by a bear stock market "anticipating" it. Most relevant for our purposes, the stock market anticipated the end of each recession with bear-market lows, or troughs, six months on average before the official end of those recessions.

Years ago, Bob Bronson, principal of Bronson Capital Markets Research, developed a useful model for predicting certain aspects of the occurrence characteristics of both stock-market and economic cycles. The template for this model graphically illustrates that the model not only explains the interrelationship of these past cycles with a high degree of accuracy – a minimum condition for any meaningful model -- but it also has been, and should continue to be, a reasonably accurate forecasting tool.

The stock-market and business cycles forecasting model

      The first three charts that follow (Exhibit B) illustrate Bronson's Stock-Market and Economic Cycle Template (SMECT) for this model by incrementally overlaying several recognized business cycles. The template incorporates multiple cycles: the Kitchin[4] cycle, the Juglar[5] cycle, the Kuznets[6] cycle, and two so-called long-memory[7] cycles: the Bronson Asset Allocation Cycle (BAAC) Supercycle,[8] and the Kondratieff[9] cycle (K-cycle).[10]

      The template makes readily apparent several significant observations about the model. The model integrates and further supports the validity of the recognized Kitchin, Juglar, Kuznets, and Kondratieff business (or economic) cycles, as well as introduces their applicability to their associated stock-market cycles.[11] The model further establishes the validity and pivotal importance of Bronson's BAAC Supercycles, which Bronson has long contended is the missing link between the Kuznets and Kondratieff cycles. Thus, this model is – as was Bronson's intention in designing it – the most comprehensive chronology of the interrelationships between classical business and stock-market cycles.

      The question is, does this model help us understand stock-market and business cycles sufficiently and provide sufficient information to meaningfully forecast significant aspects of these cycles? It is clear from the template that the model not only explains historical data with a high degree of accuracy, but it also shows that the interrelationships between these cycles continue to be emergent – that is, they have become stronger. Therefore, we expect this model to continue to be a good predictor in the future – probably for at least the next 30 years – despite market efficiency and any model misspecifications,[12] especially since it is integrated with Bronson's other sub models, factors, and indicators in his overall forecasting models.[13]

      Based on historical facts, the theory underlying Bronson's model demonstrates that the long-memory K-cycle also is directly linked to the secular (long-term) cycles in the stock market (a subject of heated debate among some K-cycle adherents). In fact, the model explains exactly why and how the K-cycle has lengthened some 10 years[14] without resorting to explanations such as longer-life demographics, expanding technology-innovation eras, and other factors that may be more consequential than causal. Additionally, the template illustrates in a natural and important setting the applicability of Bronson's Growth Cycle[15] (see Exhibit C) to stock-market and business cycles.

      More importantly, historical data supports the underlying theory that *these cycles are linked in a binary harmonic sequencing that is primarily trough-synchronized.[16]* That is, the cycles can be nested one within another by lining up their troughs, with every other bottom of one cycle also the bottom of the next larger cycle, in a predictably regular sequence, or progression (see Exhibit B). The four charts in Exhibits D-1 and D-2 illustrate the historical data from the four most recent Supercycles, which cover the 28 Kitchin business cycles since 1895, including the 22 NBER-designated recessions, and the minimum set[17] of 32 associated bear stock markets, including the false-positives (bear markets that did not lead to recession[18]).

      Significantly, the SMECT model also provides more refined timing for the more frequent and/or more severe bear stock markets, as well as the recessions they anticipate, that we have been forecasting for the current deflationary Supercycle Bear Market Period since its beginning, which we called on October 7, 1997, exactly when it occurred.[19]

Since the K-cycle does not distinguish different levels of economic growth during its uptrend (in K-cycle terminology, upgrade) and downtrend (downgrade),[20] it serves as a useful net-cycle-neutral collective for measuring the net effects of policy-making intervention by monetary and fiscal authorities. By dividing the number of NBER recessions into the number of years in the K-cycle – which has lengthened by 10 years (endnote 14) – we can see that the NBER-designated business cycle has lengthened from about 3.4 years to about 5.0 years[21] since the Modern Policymaking Era began in 1913.[22]

The BAAC Supercycle, unlike the K-cycle, distinguishes high and low secular-growth periods in the economy. During the last three Supercycle Bull Market Periods, there were a total of only 6 recessions whose durations aggregated only 63 months, thus averaging 10.5 months per such recession. See Exhibit A. But during the last three Supercycle Bear Market Periods, there were a total of 13 recessions, or twice as many, and their durations aggregated to 209 months, or more than three times longer, so that their average duration was 16.1 months, or 53% longer. This is evidence of significantly *higher* economic growth during Supercycle Bull Market Periods, and significantly *lower* economic growth during the Supercycle Bear Market Periods.

In contrast, the 14 recessions during the upgrade phases of the K-cycle (see also Exhibit A) closely matches the 15 recessions during the downgrade phases of the last two K-cycles[23] (with a Supercycle Bull *and* a Supercycle Bear Market Period in each K-cycle phase). This close match reflects very similar underlying economic growth during those upgrade and downgrade phases of the K-cycle.

Note that all of this is consistent with Bronson's claim that policymaking interventions, which have increased during the Modern Policymaking Era since 1913, not only have lengthened the NBER-defined business cycle, but also show up in the secular over- and underperformance of both the economy and the stock market that is reflected in BAAC Supercycle Bull and Bear Market Periods. Thus, Supercycles are important in the integration and understanding of the whole range of recognized business cycles.

SMECT forecasts

The end of the previous Supercycle Bull Market Period and the start of the current Supercycle Bear Market Period were marked by the peak in equity asset-allocation vs. money markets and by the peaks in total return in the equally-weighted (or unweighted) and capitalization-weighted indices for all of the currently about 6,000 publicly-traded US common stocks, as follows (see also Exhibit F):

	equally-weighted (small caps)	capitalization-weighted (large caps)
stock-market asset-allocation highs compared to money markets:	10/7/97	7/16/99
total return (dividends reinvested) highs:	4/21/98	3/24/00

Since 10/7/97, we have been forecasting that the stock market will probably significantly *under*perform money markets from these two indices' respective asset-allocation peaks for about 16 (± 4) years through their bear market lows at the end of the Supercycle Bear Market Period in approximately October 2014.

We have also been forecasting that this Supercycle Bear Market Period will probably consist of three (if one is very severe) or four (regular) Kitchin business-cycle contractions, which will probably also be NBER-designated recessions (depending on the extent and effectiveness of policymaking intervention at the time), the first of which started in March 2001 and ended in November 2001, although our work shows it started earlier and lasted much longer. Each contraction will have a bear market anticipating it, though one or more bear markets may not be followed by recession, depending again primarily on policymaker interventions. The approximate timing of these business cycles is indicated in the bottom panel of the SMECT template on Exhibit D-2.

Therefore, we expect that overall economic growth probably also will be significantly lower during this Supercycle Bear Market Period than during the preceding Supercycle Bull Market Period (1982-97/99), which only experienced one recession from July 1990 to March 1991.

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NBER Recession Count Matrix

Supercycle Bull Market Periods		Supercycle Bear Market Periods		K-Cycles on a trough-to-trough basis
		? 2013? to ? 2014?		**K-cycle downgrade 1982 to 2014?**
		Aug? 2007 to ? 2009?		
July 1990 to Mar 1991		Mar 2001 to Nov 2001		
1982-1997(9)	1	1997(0)-2014?	1+ ?	= 2+? recessions
		Jul 1981 to Nov 1982		**K-cycle upgrade 1949 to 1982**
Apr 1960 to Feb 1961		Jan 1980 to Jul 1980		
Aug 1957 to Apr 1958		Nov 1973 to Mar 1975		
Jul 1953 to May 1954		Dec 1969 to Nov 1970		
1949-1965(8)	3	1965(8)-1982	4 *	= 7* recessions
total	4		5*+?	totals 9*+? recessions

* NBER doesn't include the 1966 Credit Crunch

K-cycle from 1949 to 2014?

Supercycle Bull Market Periods		Supercycle Bear Market Periods		K-Cycles on a trough-to-trough basis
		Nov 1948 to Oct 1949		**K-cycle downgrade 1921 to 1949**
		Feb 1945 to Oct 1945		
Oct 1926 to Nov 1927		May 1937 to Jun 1938		
May 1923 to Jul 1924		Aug 1929 to Mar 1933 *		
1920 -1928(9)	2	1928(9)-1949	4*	= 6* recessions
		Jan 1920 to Jul 1921		**K-cycle upgrade 1896 to 1921**
		Aug 1918 to Mar 1919		
		Jan 1913 to Dec 1914		
Sep 1902 to Aug 1904		Jan 1910 to Jan 1912		
Jun 1899 to Dec 1900		May 1907 to Jun 1908		
1896 -1906	2	1906-1920	5	= 7 recessions
total	4		9*	totals = 13* recessions

* NBER doesn't distinguish a depression from a recession

K-cycle from 1896 - 1949

Supercycle Bull Market Periods		Supercycle Bear Market Periods		K-Cycles on a trough-to-trough basis
		Dec 1895 to Jun 1897		**K-cycle downgrade 1858 to 1896**
Oct 1873 to Mar 1879		Jan 1893 to Jun 1894		
Jun 1869 to Dec 1870		Jul 1890 to May 1891		
Apr 1865 to Dec 1867		Mar 1887 to Apr 1888		
Oct 1860 to Jun 1861		Mar 1882 to May 1885		
1858-1881	4	1881-1896	5	= 9 recessions
		Jun 1857 to Dec 1858		**K-cycle upgrade 1815? to 1858**
?		?		
?		?		= 1+? recessions
?		?		totals = 10+? recessions
?		?		**K-cycle from 1815? - 1896**

Kitchin-frequency business cycle contractions sometimes don't qualify as NBER-designated recessions
http://www.nber.org/cycles.html

Our business cycle work doesn't always agree with the NBER and most notably: (a) 1980-2, which we believe was really one double-dip recession, rather than two recessions separated by only a 12-month recovery and expansion; and (b) the 2001 recession, which we believe lasted 31 months from October 2000 through March 2003, rather than only eight months duration from March through November 2001. Important members of the NBER agree with our work which demonstrates that they underestimated the duration of the 2001 recession, but most likely they'll maintain their historical policy of not changing their previous findings, even if they are proven to be in error.

The 48-month **Kitchin Stock Market Cycle (blue)** leads the **Kitchin Business Cycle (red)** by two quarters, on average.

Exhibit B

The long term uptrend in the stock market causes right translation, or stock market peaks that occur, on average, five-eighths, or about 30 months, into the four-year cycle. The thin blue line is a one-cycle part of the Growth Cycle.
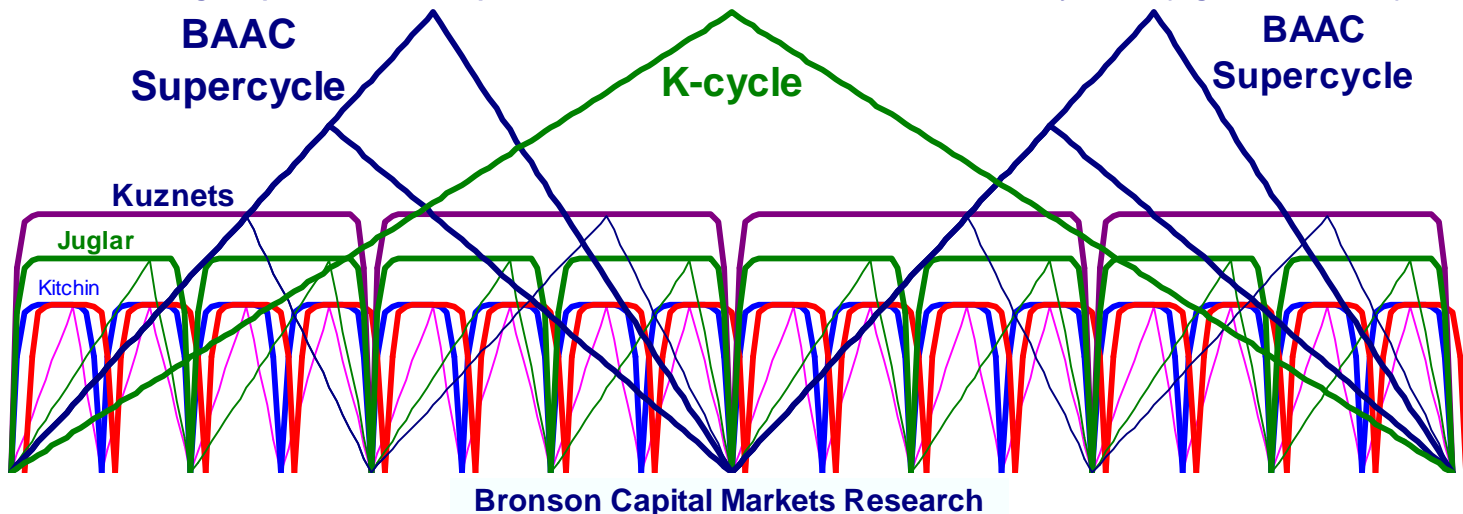
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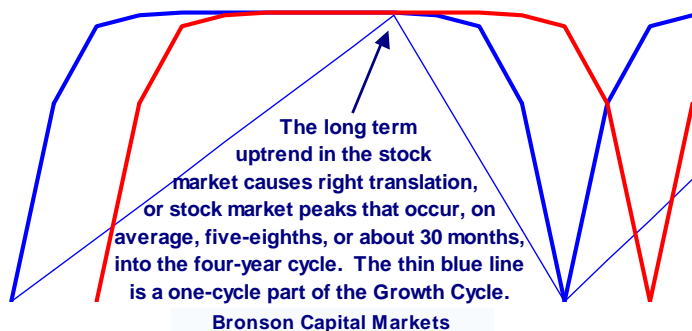
Juglar Stock Market Cycles, averaging eight years in duration, are each synchronized on an every other trough-to-trough basis with the 48-month (average) **Kitchin Stock Market Cycles.** Kuznets Stock Market Cycles, averaging 16 years in duration, are similarly synchronized on an every other trough-to-trough basis with **Juglar Stock Market Cycles.** The 12345ABC Growth Cycles (thin lines) for these cycles reflect right translation in their peaks and both peak- and trough-synchronization.

Kuznets

Juglar   Juglar

5   3   1   B   A   C   2   4

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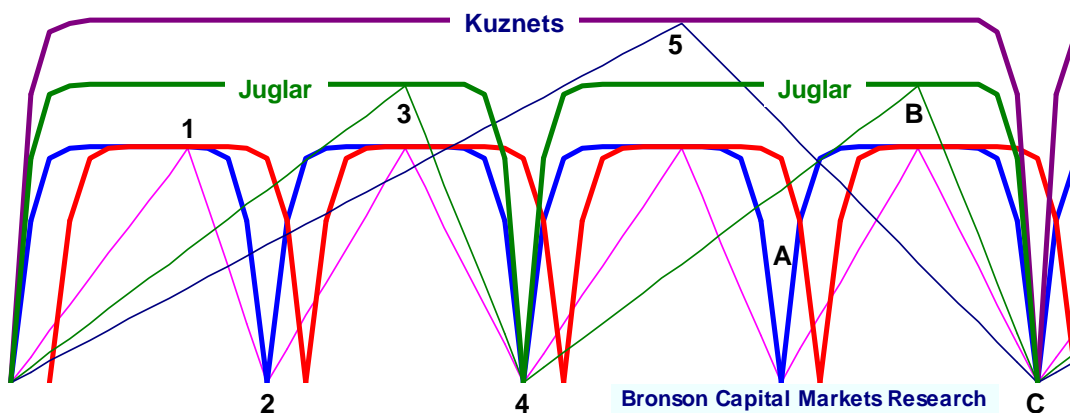
Stock Market Economic Cycle Template

Here is the entire subcycle breakdown for a single K-cycle. Every K-cycle is made up of two BAAC Supercycles, with each of their trends, or periods, being a Kuznets Cycle. These four BAAC Supercycle periods mark the naturally evolving sequence of four economic eras: reflation (spring), inflation (summer), disinflation (fall) and deflation (winter). The two peaks ending each Supercycle bull market period reflect the relative-strength pattern alternation between the capitalization-weighted (big caps) and equally-weighted (small caps) stock market indices. The small-cap market index tops out last in the reflation economic era, or K-cycle spring (e.g., 1968), while the large-cap market index tops out last in the disflation economic era, or K-cycle fall (e.g. 1929 and 2000).

BAAC Supercycle   K-cycle   BAAC Supercycle

Kuznets
Juglar
Kitchin

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THE GROWTH CYCLE
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Level 1:   1 cycle -   2 cycle-trends (waves)
Level 2:   4 cycles -   8 cycle-trends (waves)
Level 3: 16 cycles -   32 cycle-trends (waves)
Level 4: 64 cycles - 128 cycle-trends (waves)
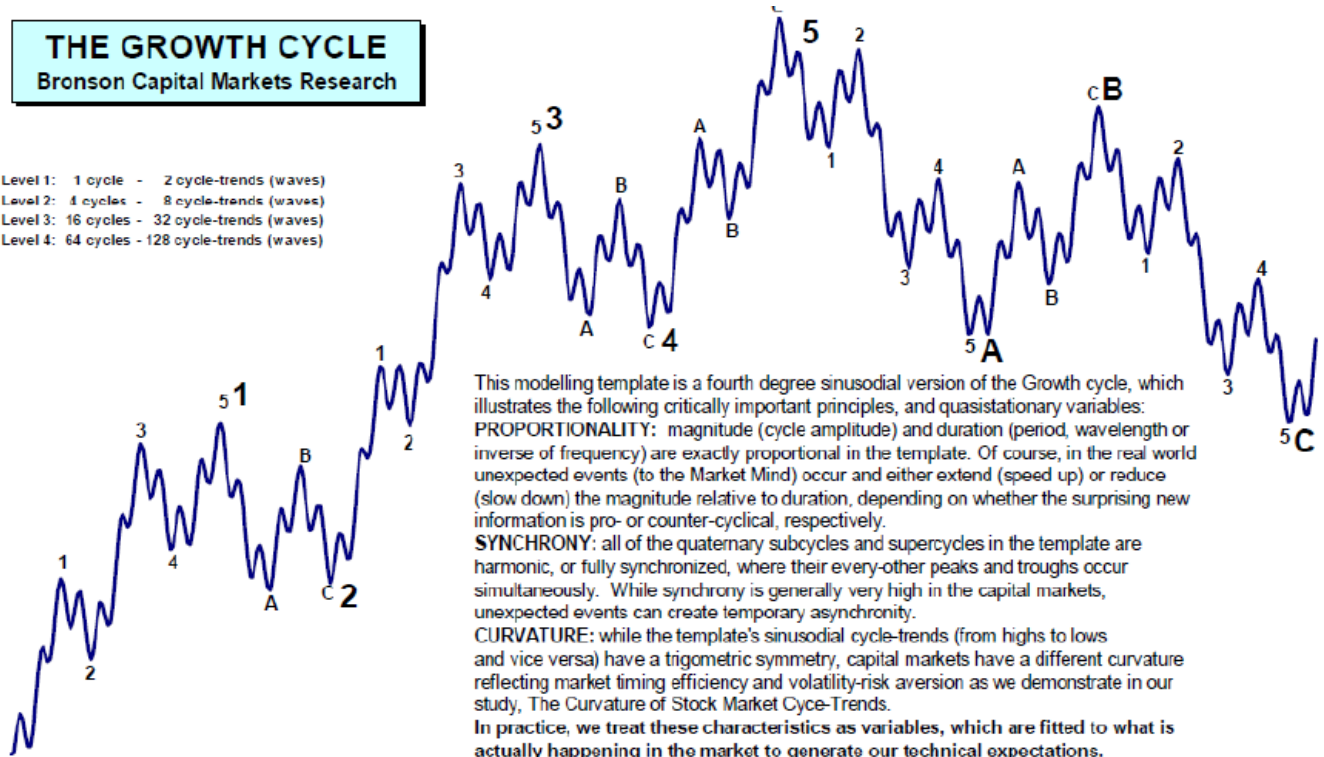
This modelling template is a fourth degree sinusodial version of the Growth cycle, which illustrates the following critically important principles, and quasistationary variables:

PROPORTIONALITY: magnitude (cycle amplitude) and duration (period, wavelength or inverse of frequency) are exactly proportional in the template. Of course, in the real world unexpected events (to the Market Mind) occur and either extend (speed up) or reduce (slow down) the magnitude relative to duration, depending on whether the surprising new information is pro- or counter-cyclical, respectively.

SYNCHRONY: all of the quaternary subcycles and supercycles in the template are harmonic, or fully synchronized, where their every-other peaks and troughs occur simultaneously. While synchrony is generally very high in the capital markets, unexpected events can create temporary asynchronity.

CURVATURE: while the template's sinusodial cycle-trends (from highs to lows and vice versa) have a trigometric symmetry, capital markets have a different curvature reflecting market timing efficiency and volatility-risk aversion as we demonstrate in our study, The Curvature of Stock Market Cyce-Trends.

In practice, we treat these characteristics as variables, which are fitted to what is actually happening in the market to generate our technical expectations.

Growth Cycle inequality algorithm: (2 < 1 < 3 > 5 > 4 > 2) > (A > B < C)
It is probabilistic and falsifiable. Elliott Wave Theory is not falsifiable.

The first two levels of cycle-trend symmetry is (53)(53)(35)(35) which sums to binary 32, not Fibonacci 34, which is not symmetrical in Elliott Wave Theory (53)(53)(55)(35)

The Growth Cycle multi-fractal is quaternary-based with three sets of nested cycles:
4^{-1} = ¼ cycle, or long term uptrend; 4^{0} =1, or one cycle; and 4^{1} = 4, or 4 cycles as follows:

Growth Cycle (level 4)

long term uptrend
$4^{-1} = \frac{1}{4}$ cycle

$4^0 = 1$ cycle

$4^1 = 4$ cycles

$4^2 = 16$ cycles

3

5

B

1

4

A

C

2
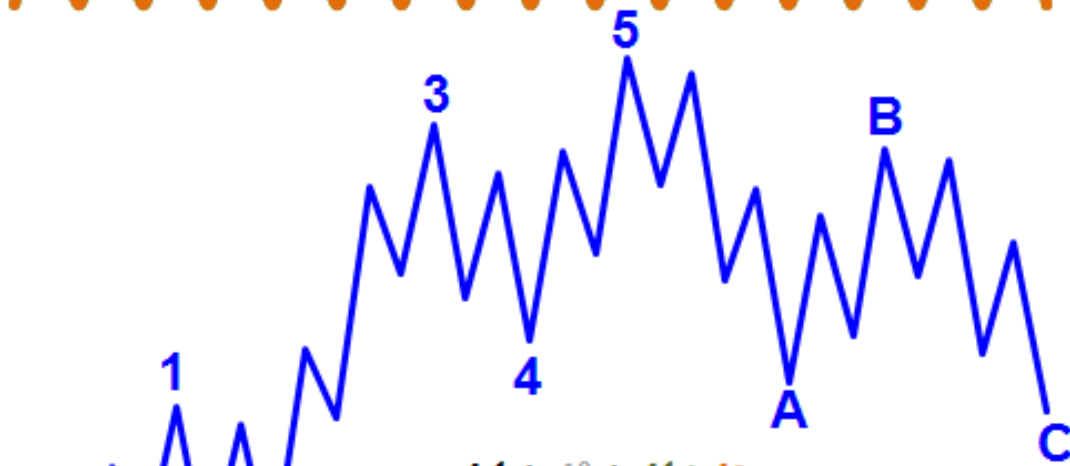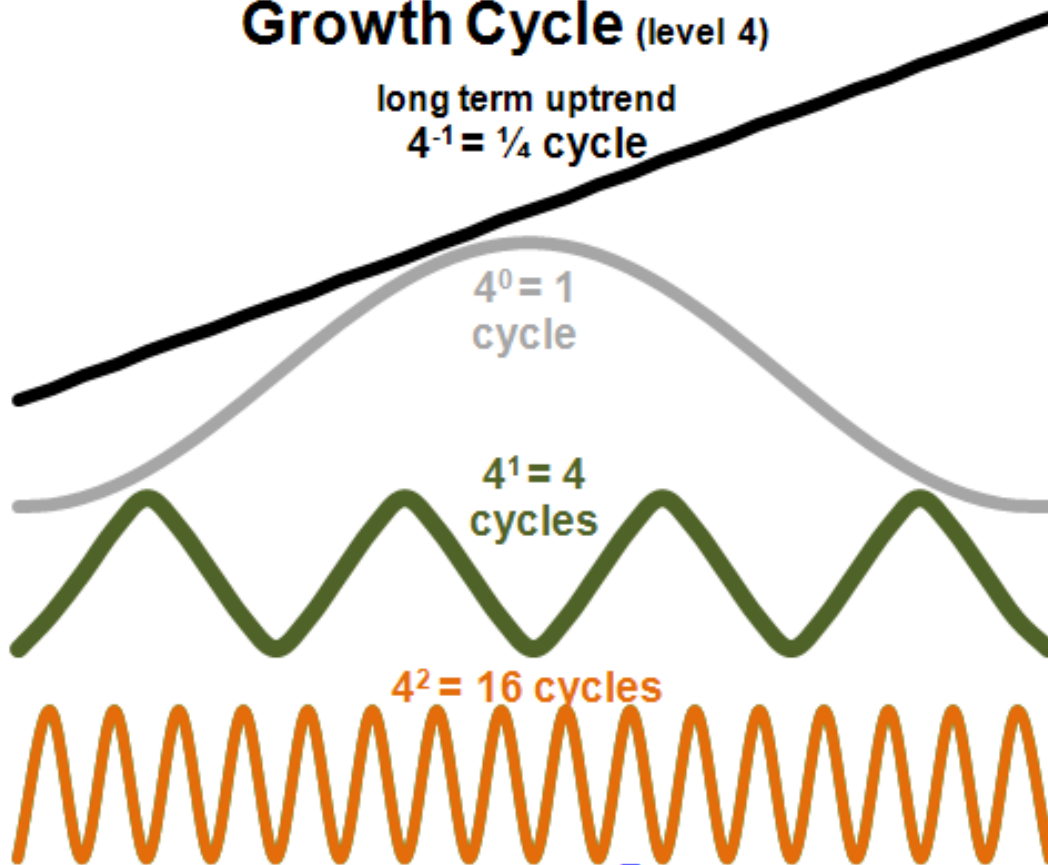
$4^{-1} + 4^0 + 4^1 + 4^2$
= 32 cycle trends
(not a Fibonacci 34)

sum of a long term uptrend plus one cycle
plus four cycles plus sixteen cycles equals
a level four idealized Growth Cycle fractal

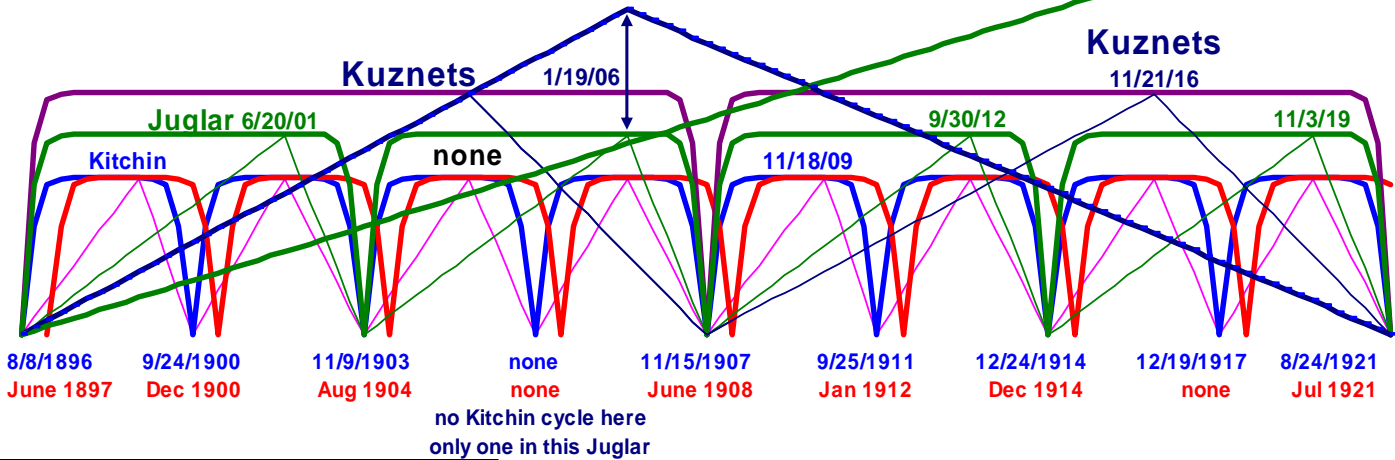Bronson Capital Markets Research

7 b

K-cycle 1896-1949

K-cycle spring, or reflationary economic BAAC Supercycle bull market period

BAAC Supercycle peak

K-cycle summer, or inflationary economic BAAC Supercycle bear market period

K-cycle peak

Kuznets 1/19/06

Juglar 6/20/01

Kitchin

Kuznets 11/21/16

9/30/12

11/3/19

11/18/09

| 8/8/1896 | 9/24/1900 | 11/9/1903 | none | 11/15/1907 | 9/25/1911 | 12/24/1914 | 12/19/1917 | 8/24/1921 |
| June 1897 | Dec 1900 | Aug 1904 | none | June 1908 | Jan 1912 | Dec 1914 | none | Jul 1921 |

no Kitchin cycle here
only one in this Juglar

Kitchin stock market cycle bottoms are in blue
Kitchin business cycle troughs are in red

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K-cycle fall, or disinflationary economic BAAC Supercycle bull market period

BAAC Supercycle peaks: 11/28/1928 (small caps) and 9/3/1929 (large caps)

K-cycle winter, or deflationary economic BAAC Supercycle bear market period

K-cycle peak

4/17/1930 orthodox peak

Kuznets

Juglar 2/11/26

Kitchin

Kuznets 5/29/46

Juglar 11/10/38

Juglar 6/15/48

2/5/34

| 12/21/1920 | 10/30/1923 | 3/30/1926 | 11/13/1929 | 7/8/1932 | 3/31/1938 | 4/28/1942 | 10/30/1946 | 6/13/1949 |
| Jul 1921 | Jul 1924 | Nov 1927 | none | Mar 1933 | Jun 1938 | none, but ===> | Oct 1945 | Oct 1949 |

Kitchin stock market cycle bottoms are in blue
Kitchin business cycle troughs are in red

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K-cycle spring, or reflationary economic BAAC Supercycle bull market period

BAAC Supercycle peaks:
2/9/66 large caps
12/3/68 small caps

K-cycle summer, or inflationary economic BAAC Supercycle bear market period

K-cycle peak

Kuznets 1/5/60

Kuznets 9/22/76

Juglar 3/20/56

1/11/73

11/28/80

Kitchin

| 6/13/1949 | 9/14/1953 | 10/22/1957 | 6/26/1962 | 10/7/1966 | 5/26/1970 | 10/3/1974 | 3/1/1978 | 8/9/1982 |
| Oct 1949 | May 1954 | Apr 1958 | Feb 1961 | credit crunch | Nov 1970 | Mar 1975 | Jul 1980 | Nov 1982 |

Kitchin stock market cycle bottoms are in blue
Kitchin business cycle troughs are in red

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K-cycle peak

K-cycle fall, or disinflationary economic BAAC Supercycle bull market period

BAAC Supercycle peaks:
3/24/00 (large caps)
4/21/98 (small caps)

K-cycle winter, or deflationary economic BAAC Supercycle bear market period

Kuznets peak 1/31/94

Kuznets peak 2006

Juglar 10/10/89

4/21/98

Juglar 3/24/00

Juglar 2006

Kitchin

| 8/9/1982 | 10/19/1987 | 10/11/1990 | 12/9/1994 | 10/8/1998 | 10/10/02 | delayed | 1Q 2009? | Oct? 2014? |
| Nov 1982 | none | Mar 1991 | none | Asian Crisis | Mar 2003* | delayed | 2010? | 2015? |

* Nov 2002 was NBER's designated end of the recession, but it started sooner (Oct '00) and ended later (Mar '03)
** 2006 housing prices and Core Capex peaked

Kitchin stock market cycle bottoms are in blue
Kitchin business cycle troughs are in red
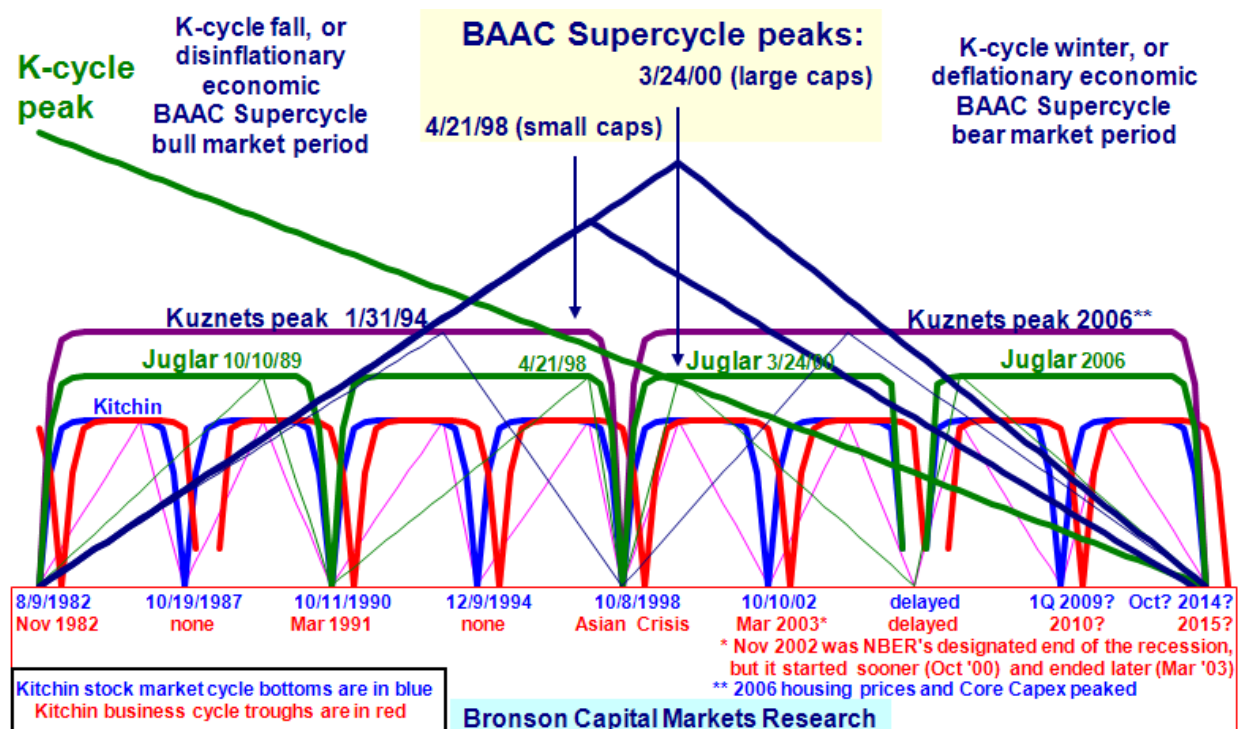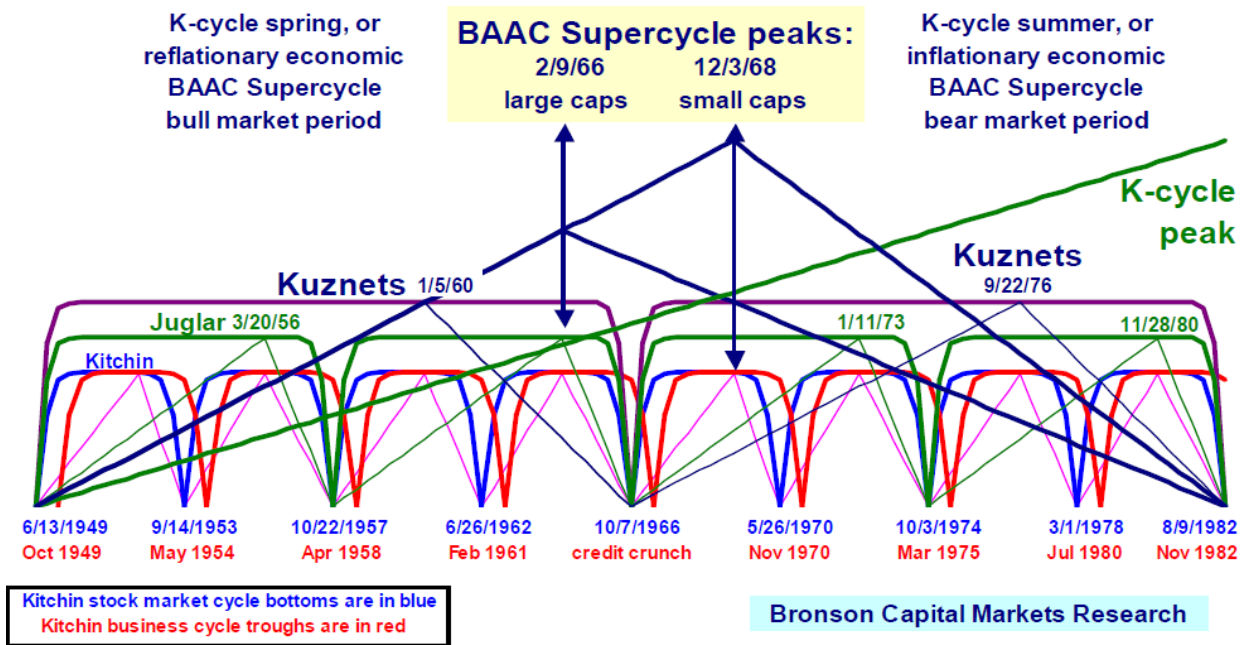
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33 Most Severe Bear Markets Since 1895

(US stock market price-only analysis - no dividend reinvestment)

Dates of Highs and Lows*	Magnitude (high to low)	Duration (months)	Severity Proxy Product *	Rank	Median Magnitudes Of the Top Ranking
4/17/1930 to 7/8/1932	86.0%	26.7	22.8	1	86.0%
11/10/1938 to 4/28/1942	43.2%	41.6	10.2	2	64.6%
3/24/2000 to 10/10/2002	50.5%	30.6	9.3	3	50.5%
6/17/1901 to 11/9/1903	46.1%	29.1	7.8	4	48.3%
1/11/1973 to 12/9/1974	49.4%	22.9	6.8	5	49.4%
9/30/1912 to 12/24/1914	43.5%	26.8	6.6	6	47.8%
10/10/2007 to 3/6/2009	57.5%	16.9	6.3	7	49.4%
11/3/1919 to 8/24/1921	46.6%	21.7	5.9	8	46.6%
1/19/1906 to 11/15/1907	41.4%	21.9	5.1	9	46.6%
3/10/1937 to 3/31/1938	49.1%	12.7	3.72	10	47.8%
11/21/1916 to 12/19/1917	48.0%	12.9	3.67	11	47.3%
12/2/1968 to 5/26/1970	37.3%	17.7	3.59	12	47.3%
11/28/1980 to 8/9/1982	27.3%	20.3	2.8	13	46.6%
4/15/1899 to 9/24/1900	31.8%	16.3	2.7	14	46.4%
11/19/1909 to 9/25/1911	20.7%	22.2	2.2	15	46.1%
3/20/1956 to 10/22/1957	20.2%	19.1	1.9	16	44.8%
9/22/1976 to 3/1/1978	20.5%	17.3	1.7	17	43.5%
9/15/1895 to 8/7/1896	25.8%	10.8	1.4	18	43.4%
10/10/1989 to 10/11/1990	18.3%	12.0	1.1	19	43.2%
3/19/1923 to 10/30/1923	27.1%	7.4	1.01	20	42.3%
2/9/1966 to 10/7/1966	25.2%	7.9	1.00	21	41.4%
6/15/1948 to 6/14/1949	18.9%	12.0	1.09	22	39.3%
12/12/1961 to 6/25/1962	29.3%	6.4	0.96	23	37.3%
9/3/1929 to 11/13/1929	47.9%	2.3	0.66	24	39.3%
10/10/1983 to 7/24/1984	14.7%	9.5	0.66	25	37.3%
2/5/1934 to 7/26/1934	22.8%	5.6	0.63	26	34.5%
1/5/1960 to 10/25/1960	13.6%	9.7	0.61	27	31.8%
1/5/1953 to 9/14/1953	14.8%	8.3	0.58	28	30.5%
5/29/1946 to 10/10/1946	24.3%	4.4	0.53	29	29.3%
1/31/1994 to 12/9/1994	8.3%	10.3	0.38	30	28.3%
8/25/1987 to 10/20/1987	36.1%	1.8	0.35	31	29.3%
7/20/1998 to 10/8/1998	22.4%	2.6	0.29	32	28.3%
2/11/1926 to 3/30/1926	21.5%	1.5	0.16	33	**27.3%**

	Magnitude	Duration	Product
Maximum	86%	41.6	22.8
Arithmetic Mean:	33%	14.8	3.5
Median:	**27.3%**	12.7	1.7
Geometric Mean:	29%	11.3	1.8
Minimum:	8%	1.5	0.2

* Product is duration times the log of the loss ratio (i.e., a 25% decline is a 0.75 loss ratio). It's a proxy for Downside-Volatility-Risk, which integrates the irregular price-time area under the highest market price. If a bear market starts declining sharply and then bottoms slowly that concave price-time geometry is more psychologically devastating to investors, and thus has a higher DVR, than a bear market that has the reverse acceleration or convex pattern by starting off declining slowly and only later declining sharply to its low.

Exhibit F

Supercycle Bear Market Periods for the Wilshire Total Market Index and the Value Line Geometric Composite Index as Proxies for the Capitalization-Weighted (CWI) and Equally-Weighted Indices (EWI)
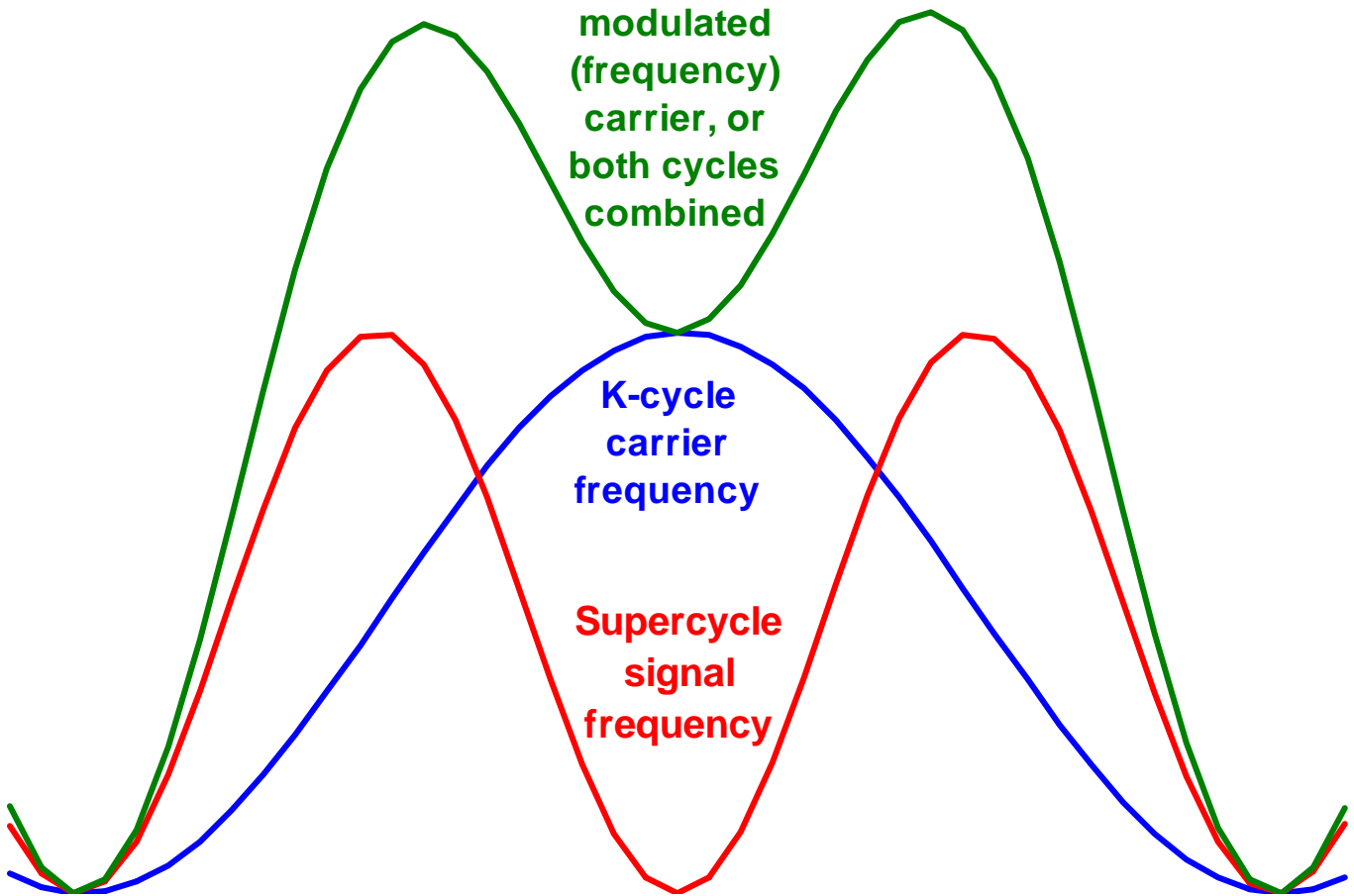
modulated
(frequency)
carrier, or
both cycles
combined

**K-cycle
carrier
frequency**

**Supercycle
signal
frequency**

Exhibit H

203 Years Of 10-Year US Treasury Note Yields

with progressively longer 47-year, 59-year and 61-year inflationary economic K-Cycle yield peaks at the end of the inflationary economic Spring Season and the beginning of the disinflationary economic Summer Season
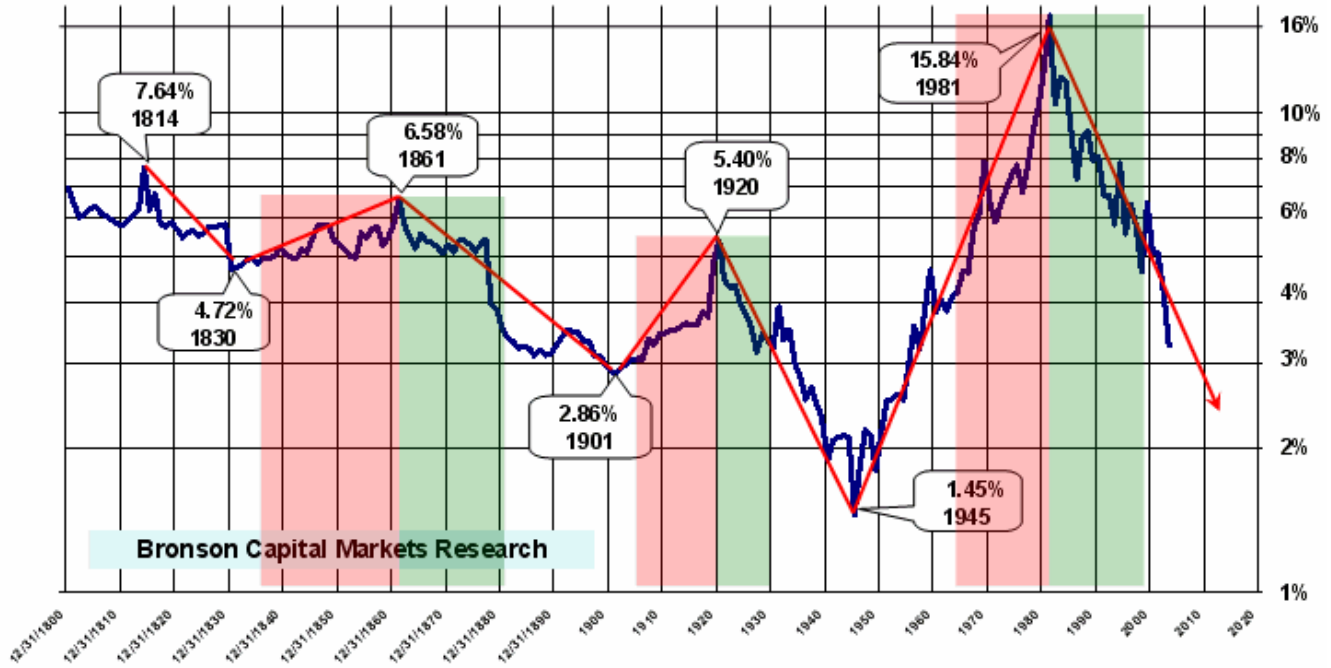
A History of Wholesale Prices/Interest Rate Peaks & Troughs
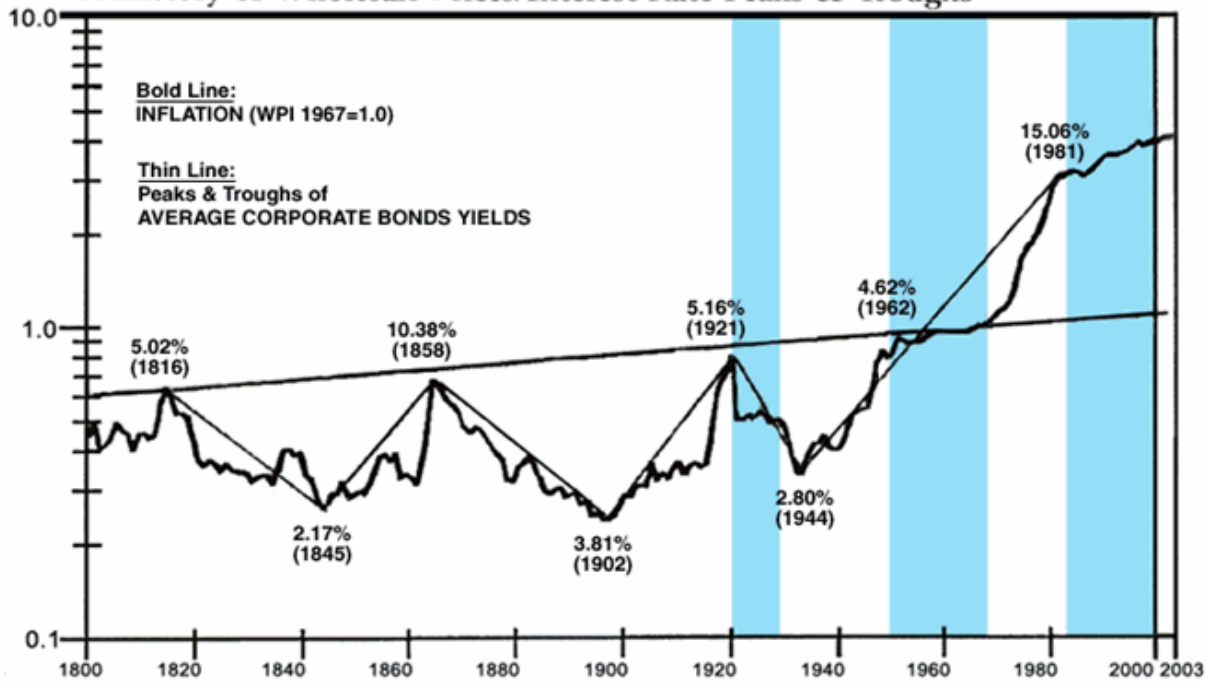
[1] The Modern Policymaking Era began in 1913, the year that Congress passed legislation to establish the Federal Reserve System and permanently added individuals to the federal income rolls (corporations were already being taxed). This new era of dramatically increased monetary and fiscal policymaking authority was first stress-tested during the Great Depression. The powers and scope of policymaking expanded rapidly in the 1930s and have grown exponentially ever since. For example, individual and corporate income taxation in relation to the total US economy has grown more than tenfold since then.

   Most policymaking interventions have resulted in an increased cost of producing goods and services, which is passed on to businesses and consumers in higher prices, thereby initiating a secular rise in the rate of price inflation that arguably started from the deflationary lows of the early 1930s. However, the SMECT model considers only the effects of such interventions on the frequency and severity of business cycles and the stock-market cycles that anticipated them.

[2] Stock-market and business cycles are economically useful because they systematically correct the inevitable, periodic accumulation of excesses in the stock market and economy. Such cycles are both self-correcting and corrected by policymakers. It can be argued that because of incomplete understanding and imperfect vision, policymaking interventions lead to inevitable unintended consequences, so that an appropriate balance between the two types of corrective forces is dynamically sought, attempting to effect maximum equity for people, businesses, and industries.

[3] It is important to note that the NBER uses a substantially subjective definition of "recession." While two successive quarters of negative GDP is a popular definition of a recession, the NBER defines it as a period of *significant* decline in total output, income, employment, and trade, *usually* lasting from six months to a year, and marked by *widespread* contractions in *many* sectors of the economy – a definition purposely designed to have a lot of wiggle room. Not all Kitchin (see endnote 4) business-cycle contractions have led to NBER-declared recessions (see Exhibit A). Those that have come up short are usually called slowdowns, mini- or growth recessions, and/or credit crunches (e.g., 1966).

[4] In 1923, Joseph Kitchin published in the Harvard University Press an article entitled, "Review of Economic Statistics," outlining his discovery of a primarily inventory-driven 40-month business cycle, based on his study of U.S. and U.K. financial instrument statistics from 1890-1922. The actual nomenclature "Kitchin cycle" was first used by economist Joseph A. Schumpeter (1883-1950).

   Progressivelyover the past four to five decades, the Kitchin business cycle and the four-year presidential election cycle have morphed together, so that the Kitchin cycle has been averaging 48 months in the post-World War II period, and especially in the past four decades. See also endnote 14.

   The Kitchin Cycle is typically credited with reflecting the cyclical fluctuations in the supply and demand of the inventories of goods and services, the excess of which most business cycle economists believe has been one of the primary causes of recessions, or business cycle contractions. We agree with than causal concept if a broader concept of inventories includes both tangible and intangible ones, especially the financial sector's excess inventories of financially engineered derivative instruments -- in particular, the hyper growth of structured investment vehicles like credit swaps and collateralized debt obligations: http://en.wikipedia.org/wiki/Collateralized_debt_obligation

[5] Clement Juglar (1819-1905), an economist considered "the father of the business cycle," studied the fluctuations in prices and interest rates in the 1860s. He determined there were boom-and-bust cycles of prosperity, crisis, liquidation, and recession.

[6] Economist Simon Kuznets (1901-1985) researched the U.S. real-estate cycle, work for which he was awarded the Nobel Prize. Kuznets studied under Wesley C. Mitchell (1875-1958), who with Arthur F. Burns (1904-1987) wrote the definitive book on classical business cycles, *Measuring Business Cycles*, in 1946. In 1920, Mitchell founded the National Bureau of Economic Research, which has since dated every recession since 1854.

[7] Long memory cycles reflect long-range dependence processes that cause the cycles to be mean-reverting.

[8] A Bronson Asset Allocation Cycle (BAAC) Supercycle is composed of one Supercycle Bull followed by one Supercycle Bear Market Period, or vice versa. A Supercycle Bear Market Period is a 12- to 20-year period of *under*performance during which bear markets, anticipating economic recessions, typically are at least twice as frequent and/or twice as severe as during Supercycle Bull Market Periods. Such a period begins when the return on money markets sustainably exceeds the total return on equities, especially when downside-volatility-risk (DVR) is taken into account (see endnote 17). A Supercycle Bull Market Period is a 12- to 20-year period of *over*performance during which bear markets typically are only half as frequent and/or half as severe as during Supercycle Bear Market Periods. Such a period begins when the total return on equities sustainably exceeds the

return on money markets, ignoring DVR. A copy of our BAAC report, which explains this and other aspects of BAAC Supercycles, including the details of the computational methodology, may be requested by private e-mail.

[9] In analyzing 150 years of commodity pricing history, Russian economist Nikolai D. Kondratieff (1892-1930?) discovered a supercycle of roughly three generations, now called the Kondratieff Wave or Cycle, or K-cycle. In a series of articles between 1922-28, he wrote that K-cycle theory suggested a coming depression in Western economies. Unfortunately, he angered the Communists by also correctly predicting that the cycle would be self-correcting and that the capitalist democracies would survive the Great Depression, a conclusion for which he was exiled to a gulag in 1930 – one of the few economists ever to have been exiled for their views. He was put in solitary confinement, became mentally ill and died.

The hyperinflation-deflation K-cycle has been connected with Schumpeter's technology-innovation, "creative destruction" cycle, about which we heard so much during the technology-stock bubble of the late 1990s. Today, many agree that there are four progressive economic phases of the K-cycle: K-cycle spring, reflation; K-cycle summer, inflation; K-cycle autumn - what some call the plateau - disinflation; and K-cycle winter, deflation , or what some call the fall from (the) plateau. In any case, we quantify and call the economic four phases Supercycle Springs, Summers, Autumns and Winters. The term, deflation, is highly debated since some think it conjures economic depression or total debt liquidation, but we do not necessarily use or mean it in that way. Exhibit H clearly shows the K-cycle in terms of price inflation and interest rates (the inflation price of credit money).

[10] "Cycle" refers to one uptrend followed by one downtrend, or vice versa. It is important to note that these cycles are *quasi-periodic* cycles – not *fixed* time cycles. The four-year Kitchin cycle, for example, historically has varied within a range of ±25% – that is, more than 90% of the time, the cycle has been no shorter than three years or longer than five years. The much longer K-cycle has only by about one-half as much variability. This decreased variability is because the nested cycles that comprise it often exhibit the self-correcting mechanism of pattern alternation, whereby shorter cycles tend to be followed by offsetting longer cycles, and vice versa, so that a series of many shorter or many longer cycles do not tend to stack up. Thus, the cumulative range (error from the mean) cuts in half. This constitutes some statistical proof that SMECT is a cohesive system of meaningfully interrelated cycles.

[11] Bronson attributes the same names to the stock-market cycles for ease of communication, fully recognizing that the namesake economists were only dealing with business cycles. The four-year, or Kitchin, stock market cycles nest sequentially in their aggregating Juglar, Kuznets, and Supercycle counterparts. See Exhibit B. K-cycle stock-market cycles are not meaningful in this respect.

[12] Although SMECT was developed over many years of observation, study, and forecasting implementation, like all models, it still may not be optimally designed. Any design flaws would most likely be because of market efficiency, which results from the self-fulfilling or self-defeating feedback from competitive observers and participants in any activity whereby they can observe data, including stock-market and economic activity, and react to it, changing the outcome.

[13] Over the past 35 years, Bob Bronson, principal of Bronson Capital Markets Research, developed knowledge-based, "expert-system" forecasting models that quantify four groups of deterministic factors: monetary/economic; valuation/sentiment; political/social; and inter- and intra-market technical data, the indicators of which are all are reweighted in light of dynamic market changes.

[14] Many people think the Krondratieff cycle has an average period of about 53-54 years, but we believe that it has progressively lengthened by about 10 years to about 64 (± 4) years since the start of the Modern Policymaking Era in 1913 (see endnote 21). Bronson's research and his SMECT model show that since the early 1800s, K-cycles usually have been composed of 16 Kitchin cycles (2 Kitchins /J uglar x 2 Juglars / Kuznets x 2 Kuznets / BAAC Supercycle x 2 BAAC Supercycles / K-cycle =16 Kitchins / K-cycle).

And originally Kitchin (see endnote 4) and others found the business cycle to be about 40 months long, so that the K-cycle was running about 53.3 years (= 16 x 40 / 12). But progressively over the past four to five decades, the Kitchin business cycle and the four-year presidential election cycle have morphed together, so that the Kitchin cycle has been averaging 48 months in the post-World War II period, and especially in the past four decades. Thus, the K-cycle has been progressively lengthening and is currently about 64 years (= 16 x 48 / 12), which is likely to be its final limit state because the current institutionalized form of the 48-month presidential election cycle is very likely to be very long-term stable.

[15] Developed years ago by Bob Bronson, the Growth Cycle is a multi-fractal pattern-recognition tool that reconciles the all possible chart pattern configurations with their most likely outcomes. See the Growth Cycle template in Exhibit C.

[16] They are also peak-synchronized, but the trough synchronization is stronger. This is because the mid-term Congressional elections (early November in years 4 modulus 2 – e.g., 2002, 2006 and 2010) have become a bear-stock-market low attractor, which Bronson has demonstrated in a separate research report.

[17] To avoid "pick and choose" statistical bias and over-fitting the data set, the bear stock markets that anticipated these 28 Kitchin business cycles and 21 NBER-designated recessions were drawn from the smallest explanatory set of them ranked by their severity (see Exhibit E). For these purposes, severity is defined as magnitude times duration, which is an approximation of our Downside-Volatility-Risk (DVR) metric – see endnote 8. This severity approximation of DVR was used because the calculation of DVR requires daily data that is not fully available over all of the historical time periods involved in this study. A full description of DVR and its comparative advantages over other volatility risk metrics is available upon request.

[18] Those bear markets did anticipate short-term, or Kitchin, business-cycle slowdowns, which did not meet the NBER's threshold for recession (see endnote 3).

[19] At that time, we issued our lengthy report, "The Case for the Third Supercycle Bear Market Period of This Century," which may be requested by private e-mail.

[20] It has been long recognized that the K-cycle reflects the long memory cyclical rise and fall of price inflation (goods and services) and interest rates (the price of credit, or debt). This can been generalized as the rise and fall of price and monetary inflation since interest rates can be regarded as the inflation rate of credit money. However, we find no satisfactory explanation in published economic literature of exactly why the K-cycle doesn't reflect secular trends in overall economic growth. That is, why is the growth rate in the economy, or aggregate production of goods and services rather than their prices, substantially similar during the K-cycle's so-called upgrade and downgrade, or up and down cycle-trends?

   We offer the following explanation in frequency modulation terms: the K-cycle is the carrier frequency for its half-period subcycle, the BAAC Supercycle, which is the signal frequency, and their cycle troughs (not peaks) are synchronized. Thus, the K-cycle is a modulated carrier frequency with respect to economic growth. And while its unmodulated peak reflects the peak in price inflation and interest rates, that peak is really an economic growth trough, as illustrated by the "missing peak, double peak" chart, Exhibit G.

   Here is why. Following a trough in the K-cycle, which is fully synchronized with its first four binary subcycles (Supercycle, Kuznets, Juglar and Kitchin cycles), the BAAC Supercycle and K-cycle are trending up together, and consequently, real, or inflation adjusted, economic growth is progressively higher than normal. This is the high-growth reflationary economic period, or K-cycle, or Supercycle, spring. But following that spring season is the K-cycle, or Supercycle, inflationary economic summer, a Supercycle Bear Market Period, where the carrier and signal cycles trend in opposite directions with the K-cycle continuing to trend up while the Supercycle turns and trends down. Because price inflation and interest rates are progressively rising to their eventual K-cycle peak, and are thus higher than historically normal, real economic growth progressively slows during the Supercycle Summer. Consequently, at the end of the Supercycle Summer and beginning of the K-cycle, or Supercycle, autumn, the turning point peak in price inflation and nominal interest rates is exactly simultaneous with the trough in progressively slowing Supercycle-measured economic growth.

   Following the Supercycle Summer peak, when price inflation and interest rates start progressively declining from their very high peak levels, economic growth turns around and starts expanding during that BAAC Supercycle Bull Market Period. This is the second period where the Supercycle and K-cycle are trending in opposite directions forming the second peak illustrated in the Exhibit G "missing peak, double peak" chart.

   Furthermore, this modulated carrier frequency (cycle) concept for the K-cycle explains why stock market manias occur at the midpoints of the K-cycle upgrades and downgrades - at the end of each Supercycle Bull Market Period, or the end of the Supercycle Spring and Autumn economic seasons. Stock market manias occur because investors become over exuberant following an extended, or Supercycle, period of economic growth where inflation and interest rates are still at moderate levels, measured on a historical basis. Of course, to those without a multi-generational long memory and only a casual understanding of these things, it seems like the business cycle has been conquered by policy-makers with no end in sight for continuing, if not escalating prosperity, in the then widely perceived and apparently obvious New Economic Era.

   Finally, pattern alternation in these economic environments explains why every other stock market mania is a super mania with multiple technology bubbles, which always emerge at the end of Supercycle Autumns or what some call K-cycle plateau periods (see endnote 9), that occurred in the late-1850s, the late-1920s, and most recently, the late-1990s. The end of these disinflationary economic Supercycle Bull Market Periods not only occurred at moderate levels of price inflation and interest rates, but investors, consumers, businesses and policy-makers all

believed that these economic indicators would only get "better" by continuing to decline - which they did, and always will - during deflationary Supercycle Winters.

Since future expectations for these economic indicators are completely distinguishable from the previous mania when price inflation and interest rates continued to rise, this is not lost upon even the most seasoned investors, consumers, businesses and policy-makers, which creates a permabull mass psychology – all believing that this (mania) time is really different. Thus, they all eagerly agree to create even more and bigger technology-based bubbles in the stock market than the previous generation did. And during the next stock market mania, the comparative logic of these competitive observer-participants reverses – and so the bigger-smaller pattern alternation in multi-generational stock market manias continues.

There are two economic reasons these every-other super manias occur, and will reoccur. First, since inflation rates are at historically moderate levels at the end of disinflationary Supercycle Autumns and they continue to decline during the following Supercycle Winters, there is no real capital competition from tangible (hard) capital market assets - commodities and real estate – so that trend-following, performance-oriented investors and businesses concentrate in acquiring more highly liquid, financial (intangible) capital market assets - stock and bonds. Second, because interest rates, and thus debt service cash outlays, are declining, consumers and businesses also borrow excessively, especially to fund their equity asset purchases and investments. Thus, debt-based malinvestment progressively characterizes Supercycle Autumns leading to super manias and inevitable deflationary economic Supercycle Bear Market Periods, or Supercycle Winters.

[21] That is, 54 years/16 recessions, or 3.4 years per business cycle → 64/13, or almost 5 years per business cycle, since there were 16 NBER-designated recessions from 1858 through 1921 during the next-to-last peak-to-peak K-cycle, and only 13 such recessions during the last peak-to-peak K-cycle from 1921 through 1982 (see Exhibit A).

[22] The increasing intervention by fiscal and monetary policymakers – ever more frequently and more extensively – to mitigate recessions and lengthen expansions in the economy has met with increasing success, if measured over long enough periods, which we argue are minimally BAAC Supercycles. In part because of this intervention, U.S. recessions, as determined by the NBER, have become less frequent, decreasing in number from about one every less than four years in the 1800s, to about one every five years since then, if averaged over a long enough period.

While the NBER business cycle has lengthened, the Kitchin business cycle has remained about four years [see endnotes 4 and 14] and, as Bronson has demonstrated elsewhere, both the Kitchin business cycle and stock market cycle are fundamentally synchronized to the four-year U.S. presidential election cycle.

However, those familiar with Bronson's research on Supercycle periods will recall that he has also determined that the frequency of recessions varies according to whether a Supercycle Bull or Bear Market period is underway, with recessions twice as frequent, and therefore NBER-designated business cycles half as long, during Supercycle *bear* market periods. Conversely, the apparent lengthening of the business cycle during the past two decades is largely explained by the less frequent recessions of a Supercycle Bull Market Period (1982-97/99). See Exhibit A.

[23] We demonstrate this model only from the K-cycle trough in 1896 because widely accepted data is only available for stock-market cycles since 1870 and for NBER-designated business cycles since 1858. However, SMECT appears to work very well going back to 1815, where we date the fourth previous K-cycle trough, rather than the 1843 date that some others use. Further, our price-inflation and interest-rate model, which covers both nominal and real interest rates as well as the yield curve, also confirms these K-cycle peaks and troughs, as well as the Supercycle marker of the four progressive economic phases, or seasons, of the K-cycle (see endnote 9). See Exhibit H.