

A Literature Study on Business Cycle Theory

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Abstract. Business cycle theory is always a research focus during the last couple of decades as a tool to explain the fluctuation in economic growth. In chronological order, this review sorts out the theories trying to explain the business cycle into five main influential schools of economics based on previous studies: Keynesian economics, Monetarism, New classical economics, Real business cycle theory, and New Keynesian economics. This review summarizes these theories respectively, introducing their origins, main mechanism, related models and empirical evidence, drawbacks, and challenges they face from other economists. Meanwhile, this review also compares the differences and similarities between each theory from three aspects: the determinant of aggregate production, the driving force of the business cycle dynamics, and the effectiveness of fiscal and monetary policies. The motivation is to gain a general view of modern business cycle theory to provoke thinking in long-term growth and short-term fluctuations in economic activities to support further research.

Keywords: Keynesian economics; Monetarism; New classical economics; Real business cycle.

1. Introduction

Macroeconomic research focuses on the aggregate economy's long-term trends and short-term fluctuations. Business cycle theory is concerned with the fluctuations in economies. Business cycle fluctuations are intervals of expansion followed by recession in economic activities, usually characterized by general upswings and downturns. Typically business cycles are measured by examining trends in a broad economic indicator such as Real Gross Domestic Production, employment, investment, consumption, price and wage, and so forth, and there are co-movements of many other macro parameters at the same time. It always presents a sine wave and can be divided into four phases—expansion, peak, contraction, and trough. The cycle is recurrent but not periodic, which means the duration between trough to trough is uncertain. According to NBER research, the average duration of each cycle is roughly five years in the postwar US.

There are many sources of fluctuations in the business cycle, such as rapid and significant changes in oil prices or changes in consumer sentiment, which affect overall macroeconomic spending and thus investment and the profits of firms. Often, these sources are not predictable and can be viewed as random "shocks" to cyclical patterns. The explanation of the business cycle has always been the center of economists over the years, and by now there are dozens of theories. Chronologically, the business cycle theories can be classified as five schools of thought: Keynesian economics, monetarism, new classical economics, the real business cycle theory and New Keynesian economics [1]. This review will present these theories, models and some empirical evidence separately according to time order.

2. Keynesian Economics

Beginning in 1936, Keynes's *General Theory of Employment, Interest and Money* tried to explain the business cycle, followed by the first mathematical model developed by Hicks, Kalecki, Metzler, Samuelson and others to describe business cycles by modeling. Keynesian economics put great importance on the role of aggregate demand. They believed aggregate demand (AD) is a key determinant of aggregate production. Keynesian economics analyzed income and expenditure and demonstrated that when investment is exogenous, the economy cannot reach a full employment equilibrium due to the lack of aggregate demand. When the good market is in equilibrium and all demand components are assumed to be exogenous and non-negative, the increase in the sum of

consumption and investment is smaller than the increase in aggregate income and production, indicating that supply does not create its own demand. To increase the aggregate demand, fiscal policy works efficiently but monetary policy fails.

Soon after the claim of Keynesian economics, Samuelson pretended the multiplier acceleration model [2]. In this model, investment follows the principle of acceleration. The essential thought behind this model is the larger the increase in the aggregate production of the last business cycle, the larger the investment is, which is also influenced by the accelerator. The multiplier accelerator model demonstrates that the interplay between the Keynesian consumption function and the principle of acceleration can explain the downward and upward movements in the business cycle: acceleration offers the moment with a cumulative element. As for the turning point in the sine-wave, which is also known as peak and trough respectively, the model gives an explanation that the investment decreases when output growth slows down during the expansion and then reaches the peak and vice versa for the trough.

Keynesian economists came up with the AS-AD model, which heavily stresses the rigidity of nominal wages but did not emphasize the stickiness of commodities prices. The assumption of this model is that the commodities prices are changeable but nominal wages are fixed. Then the equilibrium of this model is determined by a downward AD curve and an upward AS curve. Keynesian economics invented neoclassical synthesis inferring that the economy will go on several fluctuations and government can coordinate the economy to a stable statement by monetary and fiscal policies. Especially in an open economy, monetary policy is even more effective because monetary policy affects the exchange rate. For instance, expansionary monetary policy leads to decreasing interest rate, promoting net exports, and additional public expenditure decrease the net exports.

However, one of the drawbacks of the AS-AD model is that it predicts countercyclical real wages if regarding the business cycle as the consequence of shifts in the demand curve along the supply curve. Dunlop(1938) pointed out that the implied countercyclicality of the real wage rate contradicted the fact in the real world and Tarshis(1939) found that real wages should be procyclical using postwar US data. That is so-called the Dunlop-Tarshis critique [3, 4].

3. Monetarism

In around 1960s, there are increasing critics of the Keynesian neglect of supply-side factors. Led by Friedman, monetarism pretended another explanation of the business cycle, emphasizing the supply side. They argued that the self-correcting forces of the economy respond sufficiently rapidly so as to adjust the demand itself, and money moves closely together with real aggregate production with a business cycle. In this case, fiscal and monetary policies are regarded as unnecessary in keeping the economy stable.

Laidler (1976) proposed a model under a closed economy to explain the business cycle using monetarism theories, which argue that irregular monetary shock is the main reason for cyclical output movement [5]. Nominal wages are set one period in advance and there is a target of real wage to achieve. Along with this model, an equation working in both close economy and open economy called the accelerationist Phillips curve was put forward. It implicated that instead of a permanent trade-off, there is always a temporary trade-off between inflation and unemployment. This curve indicates that aggregate production exceeds the natural rate of output if and only if inflation accelerates whereas the higher the increase in inflation, the higher aggregate production is. The accelerationist Phillips curve is important because it made empirical corrections to the Keynesian Phillips curve. In the 1970s, the Phillips curve breakdown due to so-call ‘stagflation’: the rising inflation rate was accompanied by a rising unemployment rate.

Monetarists suggested that the interplay of aggregate demand and the accelerationist Phillips curve generates a business cycle. The mechanism can be described as follow: the inflation continues to increase after the peak, while high inflation impedes economic growth, so during the depression the downward trend has a cumulative character. After the outcome is less than the natural rate, the

inflation decrease, reducing the opposition to economic growth until the trough. Then economy starts to revive and go to the next expansion due to the deceleration of inflation.

The Keynesian economists think money doesn't matter at all, but monetarists proposed that money and aggregate output move together along the business cycle. The case of the US during 1948-1991 offers evidence that inflation accelerates when the economy is expanding.

4. New Classical Economics

In the early 1970s, Lucas and others initiated new classical economics. The new classical economics, characterized by rational expectations, demonstrates the tight relationship between the effectiveness of government policies and the path of expectations forming. They assert that only unanticipated money shock matters. In Lucas's new classical model, output deviates from its natural rate if and only if the supply of money deviates from its rationally expected level. In Lucas's model, unanticipated money leads to unanticipated inflation. Under this circumstance, producers rationally but mistakenly regarded the unanticipated inflation as an increase in the relative price of their respective output goods, which induces the producer to expand the scale of production, thus increasing the aggregate output.

Similar to the model of monetarism, new classical economics require a stable and predictable supply of money. Barro and Gordon came up with their model indicating that if inflation expectations and the growth rate of wages are constantly equal to zero, a discretionary monetary authority would produce positive inflation on average [6, 7]. Under rational expectations, deliberate monetary policy actions are anticipated, so monetary policy is ineffective.

In Lucas's famous article econometric policy evaluation: a critique, he argued that the predicted effect of policy is unlikely a reliable guide for economic policy. The reason is policy analysis treats the parameters to describe the agent's behavior as fixed at their estimated values, whereas the true parameters depend on expectations. However, the expectation change with the economic policy. That is people assume the expectation as constant when making estimation of the effect of policy measures, but in fact, the expectation will change, which is a brief explanation of Lucas critique. In general, new classical economics highlights the importance of expectations on the efficiency of stabilization policies.

5. Real Business Cycle (RBC Theory)

In the early 1980s, under the lead of Keyland, Prescott and others, the RBC theory appeared on the scene [8]. As a version of the neoclassical model, RBC theory adopts the classical view that the business cycle is a supply-side phenomenon and treats the shocks in the economy as exogenous. Given exogenous shocks in total factor productivity, such as the technology shock, the RBC theory interprets the fluctuations as the optimal outcome of firms' and households' optimizing behavior under rational expectation and denied the need for effort to stabilize the economy. That is: the market equilibrium is efficient and government intervention becomes futile. In the RBC version AS-AD model, the aggregate supply curve is vertical and exogenous shocks have an impact on the total output. The shocks then lead to the co-movement of other parameters and spread the influence through the capital stock.

The RBC theory argued that the supply-side models with a perfect market are capable of generating output fluctuation and co-movements of other macroeconomic variables. Monetarism put the supply side back to the fore compared with Keynesian economics. Furthermore, the RBC theory totally ignores the demand side and puts all emphasis on the supply side to explain the business cycle. It explains both qualitatively and numerically by calibrating the model to mimic the parameter moments observed in the real world. In the calibration, the numerical value obtained from economic evidence are inserted in the model.

From 1980s to 1990s, the real business cycle theory was the most influential approach in business cycle research, accounting for around 80 percent of economic activities according to Kydland and Prescott research in 1991 [9].

The main technique of RBC theory is filtering, including MV, High-pass filter, and HP filter which is used in different scenarios separately to detrend and filter out the fluctuation. Based on the benchmark RBC model, the modern business cycle theory basically takes the equilibrium model as the basic framework, forming with the Dynamic Stochastic General Equilibrium model (DSGE), introducing random disturbance into an equilibrium system. The prevailing view in modern macroeconomics is that economic fluctuations result from a variety of random shocks, including technologies, preferences, and monetary policy and fiscal policy, consumption and investment, and other forms of spontaneous shocks. Relative to the real business cycle model, the stochastic dynamic equilibrium model of multi-factor shock sources is referred as the General Business Cycle model (GBC).

During this period, there are several extensions of the benchmark RBC model; such as connecting productivity with wage and working hours, introducing human capital into the model, etc. Nowadays, there are other extensions to the basic RBC model, these fields are concerned with time to build.

6. New Keynesian Economics

The fifth school of business cycle theory is new Keynesian economics, which tries to derive Keynesian-style proposition using the RBC model with optimization of the supply side agents and rational expectations. New Keynesian economics appeared since the late 1970s and can be divided into three categories concerned with real rigidities, nominal rigidities and aggregate demand externalities.

Supporting the real rigidities, Greenwald and Stiglitz (1993) presented that business cycles can be explained as the result of the interaction of imperfections in the financial market and labor market [10]. In an imperfect financial market, firms use standard debt contracts to raise money, exposing themselves to the risk of getting bankrupt. To avoid bankruptcy, the firms will incur debt concerning their net worth, while the lenders also consider lending money according to the net worth of firms to hedge against the risk of getting bankrupt. The imperfection in the financial market fatherly influences the labor market by affecting the marginal product of labor. The use of standard debt contracts makes bankruptcy a troublesome issue. Associated with real rigidities in the labor market, this explains fluctuations in employment and aggregate output despite inelastic labor supply. As for the nominal rigidities, new Keynesian models indicated that when credit depends on firms' net worth, monetary policy influence the real world by balance sheet. Investment depends on lagged profits because past profits contribute to firms' net worth then fatherly determine their demand for investment. According to new Keynesian economics, monetary policy is effective because by reducing the interest rate, debt service will be changed thus influencing the availability of credit in the real economy.

As for nominal rigidities, Mankiw and Romer explained the business cycle on the basis of the stickiness of nominal wages and the aggregate price level and held that nominal price rigidity was the most basic cause of the business cycle [11, 12]. Mankiw came up with the argument that small menu cost will lead to large business cycle, and he also argued that 'The conflict between modern neoclassical and traditional Keynesian theories of the business cycle centers upon the pricing mechanism' [11]. Facing the decrease of aggregate demand in the economy, the general price level and nominal wages change slowly instead of falling rapidly because prices and nominal wages are sticky. To pursue a maximized profit, the manufacturers have to reduce production by adjusting quantity thus influencing employment, causing involuntary unemployment and economic recession.

When a firm's price falls, it slightly lowers the average price level and thus increases real money balances, which expands total income and shifts the LM curve outward. Economic expansion in turn increases the demand for the goods of all firms, and the macroeconomic effect of a price adjustment by one firm on demand for the goods of all other firms is called an externality of aggregate demand.

One of the explanations for the recurrent fluctuation in the economy is the sunspot theory. Jevons regards sunspots as a fundamental factor that affect the economy through climate and agricultural harvest because many economists believed that agriculture played a pivotal role in the economy at that time [13]. He observed that the average interval of the business cycle is around 10 years, coincident with the average interval of sunspot activity. The sunspot theory is known as the externality of the business cycle. Although there is no evidence of sunspot theory, it indicates the pivotal role of expectations. When agents use sunspot activity as a prophecy to adjust their expectations and guide their behavior, the sunspots affect the real economy by influencing agents' beliefs. There exist multiple rational expectations equilibria due to the aggregate demand externality; that is one producer's supply creates other producer's demand. Sunspot activity, serving as a representative of random events, induce equilibrium selection. Only if people rely on sunspots to adjust their expectations, then sunspots matter. But the sunspots theories have been challenged from three aspects. The first one is the sunspots theories cannot offer definite predictions. Thus, it is unlikely to evaluate the policy effectiveness. The second is there exists too much external uncertainty whereas the sunspots are concerned as a kind of random shock. The third is that the sunspot equilibria indicate market incompleteness.

7. Conclusion

The business cycle has always been one of the two core issues in macroeconomics research. The occurrence of business cycle is complex, covering almost all activities in an aggregate economy. However, such a big word involves many basic concepts in macroeconomics, including aggregate demand, aggregate supply, expectations, inflation, deflation, monetary and fiscal policy, and so on.

As the theory develops, microfoundations are also concluded in some of the models such as RBC. Furthermore, except for sorting out these theories chronologically, theories can also be classified from different aspects such as endogenous and exogenous. Once an influential business cycle theory has been put forward, it would be doubted and challenged. Up to now, the five schools of thought above are the most representative and seen as mainstream. Apart from the mainstream, there are also heterodox giving explanation. For instance, the Austrian business cycle theory views business cycles as the consequence of excessive growth in bank credit due to artificially low interest rates set by a central bank or fractional reserve banks, and Karl Marx claimed that recurrent business cycle crises were an inevitable result of the operations of the capitalistic system.

Reviewing all these schools of thought, the main concerns are in accordance with three aspects: what determines aggregate production? What drives the business cycle dynamics? And the effectiveness of fiscal and monetary policies. Considering these three questions can help distinguish the difference of each other referring to the transmission mechanism and evaluate the effectiveness of policy measures. The reasons of the world business cycle are complex and diverse, and each business cycle theory is reasonable to some extent but cannot give an absolute explanation. To better understand the occurrence of the business cycle, people should not follow only one school of theory but have a comprehensive overview of diverse schools and related fields.

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