Two Giants' Views on Business Cycles: Kalecki vs. Schumpeter

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Abstract

Kalecki and Schumpeter used distinct models to analyse the economic system by examining business cycles. Both economists thought that depression, which was an integral phase of the cyclical movements of the economic system, was inherent in capitalism. Although they had similar views on the nature of capitalism, Kalecki and Schumpeter differed considerably from one another with regard to the initial factor that led to the emergence of business cycles. Kalecki stated that the changes in the profitability of investments and the size of fixed capital equipment determined the change in fixed capital investments, and that business cycles emerged as a consequence. Conversely, Schumpeter argued that the main reason for the emergence of business cycles was lopsided, discontinuous, and disharmonious innovations. As a result of such innovations, the economic system moved away from the equilibrium and into business cycles. Given these diverging views, this study explains Kalecki's and Schumpeter's business cycle models individually, compare them and reveal the common features in the two models.

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1. Introduction

It has been widely observed that economic activity has accelerated as well as slowed down since the mid-18th century, when industrial capitalism emerged and spread worldwide. These ebbs and flows, which involve phenomena such as prosperity, growth, recession, crisis and depression, are called business cycles in economic literature. The question of why business cycles have emerged since the Industrial Revolution and how they affected the economic system has become one of the most debated topics in literature. Some scholars have taken business cycles as a starting point and analysed the nature of the entire economic system, in other words, industrial capitalism. On the other hand, some have argued that business cycles could only be the consequence of external shocks such as war and drought. In this study, we explain and compare two business cycle models that fall under the former group. Schumpeter and Kalecki, two very influential economists of 20th century, have actually analysed the whole economic system by examining business cycles through the models they put forward.

Schumpeter (1883-1950), undoubtedly one of the most renowned economists of

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the previous century, published more than nine books and 200 articles throughout his professional career. Schumpeter is generally known for his books on development and history of economic analysis. However, Schumpeter also studied business cycles for many years and published a comprehensive book and several articles on the subject (Reisman, 2004, pp. 3-11). According to Hansen (1951, p. 129), Schumpeter was one of the few economists from continental Europe who developed notable models on business cycles. In his works, Schumpeter analysed business cycles and explained the evolutionary features inherent in capitalism.

Kalecki (1899-1970) was an economist with a background in engineering and mathematics, who believed that social life should be analysed as one whole. Although he published books on mathematical economics, econometrics, planning methodology and growth, his books on business cycles are among the classics of economic theory today (Osiatynski, 1990, pp. 1-2). His analyses of business cycles are held in high regard due to his holistic approach to assessing economic movements, and his criticisms of the capitalist system (Osiatynski, 1990, p. 3; Sachs, 1999, p. 268).

The objective of this study is to explain Schumpeter's and Kalecki's business cycle models individually, to compare them and reveal the common features in the models. The study consists of two main sections. The second section is dedicated to Schumpeter's model, while the third reviews Kalecki's model in detail. At the end of the study, we compare these models in terms of their characteristics.

2. Schumpeter's business cycle model

Schumpeter first mentioned the business cycles in an article in German *Das Wesen der Wirtschaftskrisen* published in 1910 and in a book titled *Theory of Economic Development*

(*Theorie der wirtschaftlichen Entwicklung* in German) published in 1911 (Reisman, 2004, p. 243). In *Theory of Economic Development*, he focused on key concepts such as economic evolution, disturbances to the static state, business cycles and innovation (Anderson, 1915, pp. 648-652). Schumpeter covered a detailed literature review of cycles and crises in his book entitled *History of Economic Analysis* later on (Schumpeter, 1954). Yet, Schumpeter's most prominent work on the subject is undoubtedly *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process* published in 1939. In this book Schumpeter analysed the capitalist development process and proposed a theory of business cycles. Our explanations on Schumpeter's business cycle model rely heavily on his 1939 book.

2.1. The stationary state and the factors of change

To analyse the nature of business cycles Schumpeter began with a case in which there were no cycles and the economic system was in a stationary state. The system under review continuously reproduces itself in the steady state (Schumpeter, 1939, p. 29). According to Schumpeter, one can assess the factors that lead to economic change in an economic system under two groups, external factors of change and internal factors of change. External factors include exogenous shocks such as wars, revolutions and natural disasters. Schumpeter argued the nature of the capitalist system cannot be explained by external factors. For this reason, he excluded external factors from the business cycle model that he proposed (Schumpeter, 1935, p. 3; 1939, p. 65).

Schumpeter suggested that internal factors of change include changes in preferences, changes in quantity and quality of production factors, changes in the methods of supplying commodities and change in the production

function. In his analysis, Schumpeter assumed that the change in consumer preferences was negligible. The increase in the quantity of production factors can be considered a basic driving force for economic change. However, in the Schumpeterian system natural resources, population and capital goods are assumed to be constant (Schumpeter, 1939, pp. 66-78).

In his analysis, Schumpeter acknowledged the change in the production function from a broad perspective. A technological change that entered the production process, emergence of new sources of supply, development of new production processes, in short, any change that led to 'doing things differently' within the economic system could be a source of a new production function. Schumpeter referred to all of those as 'innovation' (Schumpeter, 1928, p. 377; 1939, p. 80). Thus, innovation is regarded as the only factor of internal change. Schumpeter argued that all the changes that innovations caused in the economic system contributed to economic evolution (Schumpeter, 1939, pp. 82-83).

2.2. Effects of innovation on economic change

Innovation, in brief, is the creation of a new production function. This definition covers the introduction of new products into the markets, the development of new organisational structures as well as the opening of new markets (Schumpeter, 1935, p. 4). Schumpeter stated that three basic conditions must be met to introduce innovations.

The first condition is that major innovations or a bunch of minor innovations require the construction of a New Plant and machinery, or at least the renovation of old plants and machines. This kind of activities involves spending valuable time and incurring a great deal of costs. The second condition is that each innovation is introduced by a New Firm. Schumpeter believed that many firms were

set up to materialise a new idea. When a firm realised the innovation it aimed to introduce, or when its innovation lost its originality, then the firm accomplished its mission and that marked the beginning of its decline. This is the main reason why firms cannot live forever. The third condition is that innovation always takes place under the leadership of New Men. Competition intensifies with the emergence of New Firms and New Men, and consequently the old firms are forced to either close down or adapt their production processes according to innovations (Schumpeter, 1939, pp. 90-93).

Schumpeter was not against the idea that an economy could make progress through a smooth distribution of improvements in technology. However, he argued that that progress would not mean much for overall development of the economy. Pathbreaking changes that could have the potential to accelerate the development process did not occur in a gradual and continuous manner in history (Haberler, 1950). Thus the distribution of innovations in a given economic system is usually uneven. Innovations are often clustered in certain sectors. According to Schumpeter, the disturbances the innovations cause in the economic system have to be big to set it in motion. A big disturbance means that it affects the entire system and thus triggers a new adaptation process. For example, an ambitious railroadisation scheme that covers all regions of a country affects all settlement areas and all cost calculations. On the other hand, industrial change is not always in accord with the remaining components of the economic system. While some industries move forward and make progress, some do not have the capacity to keep pace with the leading ones. Consequently, Schumpeter characterised the innovations and the process of economic evolution as lopsided, discontinuous and disharmonious (Schumpeter, 1928, p. 378; 1939, pp. 98-100).

In case innovations do not have those three features listed above, in other words they are realised in a continuous, smooth and harmonious manner over time, there will be no reason, except the external factors, for the emergence of business cycles. Schumpeter argued that if innovations were materialised continuously and smoothly distributed over time periods, the economic system would not be considerably affected, the stationary state would not be disturbed and the newly launched innovations would continuously be absorbed by the system (Schumpeter, 1927, p. 297; Hansen, 1951, p. 131).

2.3. The mechanism of the business cycle model

Schumpeter explained his business cycle model in stages. These stages are called first, second and third approximation respectively. Then he combined all stages and explained the business cycle model through the Three-Cycle Schema.

2.3.1. Pure model or first approximation

According to Schumpeter, the only factor that can disrupt the economic system and drive the system out of the stationary state is innovation. The first entrepreneur who introduces innovation is the person who succeedes in applying that innovation in business and introduces a new product to the market. As that innovation or product becomes widespread in the following periods, more and more entrepreneurs invest in producing or supplying the same kind of products. Thus, the process that has started with the innovation accelerates over time. The economic system moves away from the stationary state equilibrium. Then, the disequilibrium prompts a new adaptation process. During this period the firms that continue operating with the old processes and equipment should either liquidate or

restructure themselves (Schumpeter, 1928, p. 383; 1939, pp. 137-138).

At a certain point throughout the adaptation process the unit cost of the new product will be equal to its market price. From this point on, entrepreneurs cannot make profit out of that product. Therefore, the favourable series of events in the economic system that stem from a significant innovation come to an end. In the meantime fluctuations in the system affect the cost and income calculations of firms. Entrepreneurs need to wait for the fluctuations to level out to be able to realise a major innovation. In summary, the reaction of the economic system to innovations is as follows: the introduction of the new products and the spread of innovation, the elimination of some components of the system that cannot adapt to the new phase, the absorption of the consequences of innovation, and the restructuring of the economic system. As a result of these developments, the system reaches a new neighbourhood of equilibrium.[1] The new equilibrium domain, socially, represents a more advanced level than the previous equilibrium (Schumpeter, 1939, pp. 139-141).

Schumpeter called the structure presented above the Pure Model or First Approximation. He separated the cycles in economic evolution by the neighbourhoods of equilibrium. In the Pure Model, each business cycle consists of two phases. In the first one, the system moves away from the equilibrium thanks to innovations and in the second phase it moves towards a new neighbourhood of equilibrium. These phases are prosperity and recession, respectively (Schumpeter, 1939, p. 142).

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[1] According to Schumpeter, a Walrasian equilibrium never really happens. For this reason, he used the concept of neighbourhood of equilibrium instead of equilibrium (Schumpeter, 1935, p. 4).

2.3.2. Secondary wave or second approximation

The model suggests that every growth period leads to a liquidation wave. In this process firms that cannot adapt to the innovations that emerged during prosperity phase are eliminated, and prices and quantities are being readjusted while the economic system moves towards a new neighbourhood of equilibrium. However, Schumpeter suggested that the Secondary Wave caused a massive and more comprehensive liquidation and adaptation sequence (Schumpeter, 1939, p. 154).

Under the influence of the Second Approximation, in contrast with the expectations, the economic system does not achieve stability in the neighbourhood of equilibrium following the recession phase. Schumpeter referred to the characteristic feature of the Second Approximation as abnormal liquidation. This concept involves the downward revision of the values and the contraction in the volume of transactions. As we have explained previously, within the First Approximation, the system moves towards the equilibrium during the recession. Yet, after the recession phase in the Second Approximation, the system fails to reach the neighbourhood of equilibrium. Instead the cycle continues with the depression phase. When the depression period is over, the system moves towards the so-called recovery phase. Thus, when the Secondary Wave is taken into account there are four phases in a business cycle: prosperity, recession, depression and recovery (Schumpeter, 1935, p. 6; 1939: p. 155).

Schumpeter presumed that phases of business cycles could be distinguished from one another through the forces that drove them. These forces can be observed in the following order: the introduction of innovations to the economic system (prosperity), the response of the economic system to the impact of new products of the new plant, and autodeflation (recession), the abnormal liquidation process and the negative expectations arising therefrom (depression), going back to the equilibrium level (recovery). According to Schumpeter, one needs to recognise the neighbourhood of equilibrium reached before prosperity as the initial phase of a business cycle, and the neighbourhood of equilibrium attained in the process following recovery as the final phase (Schumpeter, 1935, p. 6; 1939, pp. 162-163).

2.3.3. Many simultaneous cycles or third approximation

From the explanations we have made so far, one may deduce that there may only be a single cycle model that always emerges in the same way and repeats itself. However, Schumpeter emphasised that there could be various types of business cycles at work (Schumpeter, 1935, p. 7). He stated that there were many reasons to believe that an indefinite number of cycles exist, interact and move concomitantly. Schumpeter stated that the series that he used in *Business Cycles* do not support the Single Cycle hypothesis (Schumpeter, 1939, p. 169).

If we admit that innovations constitute the basis of business cycles, then we should not expect that only a single type of cycle will occur in the economic system as the adaptation process may not be identical for every innovation. For instance, it is possible to observe smaller waves that have been created by minor innovations while the system moves along the prosperity phase of a long wave (Schumpeter, 1939, p. 173).

Major innovations are not usually realised completely when they are applied for the first time. In such cases, innovations are materialised in phases and each phase corresponds to a business cycle. Thus, one may observe successive cycles with similar characteristics (Schumpeter, 1935, p. 7;

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1939, pp. 174-175). A sequence of cycles can occur as a result of great economic, social or political events. For example, the Industrial Revolution consisted of several cycles that followed one another. These cycles, in turn, led to a new wave of significant changes in the economic and social structure worldwide (Schumpeter, 1935, pp. 5-7; 1939, p. 175).

2.3.3.1. Three-cycle schema. Schumpeter made use of Kondratieff, Juglar and Kitchin cycles to illustrate his business cycle model. He found these types of cycles convenient because their average duration matched those of the cycles analysed in *Business Cycles* (Schumpeter, 1939, pp. 176-177).

The first Kondratieff cycle in *Business Cycles* coincides with the Industrial Revolution. According to Schumpeter, this cycle began roughly in the 1780s and ended in 1842. The second Kondratieff cycle that he identified between 1842 and 1897 was also known as the age of steel and steam. In the third Kondratieff cycle, which began in 1898 and was still ongoing in 1939, the year that *Business Cycles* was published, electricity, chemistry and engines came to the forefront. The second type of cycles included in the Three-Cycle Schema, for explaining the cycles with a shorter duration than Kondratieff, is Juglar cycles. A Juglar cycle, which lasts for an average of nine to ten years, corresponds to certain innovations that have been carried out in the industrial and commercial circles. Kitchin cycles are the most difficult ones to associate with past events within the Three-Cycle Schema. The average duration of Kitchin cycles is around 40 months, which is relatively short compared to Kondratieff and Juglar cycles. Moreover, the changes that these cycles cause in the economic system are negligible compared to those of the others. Schumpeter argued that, historically and statistically, there are six Juglar cycles in a Kondratieff cycle and three Kitchin cycles

in a Juglar cycle (Schumpeter, 1939, pp. 178-180). Hagemann (2003) noted that the three cycle types included in Schumpeter's schema are, in fact, related to changes in different types of investment goods. He suggested that changes in inventories were associated with Kitchin cycles and fluctuations in fixed capital investment drove Juglar cycles whereas the driving factor of Kondratieff cycles was the fluctuations in basic capital goods which in turn led to major innovations.

2.3.3.2. The working of the three-cycle schema and some business cycles in history. Schumpeter's representation of the Three-Cycle Schema, in which external factors and seasonality are excluded, is given in his book. Curves 1, 2, and 3 illustrate the long, intermediate and short cycles, respectively. Each cycle type has four phases equal in length. A certain number of intermediate and short cycles, illustrated with Curve 2 and Curve 3, are completed throughout the long cycle represented with Curve 1 (Schumpeter, 1939, pp. 209-211).

Cycle Type 1, i.e., Curve 1, lasts 56 years and corresponds to the Kondratieff cycle on Schumpeter's Three-Cycle Schema. There are six Juglar cycles, i.e., Type 2 cycles, within each Kondratieff cycle. Curve 2 depicts Juglar cycles. Schumpeter presumed that Juglar cycles typically lasted for an average of nine to ten years. Cycle Type 3 corresponds to Kitchin cycles. Under the assumption that three Kitchin cycles are completed during a Juglar cycle, the average duration of one Kitchin cycle is around three years. Curve 4, created by Schumpeter, represents the aggregate effect, in other words vertical sum of the long, intermediate and short cycles illustrated in the Three-Cycle Schema. Thus, for example, Curve 4 exceeds Curve 1 when all cycle types are in their prosperity phase at the same time period. That is, the prosperity phases of the Kitchin and Juglar

cycles strengthen the upward movement in the economic system during the prosperity phase of the Kondratieff cycle.

Schumpeter made a detailed review of economic history of the United States and England for the period 1780-1930s to support his model and show that his analytic schema was valid. He analysed the Kondratieff cycles observed during the period that was covered in his book. He also attempted to identify the Juglar cycles within the Kondratieff cycles. However, he could not distinguish the Kitchin cycles due to insufficient data.

Schumpeter suggested that in the United States the first Kondratieff began in 1787 and ended in 1842. The driving force of the first Kondratieff cycle was the Industrial Revolution. Thanks to the revolution in production processes, manufacturing shifted from workshops to factories. The notable developments of this period were the establishment of cotton textile and wool factories and the reduction of transportation costs because of the construction of canals. According to Schumpeter, the six Juglar cycles within the first Kondratieff in the United States were completed in the following periods: 1787-1794, 1795-1804, 1805-1813, 1814-1822, 1823-1831 and 1832-1842 (Schumpeter, 1939, pp. 219-240). Based on Schumpeter's analyses, Kuznets (1940) stated that the first Kondratieff cycle was observed during the same period in England. The first Kondratieff, which Kuznets called the Industrial Revolution Kondratieff, occurred within 1787-1842 as well, and cotton textile, iron and steam power were at the foreground. Kuznets also attempted to identify the dates of the phases in this long cycle. He suggested that prosperity, recession, depression and recovery took place in the following periods: 1787-1800, 1801-1813, 1814-1827 and 1828-1842, respectively (Kuznets, 1940, p. 261).

Schumpeter thought that the second Kondratieff was observed between 1843 and 1897 in the United States. The most important and decisive innovation in the United States throghout this cycle was railroadisation. Another significant innovation was the development of machinery industry in the US. He also identified that another round of six Juglar cycles were completed within this Kondratieff cycle, in line with his Three-Cycle Schema. The periods of the Juglar cycles are as follows: 1843-1851, 1852-1860, 1861-1869, 1870-1879, 1880-1889 and 1890-1897. When Schumpeter analysed the second Kondratieff cycle, he also mentioned how the Kondratieff and Juglar cycles could move in opposite directions in the same period. For example, he noted that 1870 was the transition year from recession to depression within the Kondratieff. However, 1870 was also a year in which the fourth Juglar cycle (1870-1879) was in its prosperity phase. Schumpeter explained this seemingly contradictory case with the distinction between the evolution of the main innovation, which drove the Kondratieff cycle, and the realisation of complementary minor innovations (Schumpeter, 1939, pp. 241-292). According to Kuznets, the second Kondratieff cycle, also known as the Bourgeois Kondratieff, occurred during the period 1843 and 1897 in England as well (Kuznets, 1940, p. 261).

2.4. A short account of Schumpeter's business cycle model

Schumpeter basically examined the evolutionary nature of the capitalist system and the mechanics of the business cycles. He argued that innovation was the only factor that disturbed the economic system and entrepreneurship was the basic means to introduce them. The innovations provide the necessary investment for the economic system, just like the heart beat that pumps blood to the whole body (Hansen, 1951, p. 130). Schumpeter was criticised by many

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economists for his methodology in analysing business cycles, discarding the relevance of institutions, the significance that he attributed to certain concepts such as innovation and entrepreneurship, and his method in writing the *Business Cycles*, although he undertook remarkable analyses regarding the structure of capitalism.

McCraw (2006) criticised Schumpeter mostly for his method of writing the *Business Cycles*. He emphasised that Schumpeter worked alone for almost seven years to write that book. McCraw argued that several economists, statisticians and other social science experts organised in teams, with half a dozen researchers for each, must have worked together to be able to write the same book under the present conditions. James Tobin, a famous student of Schumpeter, reported that he did not recruit students as assistants, who could have helped him in his work, and he did not share the ideas he presented in his book with the academic circles through seminars before the book was published. Keynes, on the other hand, repeatedly discussed his ideas with the economists at Cambridge University throughout the years in which he wrote *The General Theory*. According to McCraw, Schumpeter would rather have followed a similar method. But Schumpeter never asked for such help, despite the presence of brilliant colleagues and students around him like Leontieff, Samuelson, Tobin, Haberler and Sweezy. In an article Haberler (1950) himself, pointed out to similar weaknesses and stated that the book was not organised well and not an easy read. McCraw regarded these as the methodological defects of the *Business Cycles*. He added that it was a hopeless task to try to explain the actual cycles observed in the past with standard cycle periods given in the Three-Cycle Schema (McCraw, 2006, pp. 233-236).

In a recent article Geiger (2014) suggested that although Schumpeter's idea of superimposed cycles and his famous Three-Cycle Schema were quite convenient in understanding the nature of business cycles, his illustration failed to visualise the development concept. According to the author, development, by definition, should be represented by a higher state of equilibrium which was absent in Schumpeter's superposition figure. Alternatively, he introduced a novel illustration which he claimed that it joined the cyclical factors and growth factors together with development (Geiger, 2014, pp. 43-48).

Despite being a supporter of Schumpeter, Kingston (2006), attacked him for not integrating institutions into his business cycle model. He argued that a favourable institutional framework and an appropriate legislation were crucial to innovations to emerge and cluster. He also suggested that the three Kondratieff cycles that Schumpeter identified in the past could be associated with certain legal arrangements. For example, he asserted that one could not understand the first Kondratieff, also known as Industrial Revolution Kondratieff, without factoring in the improvements regarding the property rights for exploiting natural resources. Furthermore, Kingston stressed the significance of the introduction of corporation with limited liability to improving investment climate and stimulating innovations and entrepreneurship. He concluded that Schumpeter must have been so tempted by historical analysis that he overlooked the role of institutional structure that affected the long cycles.

Solo (1951) stated that Schumpeter left some gaps concerning entrepreneurship and innovation, and some of his analyses did not reflect the truth. He underscored that in Schumpeter's model it was not clear how the entrepreneur, who was presumed to be the

person that actually introduced innovations, obtained an innovation. According to Solo, Schumpeter considered innovation a vital part of business life, and he thought that the entrepreneur purchased innovative ideas when he or she found it feasible. In this way, a relationship between social knowledge and new production functions was established through a commercial transaction (Solo, 1951, p. 423).

Solo was skeptical regarding the realism of Schumpeter's three required conditions for major innovations – i.e., New Plant, New Firm and New Men. Schumpeter believed the New Plant established the relationship between innovations and fixed investments. However, Solo suggested that in reality many innovations could be realised without building a new factory or buying new machinery. The second condition that established a relationship between innovation and the New Firm must also be questioned since existing firms may be capable of carrying out innovative activities as well. Solo asserted that the third condition that connected innovation with the emergence of new people with leadership qualities could not be considered a general rule and could only be true under some special circumstances (Solo, 1951, pp. 424-425).

Kuznets (1940) criticised Schumpeter's Three-Cycle Schema for being qualitative. Schumpeter established a relationship between several historical developments and the Three-Cycle Schema in his book. However, Kuznets was skeptical about whether the information and analyses presented by Schumpeter were sufficient to provide the validity of the Three-Cycle Schema. According to Kuznets, business cycle was a quantitative concept by definition. The features of business cycles such as duration, amplitude and phases must be measurable. Furthermore, Schumpeter did not clearly explain how he had distinguished concomitant cycles from one another, and determined the phases of each cycle only by relying on qualitative information (Kuznets, 1940, p. 266).

3. Kalecki's business cycle model

Kalecki began working at the Institute for Business Cycle and Price Research in 1929, and at the same time carried out several studies, which contributed to the foundation of his business cycle theory (Steindl, 1981, p. 591). Kalecki's first study on business cycles was *Essay on the Business Cycle Theory,* which was published in 1933. In 1935 Kalecki published a shorter version of his book as an article. In that article Kalecki made some changes in the notation compared to the model in his 1933 book (Kalecki, 1935). Kalecki's book, entitled *Essays in the Theory of Economic Fluctuations* published in 1939, was quite similar to his recent works in terms of explaining the nature of business cycles. This book, however, was more comprehensive than the ones that were published earlier. Although Kalecki's works in 1930s were of great value, to keep it short, we only examine his business cycle model published in this study in 1954.

3.1. Kalecki's business cycle model of 1954

Kalecki's most recent business cycle model was published in his book entitled *The Theory of Economic Dynamics: An Essay on Economic Dynamics and Long-Run Changes in Capitalist Economy* in 1954. The theory explained in this book was different from Kalecki's previous models in certain aspects such as the scope of topics, and the notation. Moreover, he included issues related to long-term economic development into his model.

3.1.1. The mechanism of the business cycle model

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Kalecki thought that the underlying factors of business cycles were investment decisions and realised fixed investments. At the outset, he imagined a static economic system to analyse business cycles. Kalecki wrote the equation representing the total fixed investments in an economy as follows:

$$I_{t+\theta} = \frac{a}{1+c}I_t + \frac{1}{1-q}\left(b' + \frac{e}{1-\alpha'}\right)\frac{\Delta I_{t-\omega}}{\Delta t} + d' \quad (1)$$

According to the equation, the fixed investments at time $t+\theta$ are a function of fixed investments at time t and the change in investments at time $t-\omega$. The first term on the right-hand side expresses the effect of firms' savings on investments (represented with coefficient a) in the current period, and the negative effect of the increase in capital stock on the fixed investments (coefficient $(1/(1+c))$). The second term represents the effect of the rate of change in profits.

Kalecki assumed that the term d', which stood for the possible changes related to long-run economic development, was constant at this stage. Furthermore, in order for the system to be static, the term d' needed to meet another requirement. A static system should be at rest when fixed investments equal δ, i.e., depreciation. Thus when the amount of investments is equal to depreciation of fixed capital, the investments become permanently stable and $\Delta I/\Delta t=0$. For this special case Kalecki reduced the investment equation given above to the following expression (Kalecki, 1954, p. 303).

$$\delta = \frac{a}{1+c}\delta + d' \quad (2)$$

Kalecki subtracted the equilibrium equation above from the investment equation, $I_{t+\theta}$, and he obtained the following equation, which represented deviations from the equilibrium.

$$I_{t+\theta} - \delta = \frac{a}{1+c}(I_t - \delta) + \frac{1}{1-q}\left(b' + \frac{e}{1-\alpha'}\right)\frac{\Delta I_{t-\omega}}{\Delta t}$$

The expression was simplified as $i=I-\delta$. In this form, i shows the difference between the fixed investments and depreciation. Since δ was assumed to be constant, $\Delta i/\Delta t=\Delta I/\Delta t$. Thus, the investment equation was rewritten as follows (Kalecki, 1954, p. 303).

$$i_{t+\theta} = \frac{a}{1+c}i_t + \frac{1}{1-q}\left(b' + \frac{e}{1-\alpha'}\right)\frac{\Delta i_{t-\omega}}{\Delta t} \quad (3)$$

$$\left(b' + \frac{e}{1-\alpha'}\right) = \mu$$

$$i_{t+\theta} = \frac{a}{1+c}i_t + \mu\frac{\Delta i_{t-\omega}}{\Delta t} \quad (4)$$

Kalecki started his analysis on business cycle mechanism from the point $i_t=0$, at which investments were equal to the wear of fixed capital equipment (henceforth the depreciation level). Furthermore, Kalecki assumed that $(\Delta i_{t-\omega}/\Delta t)>0$ at the beginning of the cycle. Accordingly, investments tend to increase before reaching the depreciation level. Therefore, $i_{t+\theta}$ takes a positive value. Because the first term on the right-hand side of the equation is $[a/(1+c)]i_t=0$ since $i_t=0$, and the second term is positive as $\mu(\Delta i_{t-\omega}/\Delta t)>0$. Consequently the amount of the investments is positive in the period $t+\theta$.

Once i starts to have positive values as to whether this rise will continue, that is if $i_{t+\theta}$ will be greater than i_t, will depend on the values of the coefficients $a/(1+c)$ and μ. The first component of $i_{t+\theta}$, $[a/(1+c)]i_t$ will be smaller than i_t. Because $a/(1+c)$ has to be less than one[2]. This leads to a tendency to reduce the overall value of $i_{t+\theta}$. On the other hand, the second term on the right-hand side, $\mu(\Delta i_{t-\omega}/\Delta t)$, takes a positive value. Because investments

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[2] In this expression the coefficient a refers to the portion of the firms' savings that is being invested. Kalecki assumed the coefficient a to be less than one, as firms do not tend to direct their entire savings to investment. The term $(1/(1+c))$ in the denominator represents the effect of the increase in fixed capital equipment on investments. The coefficient c takes positive values as the expansion of the capital equipment continues. For this reason $(a/(1+c))$ bit of the expression has to be less than one.

tend to increase before reaching i_t level in period t (Kalecki, 1954, p. 304).

Depending on the values of *a/(1+c)* and µ coefficients, the increase in investments comes to a halt at one point, and then they tend to fall. If the point at which the total investments in the system are at the highest value, this is denoted as i_{maks}, then at this very point;

$$i_t = i_{maks}; \frac{\Delta i_{t-\omega}}{\Delta_t} = 0$$

In case the level of investments reaches i_{maks}, the value of $i_{t+\theta}$ will be lower than i_{maks}. Because, 1- at the i_{maks} point µ($\Delta i_{t-\omega}/\Delta t)$ equals zero, i.e., the increase in investment stops, and 2- since the value of the term *a/(1+c)* is less than one, $[a/(1+c)]i_{maks}$ will be less than i_{maks}. The tendency to decline in the fixed investments will continue until the depreciation level.

After this point, the business cycle enters the slump phase which is roughly the opposite of the boom. According to Kalecki's business cycle mechanism, after the depreciation level, the fixed investment amount will keep on falling until it reaches its lowest level. Then, at the bottom, the decline in investments halts. Later on, the fixed investments tend to increase again. These ebbs and flows in the investments lead to fluctuations in total production, income level and employment level in the economic system (Kalecki, 1954, p. 305).

The business cycle mechanism described above has two salient features. (i) When the investments approach the depreciation level from a lower point, in other words from below, the investments do not tend to stop at this point and continue to increase. That is, the investments will be higher than they have been in the previous period, depending on the increase in investments, profits and total output. As previously noted, the static

equilibrium can only be achieved due to the fact that investments are equal to the erosion of fixed capital equipment, and investments have not changed in the recent past. However, the second condition cannot be attained at the depreciation level, because there is an upward trend in the investments. That is why the system cannot reach the equilibrium when the first condition is met, and the upward movement in the investment level continues. A similar mechanism is at work when the investments approach the depreciation level from a higher level, i.e., from above. Yet, in this case the total investment amount moves in the downward direction (Kalecki, 1954, p. 305).

(ii) When the increase in investments ceases, the mechanism keeps on working, and investments begin to decrease after this point. Two underlying reasons lead to this phenomenon. 1- The expression *a/(1+c)* is less than one, because of the negative effect of expanding fixed capital equipment on investments (*c>0*), and 2- the firms do not direct all the savings they have towards making investments (*a<1*). Hypothetically, in case the firms reinvest all of their savings in the firm (*a=1*) and the effect of the expansion of fixed capital equipment is negligible, that is coefficient *c* is very small, the system can reach an equilibrium where the investments are at the highest level. However, in reality, investments start to fall after reaching the highest level, and this is followed by a slump (Kalecki, 1954, p. 306).

3.1.2. The long-run trend and the development factors

In his 1954 book, Kalecki also analysed the long-term trend, which he did not include in the previous business cycle models. The development factors such as innovations hinder the whole economic system to remain in a static state and push the system towards an upward trajectory. Capital accumulation as

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a result of the investments being at a higher level than the depreciation level reinforces the effect of the development in the following periods, and helps maintain the long-term trend. As a consequence of the upward movement, the increase in profits and production leads to higher growth rates. The transition from the stationary state to the upward long-term trend corresponds to a change of the intensity of development factors from zero to a positive value (Kalecki, 1954, pp. 327-328).

Kalecki mentioned the concept of uniform growth as well as the long-run trend in the book. In the case of uniform growth, the investments in the current period and the fixed capital stock increase at an equal and constant rate. Moreover, investment, profit, output level and capital stock grow at the same rate in the long-run. Hence, in the long-run, the profit rate and capital/output ratio will be stable. According to Kalecki, many scholars considered uniform growth an automatic tendency in the capitalist system. Yet, Kalecki argued that one could observe this phenomenon only if the development factors such as innovations existed. In the absence of those factors, capitalist economies cannot depart from the stationary state, and can only reproduce themselves (Kalecki, 1954, p. 332).

Kalecki regarded innovation, rentiers' savings and population growth as the main development factors. According to him, the most important factor that was expected to boost the economic development process was innovation[3]. Innovations being realised within a certain period may make new investment projects more attractive. The effect of inventions might be similar to that of an increase in total profits in an economy because they all encourage potential investors to materialise new investment projects. Every new invention leads to new

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[3] The concepts innovation and invention are used interchangeably in this context within this section.

investment decisions, like every increase in total profits. Inventions that are observed in a steady stream contribute to investments to maintain an upward trend. Hence, inventions help a stationary system enter an upward trend (Kalecki, 1954, p. 334).

The second factor affecting the economic development is the savings of rentiers. In the case of rentiers' savings, firms' internal savings remain below the depreciation of fixed capital equipment. This causes the level of realised investments to be lower than the depreciation level. Consequently, rentiers' savings can push a static system to a downward trend. The net effect of the two factors, explained above, on the long-run development will be profound when both are taken into account jointly (Kalecki, 1954, p. 335).

It is a frequently mentioned assumption that population growth is a significant factor that has the potential to support economic development. If we suppose that there is no population growth, an increase in the production in an economy can still be achieved by an increase in the productivity of the workforce, or through participation of the reserve army of unemployed people in the production lines. Thus, it can be suggested that the population growth may contribute to the increase of the potential of the economy to expand its output in the long run. However, Kalecki argued that whether the increase in the potential, as a result of population growth, really bolstered economic development was a controversial issue (Kalecki, 1954, p. 336).

3.1.3. Distribution of national income

Kalecki analysed the distribution of national income through the share of wages in total value added created in the economy. He showed the relative share of wages as;

$$w = \frac{1}{1+(k-1)(j+1)}$$

In this equation, *w* represents the share of wages in total value added, *j* represents the ratio of the cost of materials to wages; *k* stands for the ratio of proceeds to production cost, also known as the degree of monopoly. Accordingly, the share of wages in total value added is determined by the monopoly degree and the ratio of material cost to wages (Kalecki, 1954, p. 225). The second determinant can also be regarded as the ratio of raw materials prices to unit labour cost. Therefore, when the degree of monopoly rises or the material prices increase with respect to the unit labour cost, the share of wages in total value added decreases (Kalecki, 1954, p. 226).

According to Kalecki, if the degree of monopoly is a determinant of the distribution of national income, then there is no free competition in that economic system. He argued that monopoly was inherent in the capitalist system. Free competition, while being used as a convenient assumption at the early stages of certain analyses, is only a myth that is far from being defined as a natural feature of the capitalist system (Kalecki, 1939, p. 252).

Kalecki focuses on two factors affecting the degree of monopoly. The first is the change in overheads that affect the production cost. The second is the power of trade unions. While the first factor is associated with an increase in monopoly degree, the second factor is considered an element that prevents a rise in monopoly power. When the production cost goes up because of an increase in overheads, profits of the firms will be squeezed in case the ratio of the price to the cost of production cannot be maintained or increased. Thus, in the case of increasing costs, firms may make implicit agreements to protect their share of profits. As a result, prices and consequently profits may rise (Kalecki, 1954, p. 215).

Strong trade unions can influence the degree of monopoly by putting pressure on profit margins generated by firms. A rise in the proportion of profits to wages increases the bargaining power of trade unions for higher wages. If trade unions succeed in raising wages, prices will also go up as this will lead to cost increases. Thus, it is not possible to achieve a higher profit rate without a cost increase. This motivates the firms to set profit margins at a lower level. Consequently, the presence of strong trade unions helps keeping the degree of monopoly under control (Kalecki, 1954, p. 216).

3.2. A short account of Kalecki's business cycle model

Kalecki presumed that the underlying element of business cycles was the change in investment level. He emphasised that investments were realised in a few stages: the decision to undertake investments, production of capital goods, and realisation of investments. Essentially, there is a lag between investment decisions and realisation of investments. Kalecki explained the business cycle mechanism through a basic equation that includes the determinants of investment (Steindl, 1981, p. 593). According to him, the most important determinants are the profitability of investments and the size of fixed capital equipment (Trigg, 1994, p. 94). In addition, he regarded retained profits of firms as another determinant of investments in his 1954 model since this financial source contributed to capital accumulation.

Kalecki changed his methodology for analysing business cycles over time. In his 1933 model, he extensively used mathematical expressions to explain the business cycle mechanism. However, in the 1939 version of the model, he reduced the weight of mathematics and opted to use graphic illustrations. In the 1954 version, he simplified the mathematical expressions and employed charts. One can associate the diversity in Kalecki's methodology with his general

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approach to the whole economic system. His focus was mainly on the underlying causes of the developments in economic indicators. He criticised Western economists for discarding the underlying factors that led the economic variables to move concomitantly. Thus, he was not exclusively interested in applying certain quantitative methods. Although he was an economist who could utilise abstraction and mathematics ingeniously, Kalecki opposed unnecessary use of complex mathematical expressions in economic analysis. He regarded mathematics and econometrics as the servants rather than the masters (Sachs, 1999, p. 267; Jefferson and King, 2011, pp. 962-967).

In the business cycle models Kalecki attached great importance to wages, income share of the capitalists, and distribution of national income. He argued that the nature of the capitalist system incorporated monopolistic behaviour rather than free competition. The presence of monopoly deeply affects the distribution of national income. In relationship with this issue, Kalecki also investigated whether the upturn in economic activity during the period 1932-1934, after the Great Depression, meant an increase in prosperity at the same time. According to Kalecki, when the economy started to recover, production and employment would increase first in the investment goods industry and then in the consumer goods industry. As a result, the consumption of workers would rise during the recovery. He concluded that one could observe a limited increase in the welfare of the majority of the population (Kalecki, 1934, pp. 174-175).

After the Great Depression, several economists examined the policy measures to be taken to tackle the crisis and revive the economy. Kalecki analysed this issue in terms of income distribution. He argued that during depressions, the expected effect could

not be created by cutting wages to stimulate economic activity (Lopez and Mott, 1999, p. 300). With a lower wage level, entrepreneurs can start utilising the idle capacity during the slump. Thus, unemployment can be reduced for a while, but this will not suffice to end the crisis. Although the profits of capitalists and production increase as a result of the wage cuts, it is necessary for the capitalists to expend or invest all the additional profits they have earned to move out of the slump phase. Yet, in Kalecki's opinion, it is highly unlikely to observe such a phenomenon. Under these circumstances, Kalecki looked for an answer to the question: 'In that case, is the crisis going to last forever?' Roughly speaking, his answer is: 'No'. Slump is one of the stages of business cycles. At this stage, profitability rises as fixed capital investments remain below the depreciation level. In the following periods, however, new investment decisions are taken with the expectation of a profit increase. As a result, the economy shifts from the slump to the recovery phase (Kalecki, 1935, pp. 188-192).

Regarding the remedy to the slump, Darity (1979, pp. 225-226) drew attention to Kalecki's perspective on the hostility of businessmen to deficit spending. According to Kalecki, businessmen opposed an increase in public expenditure to maintain full employment for several reasons. One reason might be that private business owners would not like to see that the dependence of overall economic activity on private investment falls. Moreover, capitalists may feel uncomfortable with possible social and political changes that have the potential to threaten their prevailing status as a result of continuous full employment.

Some scholars compared Kalecki with Keynes since he analysed macroeconomic variables as well and published his works while Keynes was gaining popularity in economic circles. Tew (1999, p. 281) suggested that

Keynes and Kalecki shared similar views on the analysis of the business cycles that took place due to the fluctuations in the capital goods investments. He added that both economists believed that the recovery in economic activity depended on the increase in investment and consumption through the multiplier mechanism[4].

On the other hand, Lopez and Mott (1999) stated that Kalecki opposed Keynes' investment theory for certain reasons. They noted that he criticised Keynes' theory because it was basically interested in how much investment must be made to restore the equilibrium in an economic system. However, Kalecki attempted to create a more general model on business cycles. Hence, he asserted that Keynes' theory was incomplete. Moreover, Kalecki stated that the most important defect in Keynes' investment theory was its static structure, which was not compatible with the dynamic nature of investments. Finally, Kalecki contended that Keynes ignored the distinction between investment decisions and actual investments. This was another important shortcoming of Keynes' investment theory (Lopez & Mott, 1999, pp. 293-297).

With a different perspective, Steindl (1981) asked, 'Why did Kalecki, with loads of original analyses, remain in Keynes' shadow for so long?' To answer this question, he suggested that it was necessary to evaluate Kalecki and Keynes not only in terms of their contributions to economic theory, but also their social status. Considering his family's social position, his prestige as an economist, his status at Cambridge University, his experience as a civil servant, and his circle of friends that included influential people, Keynes was a strong figure in his own country and society. Conversely, Kalecki was a newly emigrated Jew from Eastern Europe. He did not have a

background in the United Kingdom, a circle of friends to support him, or disciples who would follow his ideas. While Keynes was in a position in which he could socially command people's attention and make people listen to his ideas, Kalecki was not as fortunate (Steindl, 1981, p. 596).

Finally, it is worth mentioning the so-called Kaleckian economists' views in the economic literature, who created their own models based on Kalecki's analyses. Steindl, Baran, Sweezy and Cowling, who were especially inspired by the view that the capitalist system was in fact monopolistic, are regarded as Kaleckian economists in the literature. Monopoly power, distribution of national income, investments, and the linkages between these variables constitute the core of the Kaleckian economists' models. However, Kaleckian economists did not completely share Kalecki's views of the factors that determine the degree of monopoly (Trigg, 1994, pp. 91-100).

4. Comparison and conclusion

Schumpeter and Kalecki actually analysed capitalism by examining how the business cycles emerged and created effects on the economic system. Schumpeter stated that depression, which he regarded as one of the four stages of the business cycles, was a characteristic of the capitalist system and that it was not possible to avoid crises. According to him, crises are not some random disturbances to the equilibrium. They arise as a reaction of the system to the prosperity periods and motivate it to move towards a new neighbourhood of equilibrium (Schumpeter, 1927, pp. 287-294; Anderson, 1915, p. 659). On the other hand, Kalecki asserted that fixed capital investments, which he regarded as the main source of wealth and growth, underlied the crises. The productive nature of investment first slows growth, which in turn leads to a halt. What causes the boom to end

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[4] Kalecki did not explicitly mention a multiplier mechanism in explaining business cycles.

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is the expansion in the fixed capital stock, which is one of the most important paradoxes of the capitalist system. The expansion of fixed capital equipment, in other words, the increase in wealth, carries the seeds of depression in it. One could argue that Kalecki's view sounds contradictory. Yet, he responded to the criticisms by emphasising that the contradiction was not in his model but in capitalism itself (Kalecki, 1935, p. 193; 1939, p. 318). To sum up, we can infer that both economists agree that depression is inherent in the capitalist system.

Although they have similar views on the nature of capitalism, Schumpeter and Kalecki differ considerably from one another in terms of the 'entry points'[5] of their business cycle models. According to Schumpeter, when external factors are excluded, the main reason the business cycles emerge is lopsided, discontinuous, and disharmonious innovations. Thanks to the innovations, the economic system moves away from the equilibrium, and business cycles occur. For this reason, we suggest that the entry point in Schumpeter's model is innovation. Conversely, fixed capital investments are the entry point of Kalecki's model. Changes in the profitability of investments and in the size of fixed capital equipment determine the change in the fixed capital investments, and consequently, business cycles emerge. In Kalecki's model, business cycles do not appear when investments are equal to the depreciation level. However, the changes in the determinants prevent investments from staying at the depreciation level, and the

economic system continuously enters another cycle.

At this point, one could ask two questions: 1) did Schumpeter discard the fixed capital investments, to which Kalecki attached great importance, from his analysis on the business cycles?; and 2) did Kalecki ignore the significance of innovation, which Schumpeter placed at the core of his model, when examining the nature of business cycles? The answer would roughly be 'No' to both questions. Fixed investments are also included in the framework of Schumpeter's business cycle model. Considering the conditions for the realisation of the innovations, he mentioned that a significant amount of investment expenditure and purchase of new machinery equipment would be required (Schumpeter, 1939, p. 90). Hence, in Schumpeter's model, investments are an integral part of innovations. In addition, Schumpeter evaluated the effects of replacement investments, but he stated that such investments could not be considered an independent driver of the business cycles (Schumpeter, 1939, p. 194). On the other hand, Kalecki left the innovations out of the model for the cases in which there was no long-run trend in the economic system and economic development was discarded. Nevertheless, when Kalecki included economic development in the business cycle analysis, he considered innovations the most important factor that pushed the system to move upwards. Furthermore, Kalecki's definition of innovation in his 1954 model covered the supply of new products to the market as well, which also made the definition quite similar to Schumpeter's innovation concept (Kalecki, 1954, pp. 332-334).

Finally, we would like to touch upon the relationship between the equilibrium concept and the business cycle models we have examined throughout our study. Schumpeter takes the Walrasian equilibrium as the starting

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[5] The term 'entry point' refers to the concept or concepts that a theorist uses as a starting point of an analysis. The common feature of entry points is that they are basic concepts that mediate the analysis of social phenomena. An entry point is a concept that guides other concepts of a discourse and considerably shapes all the questions regarding a certain issue. For a detailed discussion of entry points, see Amariglio, Resnick and Wolff, 1990.

point of his business cycle analysis. He posits that when the external factors are left aside, the economic system departs from the equilibrium as a result of the realisation of innovations and moves towards a new neighbourhood of equilibrium at the end of a cycle. Although Schumpeter placed the concept of equilibrium in his model in this fashion, he did not regard it as a crucial condition that the system continuously tried to satisfy because his main goal was examining the process of capitalist evolution. Schumpeter argued that as long as Walrasian equilibrium is sustained, the system only reproduces itself, and evolution does not take place. Kalecki, on the other hand, included the concept of equilibrium in his 1939 business cycle model. He stated that there might have been an equilibrium point in a business cycle, but this could only be an exceptional case. Kalecki suggested that the economic system will not reach equilibrium if it is not already in it at the beginning, and the system will move around this equilibrium point. Sawyer (1985, p. 9-14) noted that Kalecki used the equilibrium concept along the line of the Marxian-Ricardian tradition, which led him to consider it in a more general sense. The equilibrium in Kalecki's writings only helped him explain certain tendencies such as the equalisation of rates of profit in the economic system. Therefore, we infer that the concept of equilibrium is not central to the analysis of business cycles for either economist.

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