A CENTURY OF RESEARCH ON PROPERTY CYCLES – A REVIEW OF RESEARCH ON MAJOR AND AUXILIARY BUSINESS CYCLES

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The existence of cycles within economy and its sub-sectors has been studied for a number of years. The importance of cycles has grown to have significant importance in the major capitalistic countries, seeing cycles as having a negative impact on the aggregate output of these economies. As a result, economists and scholars attempted to research this phenomenon in the belief that a better understanding of the cyclical nature of the economy would prevent cycles from happening in the future. Various theories have been developed to explain the regularity of business cycles. The aim of this paper is to discuss the major types of cycles found in the literature. There are four major and eight auxiliary cycles. The review presents a discussion on their general characteristics, and the key forces that produce these cycles. Concluding remarks summarise the discussion and present key findings.

Keywords: Business, Cycle, Literature Review.

"Everything that happens once can never happen again. But everything that happens twice will surely happen a third time"

Coehlo (1999, p.164)

INTRODUCTION

The literature concerning business fluctuations reveals that there is a disagreement between classical and modern business cycle researchers on how regular business cycles are. According to Reiter and Woitek (1999), classical economists such as Moore (1914) and Kitchin (1923) saw business fluctuations as genuine cycles, i.e. recurrent phenomenon with typical characteristics. Conversely, modern macroeconomists including Zarnowitz (1992), Solomou (1998) and Dudukovic (2007) identify business cycles as a sequence of irregular fluctuations with no cyclical pattern. Dudukovic (2007) argues the term *"cycle"* is rather misleading, whereas business fluctuations do not tend to repeat at the regular time periods. As her evidences suggest, the length of business cycles, measured either from peak to peak, or trough to trough, vary substantially, implying that cycles are not mechanical in their regularity. Maddison (1991) and Solomou (1998) expressed similar views by stating that the average duration and other defining features of the business cycles have apparently changed over time. In the UK, these features changed notably after the 1970s, compared with the *"golden age"* between the 1950s and 1960s. Consequently, this variance of views and facts led macroeconomists, including Solomou (1998) and de Groot (2006), to hypothesise that over the years various types of cycles have been developed.

The aim of this review is to explore the mechanics and rationale behind these cycles and thus argue the importance of the subject. The paper assesses what research methods, data and data analysis techniques were employed by researchers, and what were outcomes of these studies.

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A greater awareness of various types of cycles could be useful for both the private and public sector in examining various economic issues. The existence of business cycles implies that economy has its rhythm and dynamic behaviour. Therefore, it is considered that by recognising both short and long business cycles and their repetitive nature, it is possible to anticipate changes in the economy (Sichel, 1991; Diebold *et.al.*, 1993; de Groot, 2006). As Diebold *et.al.* suggested, the understanding business cycle duration may furnish vital insights *"on important and long-standing questions in macroeconomics"* (*ibid.*, p.255).

The paper is organised as follows. The next section reviews four major business cycles, thereafter eight auxiliary cycles found in the literature, are reviewed. The concluding remarks summarise the discussion and present key findings.

MAJOR CYCLES

The results of the literature review on the subject indicated the existence of four major types of cycles (Su, 1996; Solomou, 1998; Reiter and Woitek, 1999; de Groot, 2006, Dudukovic, 2007):

- 3 to 4 years cycles (Kitchin cycle), which are related to changes in inventory investment;
- 7 to 10 years cycles (Juglar cycle), related to changes in equipment investment;
- around 20 years of length cycles (Kuznets cycle), typically observed in building and transport investments;
- and long waves of around 50 years (Kondratieff *"wave"*), which are related to major technological changes.

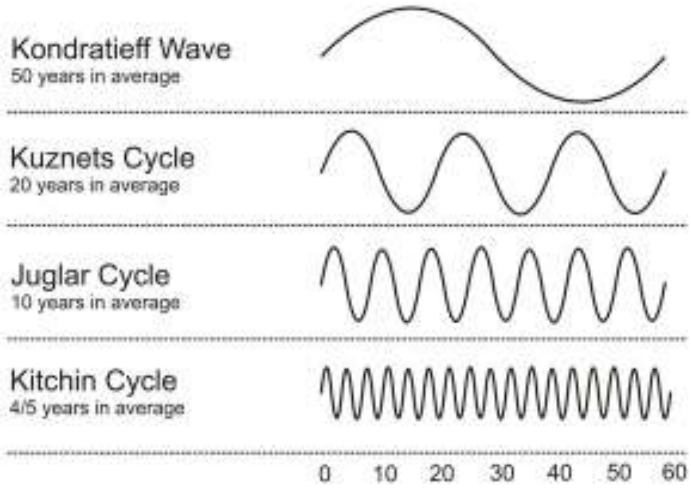

Figure 1. Classification of major cycles (Adopted from: *Liberated Stock Trader, 2010)*

The Kitchin Cycle

In his analytical work on cycles and trends in major economic indicators for the United States and Great Britain, Kitchin (1923) identified that business cycles average 3.3 years in length. The researcher employed visual inspection of time-series, including prices of commodities, level of trade, income, wages, and interests, as well as quotations of stock exchange securities, with most of the economic indicators being studied in monthly figures. The results of the study showed that business fluctuations are triggered by inventory adjustments.

The importance of inventory cycles was further investigated by the American economist Lloyd A. Metzler, who presented a greater explanation of these cycles. In his analysis of the

nature and stability of inventory cycles, Metzler (1941) observed that whenever the equilibrium of the economy is disturbed due to changes in demand, either by its increase or decline, entrepreneurs immediately attempt to adjust production output to recoup their inventory losses. However, since there is always a time lag within this adjustment process, businessmen are unable to adapt immediately to volatile market conditions. Thus, they overshoot or undershoot the production level, which generates the cycle. As Metzler indicated, this particular adjustment process constitutes the *"pure inventory cycle"* (*ibid*., 118). In his subsequent study, Metzler (1947) identified four major factors which govern the length of the inventory cycles, i.e. (i) length of the production period, (ii) propensity to consume, (iii) relationship between producers and dealers, (iv) and future expectations. In this empirical study of the United States economy Metzler estimated that the length of observed cycles is between 36 and 42 months, i.e. 3 to 3.5 years, what corroborated Kitchin's (1923) findings.

The Juglar Cycle

In his seminal work, Juglar (1862; cited in Besomi, 2005) analysed a long series of banking statistics (circulation of banknotes, deposits, discounts level) as well as major economic indicators (population growth, import, export, rents) for France, England and the United States. As Legrand and Hagemann (2007) observed, for his research Juglar employed at that time a very original and novel approach - a mixture of economic analysis, statistics, history and economic theory. Accordingly, Juglar demonstrated the existence of cyclical correlation between major indicators. As Schumpeter (1939) and recently Fukuda (2009) observed, business investments in equipment and materials were the major drivers for the Juglar cycle to occur. According to both commentators, Juglar estimated the approximate length of the cycle, which is between 7 and 10 years.

However, as many commentators including Maddison (1991), Besomi (2005), de Groot (2006) and Legrand and Hagemann (2007) have noted, despite all compliments, Juglar's findings were subject to heavy criticism.

The Kuzents Cycle

Kuznets swings, as Abramovitz (1968) noted, are longer than common business cycles but shorter than very long waves of Kondratieff. They are around 20 years in length and associated with building and transport investments. In his seminal work on *"secular movements in production and prices"*, Kuznets (1930, p.1) identified the period of a complete swing for production to be around 22 years in length and for prices to be around 23 years. The cyclical process was explained as a correlation between business conditions and migration. An increase in GDP leads to a rise in demand for labour, which triggers greater migration. Migrants tend to concentrate in certain areas with greater earning potential; this influences family formation, which consequently stimulates population-sensitive investment, such as building and construction. Kuznets observed fifty-nine economic indicators, including GDP, investment, productivity, and money supply. Then he applied a basic statistical technique similar to the one used by Kondratieff, i.e. data smoothing which eliminates the ordinary business cycle and identifies long waves.

It is also important to note that Abramovitz has made probably the most ambitious attempt to deny the existence of Kuznets cycle. After the analysis of long swings in the American economy of the period between 1840 and 1914, Abramovitz (1959, cited in Solomou and Shimazaki, 2007, p.14) stated that *"it is not yet known whether they are the result of some stable mechanism inherent in the structure of the US economy, or whether they are set in motion by the episodic occurrence of wars, financial panics, or other unsystematic*

disturbances". Accordingly, Abramovitz (1968, p.367) concluded that *"the Kuznets cycle in America lived, it flourished, it had its day, but its day is past"*.

The Kondratieff Wave

The presumption that capitalistic economies *"experience long waves of an average length of about 50 years"* was argued by a Russian economist Nikolay D. Kondratieff (Kondratieff and Stolper, 1935, p.105). As Solomou (1998) observed, Kondratieff was one of the first researchers who exercised a comprehensive statistical analysis of major economic time-series. For his analysis, Kondratieff distinguished three types of cycles, i.e. long waves of 50 years duration, intermediate cycles of 7 to 10 years duration, and short cycles of 3.5 years of length. He employed statistical analysis of major economic indicators including wholesale price level, rate of interest, wages, foreign trade, as well as production and consumption of coal and pig iron for the United States, England and France for a period between 1780 and 1920. He then applied the double decomposition method to measure long waves. First, secular trends from time-series were removed, and then the data was smoothed by nine-year moving average. This led the authors to conclude, that *"on the basis of the available data, the existence of long waves of cyclical character is very probable"* (Kondratieff and Stolper, 1935, p.115).

However, as researchers including Garvy (1943), Maddison (1991) and Solomou (1988; 1998) indicated, Kondratieff's findings have been subject to heavy criticism. Garvy (1943) criticised the arguments Kondratieff presented, the statistical techniques he employed, and underlying assumptions he made. Similarly, Maddison (1991) pointed out several problems with Kondratieff's approach. As Maddison noted, Kondratieff failed to substantiate the existence of long waves in other economic activities apart from wholesale prices, that he did not consider the impact of the First World War on the economy, and that he gave no plausible explanation as to why capitalistic economies should consider the existence and importance of long waves.

AUXILIARY CYCLES

So far, however, there has been little discussion on other types of fluctuations within the economy. As literature suggests, there are eight auxiliary types of cycles. Commodity Cycles analysed by Cambridge economist Nicholas Kaldor, Hegemony Cycles proposed by American scholar George Modelski, Long Wave Cycles analysed by another American scholar Jay W. Forester, Stock Market Waves developed by American author Ralph N. Elliott, and two Political Business Cycle, one *"Opportunistic"* Political Business Cycle hypothesised by American economists William D. Nordhaus, second *"Partisan"* Political Business Cycle proposed by US academic Douglas A. Hibbs, Jr. What is more, two less cited but still discussed in the literature, are Bronson's Asset Allocation Cycle and Harrison's 18-years economic cycle. According to de Groot (2006), most of these cycles have their own empirical and theoretical reasoning. Therefore, for a complete discussion on the subject, it was decided to examine these auxiliary cycles.

Hegemony Cycle

Modelski's (1978) *"long cycle theory"* originates from the hegemonic dominance lasting around one hundred years. As the author indicated, the mechanics behind the global political cycle, or hegemony cycle, is relatively simple. During a period of weak organisation, global war occurs. The war disperses the existing global system and at the end creates to a new world order, which as a result benefits from its state. However, this dominant position attracts competitors and system moves into multi-polarity, and then into oligopoly. Gradually, the new order dissolves and moves towards its primary state – the

period of weak organisation, which consequently triggers new conflict, and the cycle is repeated again. Modelski has also demonstrated that hegemony cycles have coincided very closely with historical centuries, e.g. the nineteen century is the second British hegemony cycle. Therefore, if this model of the long world order (hegemony) cycle is considered as being accurate, and empirical evidences presented by the author are accepted, the implications behind this concept would be that the current system has passed ascending phase and has entered the phase of descent. This period is usually characterised as a period of counter forces being equal. On this basis, Modelski predicted that the end of the twentieth century and the beginning of the twenty-first century will experience the augmenting nationalism and thus growing confrontations and animosities. However, he was well aware of the limitations of his model, and thus has not excluded the possibility that the system can take another direction other than was predicted.

Commodity/Cobweb Cycle

Baffes *et.al.* (2009) demonstrated that commodity markets are especially volatile. According to the authors, the price volatility is in the nature of commodities, due to the particular relationship between demand and supply within this market. Their volatility rises because individual producers are inclined to over- or under-compensate the level of short term equilibrium. As it is known from the classical economic theory, price and production always move towards their equilibrium, and once disturbed, they gravitate back to their norm (Ezekiel, 1938). As a result, this adjustment process drives commodity prices (Baffes *et.al.*, 2009).

It is considered that Benner (1904) was the first to recognise regular oscillations of production and prices. The idea was further developed by other scholars internationally. The most important contributions towards the understanding of this phenomenon were made by American economist and statistician Henry Schultz, Dutch economist Jan Tinbergen, Italian economist Umberto Ricci, and Russian-American economist Wassily W. Leontieff (Ezekiel, 1938). Subsequently, Kaldor (1934) accumulated the ideas of his predecessors and formulated what is now called *"the cobweb theorem"*. According to his hypothesis, the cobweb is the state of the economy *"where the adjustments are completely discontinuous"* and elasticity of both demand and supply determines stability of equilibrium (*ibid*., p.134). Kaldor identified *"wrong anticipations"* as the primary cause of real world instability (*ibid.*, p.136).

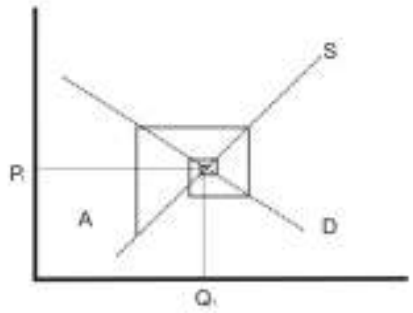

Figure 2. A cobweb market adjustment process (Source: Ball *et.al.*, 1998)

Ezekiel (1938) presented a more robust cobweb model. For his research, Ezekiel constructed an artificial economy with synthetic time-series to test his hypothesis. The experiment demonstrated, that with one-year lag between prices and production, commodities experience two year cycles. With two-year lag in production, there is a four year cycle, and with three-year lag, six year cycle in production is most likely to be expected. The cycles were measured from peak to peak. Subsequently, synthetic time-series

were compared with real time data (production and prices of potato, acreage, and yield from 1921 to 1936). *"Cobwebiness"* was obvious (*ibid.*, p.277). Accordingly, the researcher hypothesised that it is in the nature of commodities to deviate from their equilibrium, and thus it is always expected that certain degree of volatility within an economic system will appear.

Forrester's Long Cycle

Forrester (1973, p.ix) in one of his major studies assessed *"how the behaviour of the world system results from mutual interplay between its demographic, industrial, and agricultural subsystems"*. He created a world dynamics model and made predictions reaching year 2100. The term *"world system"* in this research was described as coherence between humans, their social system, technological and natural environments. Forrester gave a simple explanation on how population, capital investments, geographical space, natural resources, pollution as well as food production interrelates. Growing population triggers industrialisation and demand for more food and shelter. A greater industrialisation as well as demand for food and shelter security in turn triggers population growth. This circular process of growing population and industrialisation causes greater pollution and exhaustion of the natural resources. The growth is then limited by nature. As Forrester indicated, *"exponential growth cannot continue forever"* (*ibid*., 8). Therefore, he suggested a number of ways which could restrain further damage. Man itself can choose a better and environmentally friendly path, or world dynamics can be directed towards equilibrium.

For his research, Forrester (*ibid.*) accumulated various statements, observations and assumptions about the global system, and computed them with a specially designed computer model. As the modelling results demonstrated, capital investments peak approximately every 50 years. The findings coincided with Kondratieff's long waves. Similar to Kondratieff, Forrester divided long wave cycles into three periods: thirty years of market expansion, ten years of maturity, and ten years of contraction.

However, according to de Groot (2006), some researchers, including Reijnders (1990, cited in de Groot, 2006), were sceptical about this model. The scepticism derived from the parameters this model is based on. As Reijnders (*ibid.*) explained, whereas these parameters can vary significantly, thus, it is questionable, whether long waves found in the model are only a result of the model itself.

Comparing results from the *"original"* world model, developed by Forrester, and actual data, yields some interesting findings. In case of population growth, Forrester's estimates surprisingly match real population growth. According to his projection, total population is expected to increase in around 40 per cent during the period from 1980 to 2004. Looking at the official statistics provided by the United Nations (UN) (2004), it is seen that total world population increased in around 35 per cent during the same period. However, Forrester's predictions that population will peak in 2020 and thereafter decline contradicts UN projections. According to UN, population will continue to growth to 2050 and further, or in worst case scenario will slightly decline in 2030/2040. In case of capital investment, Forrester projected its increase in around 36 per cent during the same period. It was difficult to obtain statistics on capital investment for the whole world economy, however, as statistics of the European Central Bank (ECB) (2010) indicates, gross capital stock in Euro area increased around 45 per cent during 1982-2002. Repeatedly, Forrester's projections matched the real data.

Even though this small comparison doesn't prove whether Forrester's model is robust and applicable for the forecasting, its relative fitness with the real data gives notion for its validity.

Elliott Waves

Frost and Prechter (1998) presented probably the single best investigation into the Elliott Waves. They stated that, *"the "Elliott Wave Principle" is Ralph Nelson Elliott's discovery that social, or crowd, behaviour trends and reverses in recognizable patterns. Using stock market data as his main research tool, Elliott discovered that the ever-changing path of stock market prices reveals a structural design that in turn reflects a basic harmony found in nature. From this discovery, he developed a rational system of market analysis"* (*ibid.,* p.19). According to Frost and Prechter, Elliott illustrated thirteen *"waves"* which do recur in stock market prices, but, which are not necessarily repetitive in time or amplitude. Elliott further explained how these structures correlate together and subsequently form a larger version of the structure, which ultimately compose the next identical but larger structures. As Droke (2000) observed, Elliott classified these cycles (structures) from greatest to smallest. The major ones include Grand Super Cycle (approximately 100 years similar to Modelski Hegemony cycle), Super Cycle (around 50 years and similar to Kondratieff wave), Cycle (around 10 years and similar to Juglar cycle), and Primary Cycle (from 1 to 4 years and similar to Kitchin cycle). Following Kuchiki's (2006) explanation, the Super Cycle consists of two waves, one upward and one downward. The Cycle constitutes eight waves, five upward and three downward. The Primary Cycle consists of thirty-four waves, twenty one upward and thirteen downward. However, as Kotick (2010) observed, although the pattern of cycles is always self-similar, cycles themselves, at the same time, are always different. Individual characteristics of cycles such as length, amplitude, and period always differ despite the fact that the pattern is identical. Kuchiki (2006) also has noted that these waves are based on Fibonacci numbers. The broader implications behind Fibonacci sequence and Elliot Waves was presented by Kotick (2010). As Kotick stated, although stock prices may exhibit random with no cyclical pattern oscillations, there are mathematical links between these numbers which can help to determine the characteristics of cycles and thus can be measured and forecasted using Fibonacci sequence.

Political and Partisan Business Cycles

In the mid 1970s political economists and scholars attempted to assess the possible dynamic relationship between politics and macro-economy. The question was whether incumbent governments employ certain fiscal and monetary policies to get re-elected. It was hypothesised that incumbents stimulate the economy or employ certain economic manipulations before the elections in order to acquire more votes and get re-elected. As a result, it triggers the economy to fluctuate around its long-term trajectory (Gautier, n.d.; Drazen, 2000; Merikas and Merika, 2005). As Alesina *et.al.* (1993) summarised, this doctrine analyses the impact of interest groups on the macroeconomic performance of the country.

As the literature suggests, the Political Business Cycle (PBC) doctrine developed into two separate avenues. One, so called *"Opportunistic"* Political Business Cycle theory formalised by Nordhaus (1975), and *"Partisan"* Political Business Cycle doctrine presented by Hibbs (1977). Briefly, Nordhaus' pioneering model implied opportunistic pre-electoral manipulations. As Alesina (1987) noted, economic decline should be expected at the beginning of any type of administration, and economic upturn towards its end. While in Hibbs' model, partisan policymakers, who operate in the similar environment to that of the Nordhaus, have different macroeconomic goals, what generates the cycle (Alesina *et.al*., 1993; Drazen, 2000).

The "Opportunistic" Political Business Cycle

In his seminal work, Nordhaus (1975) assessed how today's political decisions are likely to affect future welfare. As he indicated, this issue is of importance, whereas consequences of current policies do have a major impact on most parts of our economic life. Moreover, there exists an option to choose between present and future well-being. Therefore, Nordhaus emphasised a need to develop a theory which would explain government investment behaviour.

Nordhaus based his hypotheses on the dynamic relationship between the rate of unemployment and the rate of inflation (best known as Phillips Curve) and Kalecki's (1943, p.329) *"political trade cycle"* model. Nordhaus' model assumed the predictable pattern of events, starting with an expansion monetary policies before the elections which trigger economic growth and generate jobs, and ending with post-election economic contraction due to the inflationary consequences of pre-election policies. Subsequently, Nordhaus created synthetic political regime to examine the possibility of politically induced cycles. The results of modelling established typical cycle pattern characterised above. As shown in Figure 3, the approximate magnitude of the cycles for the US was around 4 years (measuring both from peak to peak and from trough to trough). The hypotheses were substantiated with historical evidence. Nordhaus employed annual unemployment data for nine countries including Australia, Canada, France, Germany, Japan, New Zealand, Sweden, the UK and the US for the period between 1947 and 1972. He also determined election dates of each country. The test results indicated "*that a political business cycle is a significant factor in the operation of some capitalist democratic economies"* (*ibid.*, 187).

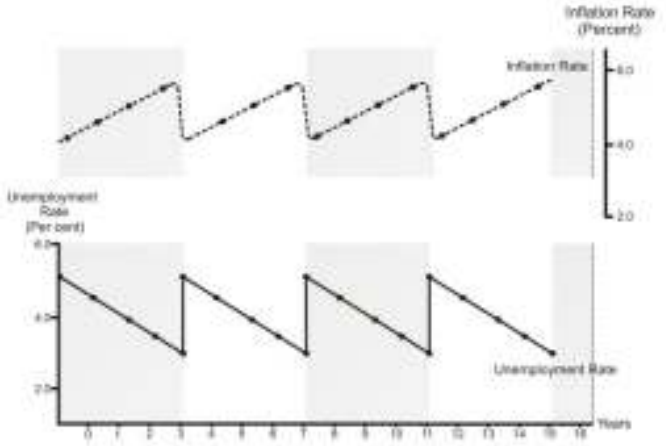

Figure 3. The Political Business Cycle (Adopted from: Nordhaus, 1975)

The model also considered several major assumptions, which were highly criticised by many commentators, including Hibbs (1977), Lächler (1978), McCallum (1978), Paldam (1979), Golden and Poterba (1980), and Alesina and Roubini (1992). First, the model assumes that voters are myopic, that they do not have knowledge of the macroeconomic manipulations of the incumbent before elections, and only care about their current economic state. Second, it assumes that politicians can manipulate the economy easily and move it in desirable direction. What is more, it implies the constant and operational trade-off between unemployment and inflation (Alesina *et.al.*, 1993, Merikas and Merika, 2005).

In response to the criticism, the myopic-expectation *"opportunistic"* PBC theory was further developed by incorporating rational expectations. As a result, "*rational political business cycle models"* were created (Alesina *et.al.*, 1993, p.2). The prominent publications include Cukierman and Meltzer (1986) and Rogoff (1990). As the literature suggests, these

models have two major implications. First, voters are rational and they recognise the *"opportunistic"* behaviour and its implications before and after the elections. Second, economy in general is less dependent on actions of incumbent (Rogoff, 1990; Gautier, n.d.).

The PBC ideas were further developed by Schultz (1995) in his empirical research of transfer payments of the Great Britain for a period between 1961 and 1992. Lohmann (1998) rationalised the PBC by developing simple model of political cycle.

The "Partisan" Political Business Cycle

Pioneered by Hibbs (1977), this theory states that different parties have different approach to macro-economy and thus implement different policies. As with the opportunistic political business cycle, the partisan theory adopts Phillips Curve and analyses the dynamic relationship between the rate of unemployment and the rate of inflation. However, unlike the Nordhaus' (1975) *"opportunistic"* model, the *"partisan"* political business cycle results from partisan preferences (Gautier, n.d.; Heckelman, 2001; 2002)

Following Hibbs' (1977) explanation, traditional partisan theory assumes bi-partial political system where each of the party (partisan) has different economic interests and preferences. Hibbs argued that left-wing, labour-oriented, working-class-based parties such as Socialists in the US, and Labour in the UK, are more concerned with full employment rather than inflation, while right-wing, business-oriented, upper-middle class Conservatives (both in the UK and the US) put more attention on price stability rather than employment.

To support his hypotheses, Hibbs employed statistical data analysis and mathematical modelling. First, he provided cross-national statistics on average rates of employment and inflation of 12 industrial economies for1960-1969 period. The analysis demonstrated that in countries with a greater inflation but lower unemployment Socialists dominated the politics, and *vice-versa*. Then the author performed a dynamic post-war time series analysis for the UK and the US. Time series were modelled using autoregressive moving average (ARMA) modelling approach. The modelling results supported the basic hypotheses that Labour (UK)/Democrats (US) administrations bring unemployment downward and inflation upwards, while Conservatives (UK)/Republicans (US) – opposite (Figure 4). This led Hibbs to conclude that "*the macroeconomic policies pursued by left- and right-wing governments are broadly in accordance with the objective economic interest and subjective preferences of their class-defined core political constituencies"* (*ibid.*, p.1468).

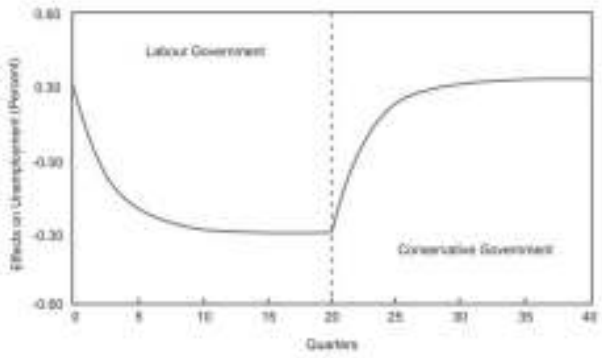

Figure 4. Stimulated Net Effects of Labour and Conservative Governments on the Unemployment Rate (Adopted from: Hibbs, 1977)

Hibbs' partisan theory was a subject to a similar critique as that made for Nordhaus. First, the model was non-rational. Second, it did not identify what macroeconomic tools incumbents are using to achieve their political targets (Alesina *et.al.*, 1993; Heckelman,

2002). Subsequently, Alesina (1987) incorporated rational expectations framework into partisan theory. This new model implied that voters are rational and have their expectations on what the level of inflation and employment should be. As a result, outcomes of elections are unknown, and thus the future policy is uncertain. This uncertainty subsequently leads to short-term business cycle effect, whereas newly elected government has its own inflationary and unemployment targets. However, as Alesina (1987) suggested, cycles could be avoided if parties would agree on common monetary policies. This cooperation as a result would be of great benefit for both of them in a long run.

Alesina's model was further adopted by Ellis and Thoma (1991), Heckelman (2001; 2002), Tella and MacCulloch (2005), and other researchers.

Researcher	Non-Rational Behaviour and Non-Rational Expectations	Rational Behaviour and Rational Expectations
"Office Motivated" Politicians	Nordhaus (1975)	Cukierman and Meltzer (1986), Rogoff (1990), Schultz (1995), Lohmann (1998)
"Partisan" Politicians	Hibbs (1977, 1987)	Alesina (1987), Ellis and Thoma (1991), Heckelman (2001; 2002), Tella and MacCulloch (2005)

Table 1: Politico Economic Models of Business-Cycles (Adopted from: Alesina, 1988)

Bronson Asset Allocation Cycle

Bronson Asset Allocation Cycle (BAAC) also known as Super Cycle (SC) was pioneered by American investor Robert E. Bronson. Bronson developed a model which was used to analyse major characteristics (turning-points, duration and magnitude) of the capital markets and also to examine the relationship between stock-market and economic cycles (Bronson, 2008; 2010). As the researcher indicated, BAAC is a combination of super cycle Bull Market Period followed by the super cycle Bear Market Period, or *vice-versa*. The first period is a 12-20 year period of the over-performance in the market when returns on equities exceed returns on money markets. During this period, the market players usually ignore the risk involved. The other period is of the same duration but of the under-performance in the market. Typically it starts when returns on money markets are much greater than the ones on equities. During the Bull Market Period, the market players anticipate economic decline, especially when risk involved is taken into account (Bronson, 2008).

Following Bronson's (2008) explanation, BAAC is a middle cycle between Kuznets and Kondratieff cycles, which he contends as the missing link between the two cycles. His historical analysis of 10-years US Treasury Note Yields for a period from 1800 to 2002, and Wholesale Prices for the same period led to the conclusion that these cycles are linked and highly synchronised. Accordingly, super cycle was identified as an important element "*in the integration and understanding of the whole range of recognized business cycles"* (*ibid*., p.3).

According to Jerrett and Cuddington (2008), super cycles (SC) are *"super"* in two senses. First, they are long in durations, i.e. 30 years of duration. Second, they involve a wide range of economic indicators. Therefore, as Jerrett and Cuddington highlighted, there is a need for both business and public sector to have a greater understanding of the SC.

The idea of super cycles was further elaborated by commodity market researchers. Heap (2005) hypothesised that SC are driven by materials intensive economic growth. As he explained, urbanisation and industrialisation of major economies demand greater level of commodities to ensure their successful expansion. Consequently, this demand drives commodity prices up. What is more, the rising demand increases commodities supply time, thus bringing extraction expenditures up and creating tension in the market. However, when economies evolve, they move from manufacturing towards service based activities, thus demanding fewer materials. As a result, this transformation process brings the super cycle to an end. For his analysis Heap used example of China's economic growth with an emphasis on the copper market. Accordingly, Heap concluded that a super cycle is a demand driven phenomenon, that urban migration is very important factor generating this cycle, and *"further materials intensive economic activity (as measured by rising intensity of use) in China will drive another super cycle"* (*ibid.*, p.8). Cuddington and Jerrett (2007) applied a ban-pass (BP) filter to assess the existence of the super cycle component in the commodity market. The authors analysed time-series of nonferrous metals, including aluminium, copper, lead, nickel, tin, and zinc, of a period from 1909 to 2006, some of them going back to 1850. They found evidence of super cycles in metal prices of a period between 10 and 35 years. The study also found that the amplitude of commodities super cycle is very large with 20 to 40 per cent deviations from the trend line. In a subsequent paper, Cuddington and Jerrett (2008) employed annual data series of six on the London Metal Exchange (LME6) traded nonferrous metals for a period from 1850 to 2006 to search for super cycles in metal prices. Time series were first deflated using US CPI index with a year 2006 being as a starting point. Then, as in previous study, time series were filtered using ban-pass (BP) filter. Finally, contemporaneous correlation analysis was performed. The results of this study confirmed the existence of super cycles in the real metal prices. The authors also hypothesised that metal prices at the time of writing were in the early phase of a super cycle due to China's industrialisation and urbanisation. These findings provided with some important implications for investors and policy makers. Jerrett and Cuddington (2008), subsequently, extended their previous study by adding three metal products, steel, pig iron and, molybdenum, which are considered as being very important for any growing economy. The same analysis techniques (time series deflation, BP filtering, and correlation) were performed. The study results identified the existence of super cycles in metals with a periodicity of 30 to 70 years, and amplitude variations of 15-75 per cent. The analysis also indicated that prices of commodities are demand driven. All these and previous findings were considered as having important implications for both mining and investment industries as well as fiscal authorities.

The concept of super cycles was also used by environmental researchers (Vail *et.al.*, 1977, Hohwy *et.al.*, 1999, and Veevers, 1990).

Harrison 18-year cycle

Based on his 18-year cycle theory, Harrison (2007) predicted global economic downturn to happen in 2010. The year 2010 was identified as a trough of the current business cycle, which has began in 1992. Harrison anticipated, 2008 will be a peak year for the property market which will follow a decline in 2010. Speculation in the property market was identified as the primary cause of the forthcoming crisis.

Harrison (2007) based his 18-year cycle theory on Hoyt's (1970, pp.538, cited in Foldvary, 2007) findings, who identified that *"while there were variations in timing between different cities and different types of property, the urban real estate cycle was approximately 18 years in length...it was usually 18 years from peak to peak or from trough to trough"*. As

Harrison explained, cycle starts with an around 7-year upswing, which is then followed by a mid-cycle correction in the market, and then another 7-year upswing with a recession of around 4 years afterwards (Calverley, 2005). For Harrison (*ibid.*) the cycle arises partly from the way home ownership is financed. As he points out, if 5 per cent is a normal mortgage interest rate (which it was for most of 1990s and 2000s in the UK), the amount invested/borrowed doubles in almost 14 years with 5 per cent compound interest. In other words, if someone acquires an asset which yields 5 per cent, the money will return in 14 years assuming the compounding of the interest. Without a compounding this period extends to around 20 years. Therefore, those, who acquire residential property with a mortgage, are expected to buy a new property only every 14 to 20 years. During the easy credit times, when the interests are low, it is considered a better option for individuals to acquire property rather than to rent it, i.e. it is cheaper to own property than to rent. This impetus of owning subsequently triggers the cycle. Once it begins, a home buying cycle goes for years. Greater demand for property triggers its prices. The rising prices increase home equity (the wealth effect). It subsequently encourages more buying. Individuals use their existing equity to acquire more expensive and bigger homes as they climb the housing ladder. Essentially, as Harrison hypothesises, this process continues until prices reach the level at which they cannot be sustained. After this period, which is around 14 years, a market downturn begins. This 3-4 year process brings property prices back to the sustainable level. According to Harrison, a downturn lasts much shorter than upturn, whereas it is based on fear rather than on greed. The fear of market collapse reduces prices much quicker than they were built on greed. Subsequently, Harrison argued that a heavy tax on land could dampen the cycle. Also, it would stop speculation within the market.

As Calverley (2005) observed, Harrison's theory has several drawbacks. First, it is mostly inclined into discussion on residential property. There is almost no discussion on commercial property, where prices, as observed, soared significantly during the current cycle, thus carrying a risk of bust. Also, Harrison does not explain what impact the heavy land tax, which he is proposing, would have on the planning system.

OVERVIEW OF THE CYCLES AND CONCLUSIONS

The major findings of this review are presented in Table 2 below. In this review four major cycles Kitchin, Juglar, Kuznets, and Kondratieff and their characteristics were discussed. For a complete discussion on the subject, eight auxiliary cycles Cobweb, World System, Hegemony Cycles, Elliott's waves, Partisan and Opportunistic Political Business Cycles as well as Bronson Asset Allocation and Harrison 18-year Cycles have been described. The study has found that all of these cycles have their own specific characteristics. They are based on certain theoretical and empirical foundations, cycles are of different periodicity. The longer the cycles are, the greater are the controversies that surround them.

In general, this paper argued the central importance of cycles. Following the observations of Barras (1994; 2009), it is believed that different cycles sometimes reinforce one another or cancel each other out. Thus, for a greater perception of the dynamics of the cyclical nature of the economy, these interacting influences must be understood. Moreover, it is considered that economic booms and slumps are not just random events. Rather they derive from combinations of particular circumstances, which tend to be self-replicating over time. The aim of this review was to explore the mechanics and rationale behind these cycles as well as to assess what research methods, data and data analysis techniques were employed by researchers to examine this phenomenon.

	Researcher	Length (years)	Driving Factors	Periodicity
Major Cycles	Kitchin (1923)	3 - 5	Investment in Inventories	Minor cycle
	Juglar (1862)	7 - 11	Investment in Machinery	Major cycle
	Kuznets (1930)	15 - 20	Investment in Building	Long swing
	Kondratieff and Stopler (1935)	48 - 50	Investment in Innovations	Long wave
Auxiliary Cycles	Elliott (1939)	1 - 2	-------	Minute Cycle
	Kaldor (1934)	2 - 6	Wrong Anticipations	Commodity/Cobweb
	Forrester (1973)	50	Capital Investment	Long Cycle
	Modelski (1978)	100 - 150	World Power	Hegemony Cycle
	Nordhaus (1975)	4	Economic manipulations	"Opportunistic" PBC
	Hibbs (1977)	5	Partisan preferences	"Partisan" PBC
	Harrison (2007)	18	Speculation in Property	Housing Cycle
	Bronson (2008)	30	Urbanisation and industrialisation	Super Cycle

Table 2: Scheme of Major and Auxiliary Cycles

It is considered that a greater awareness of the various types of cycles discussed herein could be useful for both the private and public sector in assessing various economic issues. The existence of business cycles implies that the economy has a rhythm and exhibits dynamic behaviour. Therefore, it is expected that by recognising both short and long business cycles and their repetitive nature, it is possible to anticipate changes in the economy (Diebold *et.al.*, 1993; de Groot, 2006). As Diebold *et.al.* suggested, the understanding business cycle duration may furnish vital insights *"on important and long-standing questions in macroeconomics"* (*ibid.*, p.255). Consequently, following observations of Pyhrr *et.al.* (1999, p.), it could be concluded that "*cycles are a major determinant of success or failure because of their pervasive and dynamic impacts [on the economy] - impacts that should not be ignored or over-simplified"*.

However, as de Groot (2006) and Barras (2009) noted, it should be remembered that there is always a danger of adopting too mechanistic an approach of cycle theories.

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