

BUSINESS CYCLES AND THE EMERGENCE OF MACROECONOMICS

A. AL-AMEEN

I INTRODUCTION

The purpose of this paper is to develop an understanding of the principle theories of the nature and causes of business cycles and to show that the emergence of macroeconomics was a result of business cycles and business cycle studies. That is, this paper will attempt to show that business cycles and the Neo-Classical theories of the business cycle were the major causes of the emergence of macroeconomics. The format will be one of descriptive presentation with analysis of Neo-Classical theories and the background for Keynes' General Theory.

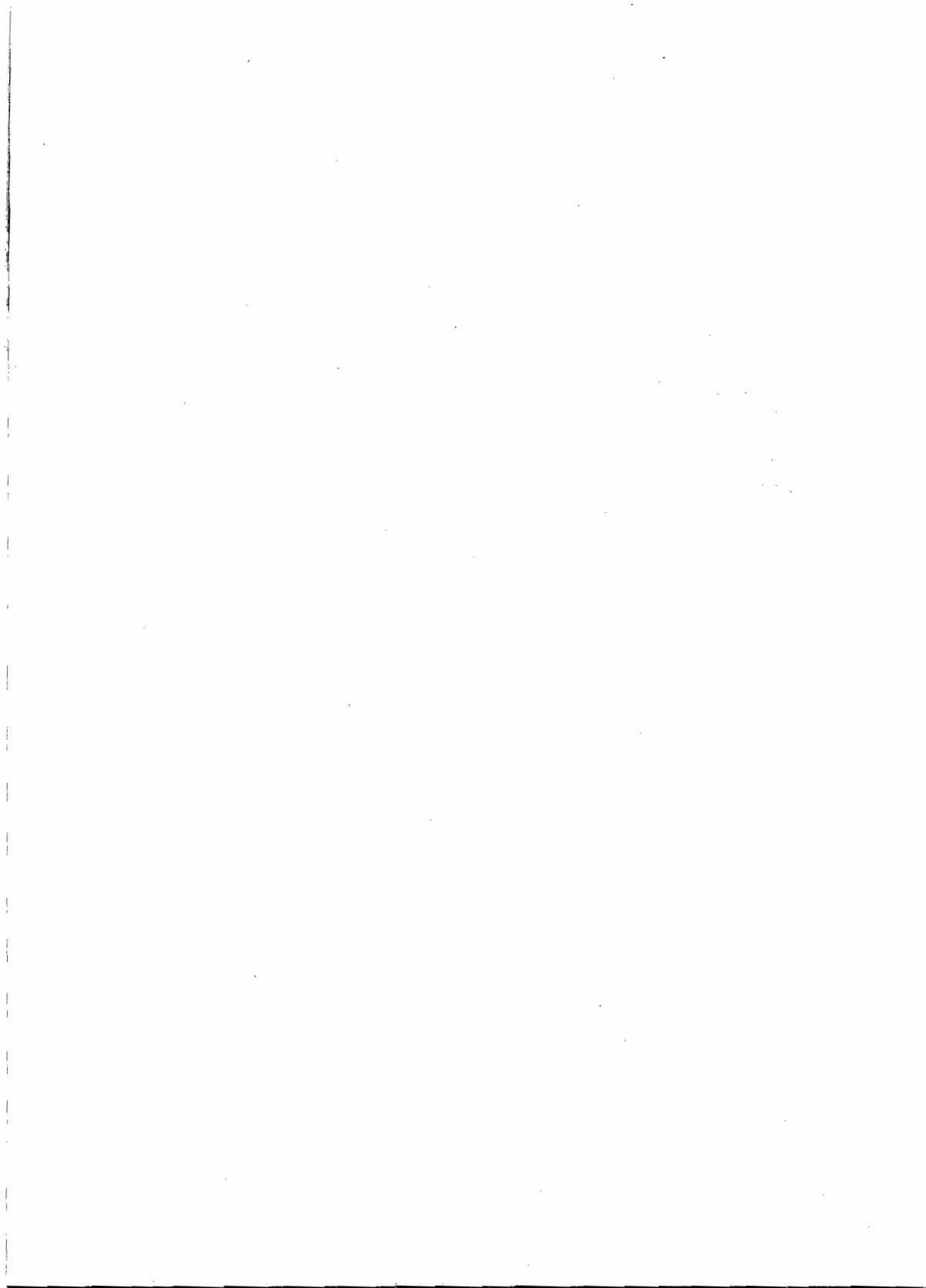
II BACKGROUND

Classical economists, for the most part, ignored cycles as a short-run phenomena of no consequence since the free market system tended automatically to full-employment equilibrium. Some minor writers, contemporaries of the Classicists, did develop cycle theories but they were generally ignored. Some writers looked for exogenous causes of cycles while others, especially later, developed theories which broke away from the Classical concepts.

Identifying Cycles

A great deal of important work in identifying, and thus calling attention to, cycles was done by Juglar, Kitchin, and Kondratieff. Clement Juglar, a French medical doctor turned economist, was one of the first to conclude that supposedly isolated panics and depressions were really only phases of a continuous cycle.⁽¹⁾ In the second half of the nineteenth century he reported cycles having an average duration of nine to ten years and talked of prosperity, crisis, and liquidation as the three phases of a

*Professor of Economics at Kuwait University.



cycle.(2) In the early 1920's, Joseph Kitchin(3) viewed cycles as comprised of a minor cycle of about 40 months duration and a major cycle which was the aggregate of two or three minor cycles.(4) In 1925, Nikolai D. Kondratieff reported much longer cycles(5) of about fifty years in length which are international in scope, having the same timing in all capitalistic countries.(6)

Joseph Schumpeter developed a three-cycle schema(7) in which each Kondratieff cycle is composed of six Juglar cycles, each of which in turn is composed of three Kitchin cycles. Thus economic activity is a composite of the three types of cycles which constantly interact. Supposedly, extreme positions in the economy could be due to simultaneous peaking or troughing of all three cycles.(8) These early attempts at identifying cycles led to premature conclusions because of lack of data and inadequate statistical methods, but the conclusions remain important as the groundwork for later efforts.(9)

Exogenous Theories

Since classical theory allowed no room for cycles, some economists looked outside the system for an explanation of cycles and developed a number of exogenous theories. Various meteorological theories attempted to show that variations in weather conditions affected agriculture which in turn caused business cycles.

In 1875, W. Stanley Jevons noted that there were a series of great crises in nineteenth century England having an average period of 10.466 years. At the same time it was established that sunspots had a cycle of 10.45 years. Jevons developed the explanation that sunspot activity affected weather, which affected agriculture, which caused business cycles.(10) John Mills suggested in 1867 that crises might be caused by waves of human emotional aberration and Jevons also toyed with the idea of solar radiation causing behavior patterns which would cause business cycles. Later sunspots were shown to have 10 to 11 year cycles and Jevons' son tried unsuccessfully to rework and rescue his father's theory.(11) Much later Garcia-Mata and Saffner developed a well-evidenced theory linking sunspots to variations in ultraviolet radiation to variations in mental and physical health, but it is still difficult to link this to business cycles.(12)

The American economist, Henry L. Moore, discovered an eight year rainfall cycle which he thought led to business cycles through variations

in agriculture.(13) But instead of sunspots, his rainfall cycles were due to movements of the planet Venus which, at eight year intervals, "comes directly into the path of solar radiations and through its magnetic field affects the streams of electrons flowing from the sun and, hence, earthly magnetism and the weather.(14)

Generally because of conflicting evidence, it is thought that there is no correlation between variations in weather and agriculture, and business cycles. The theories of cycles caused by radiation and behavior lack data to support them.(15)

Underconsumption Theories

Karl Marx thought that periodic violent crises were inherent in the capitalist system and would eventually lead to the downfall of capitalism. He used the Classical theory of value and the Classical theory of wages to attack rather than to defend capitalism.(16)

In Marx's model,(17) the system is one of perfect capitalism and perfect competition where everything sells for its true labor-embodied value. In order to survive the competition, capitalists must strive to accumulate wealth and exploit workers. Workers are free-bargaining agents selling their labor-power, but they cannot ask more than a subsistence wage ! Capitalists pay only the subsistence wage, but because they monopolize the means of production, they force labor to work longer than it takes to earn their wage and thus the capitalists gain the "surplus value" of labor's efforts. Profits are the difference between what labor is paid and the full (labor) value at which goods are sold.(18)

Since the system, following Classical assumptions, is at full employment and capitalists are striving to accumulate more wealth, they did bid up wages trying to hire more workers. Higher wages reduce the surplus value, forcing capitalists to purchase labor-saving machinery; but there are no profits from machines since full value must be paid for them. Although this action keeps wages from rising, it also cuts profits by reducing the labor force. But capitalists have no choice if they are to stay competitive, and the situation becomes worse and worse as more labor-saving, cost-cutting machinery is added. Eventually, production is no longer profitable and consumption dwindles with rising unemployment as fewer people have the means to purchase goods. Goods are dumped on the market and in the crisis smaller firms go bankrupt.(19)

According to Marx, recovery starts as unemployed workers are forced to accept subvalue wages and surviving capitalists can acquire dumped machinery at less than full value, and surplus value returns. With recovery, the same process will develop and end in catastrophe again; each crisis is worse than the last and bigger firms absorb smaller firms in each cycle until the economy is highly centralized and the last crisis results in the overthrow of capitalism.(20)

Marx recognized business cycles and the need for business to innovate and experiment if it is to survive competition. His prediction of giant firms is startling considering his time. But Marx did not foresee that the system would not remain one of **pure** capitalism, but would adapt rather than collapse.(21)

Paul Sweezy presents Marx's economic doctrines in a most favorable light and his works are a good explanation of, and introduction to, Marx. In describing the causes of crises, Sweezy's approach is a little different. Profits are the difference between what capitalists pay for the factors of production and the total revenue from the sale of goods. (M). (22) The objective of the capitalists is the expansion of this difference (M). Or, rather, the capitalist is interested in the rate of profit instead of the actual size of profits. If the rate of profit falls (even if (M) is still greater than zero), capitalists' operations will begin to contract. Generally, if the rate of profit in one industry starts to decline, capitalists will shift their capital to another industry. But if the rate of profit declines in all industries, capitalists will postpone reinvesting until conditions become more favorable again. This postponement of reinvestment interrupts the circulation of money, bringing on a crisis and overproduction. The subsequent depression is what begins to restore the rate of profit and brings about recovery.(23)

To Sweezy, overproduction is a result of, not a cause of crises. "The specific form of capitalist crisis is an interruption of the circulation process induced by a decline in the rate of profit below its usual level."(24)

J. A. Hobson has been called the champion of the underconsumption school and he breaks with the Classicists in his 1896 study which analyzed cycles as simultaneous surpluses throughout the economy, followed by simultaneous shortages.(25) The cause of cycles lies in undue saving which Hobson equates with underconsumption. The undue saving

is 3 to 1 so the multiplier is 3 thus, the multiplier depends on the marginal propensity to consume and can be expressed as $1/(1-MPC)$. From the above example, the multiplier would be $1/(1 - 2/3) = 1/(1/3) = 3$. This means that the smaller the leakage in income (that is, the smaller the portion saved or otherwise leaked from income that does not go to consumption), the larger the multiplier. Thus spendthrift communities would suffer wider fluctuations of income from changes in investment than would thrifty communities; and in a slump, a larger addition to investment would be necessary for recovery in the more thrifty community.(86) "When looked at as a cumulative process which undergoes expansions and contractions, the multiplier can produce wavelike movements in income that help to explain business cycles."(87)

The Accelerator

Through the multiplier, changes in investment cause changes in income, while through the accelerator, changes in output cause changes in investment. The accelerator principle shows that net investment is a function of the rate of change of final output rather than of the absolute level of output. The accelerator shows why the demand for capital fluctuates much more violently than the demand for goods.(88)

The accelerator coefficient, A , is the technical relationship between a given level of output and the quantity of capital necessary to produce that output. Thus $A = K/Y$ where K is the capital stock and Y is total output (or income). Assuming no change in technology, an increase in output, once full capacity is achieved, will require additional capital equipment in the proportion indicated by A . $A = K/Y$ is generally called the average capital-output ratio when discussing the economy as a whole. If technology remains at a constant level, then the average and marginal capital-output ratios are equal. $A = K/Y = K/Y$. K is the same thing as net investment, I , so $A = I/Y$. Then multiplying both sides of the equation by Y , the result is $A(Y) = I$, which is the formal algebraic expression for the accelerator principle. That is, some multiple of the change in output equals the required net investment, and that multiple is the capital-output ratio. In general, the accelerator principle demonstrates that small changes in output may result in large changes in net investment.(89)

The accelerator principle assumes a stable or constant capital-output ratio. As long as consumption rises at a steady rate, net investment

Second, new investment usually represents lower per unit costs through improved technology so that prices can go down and the same level of of imperfect knowledge and errors in forecasting.

Psychological Theories

Most theories of cycles involve human behavior and thus psychological factors, but to the psychological theorists, psychological factors alone cause cycles.(33) Waves of optimism and pessimism occur because of imperfect knowledge and errors in forecasting.

In the early part of the twentieth century, W. H. Beveridge thought that alternating periods of over - and underproduction were due to excessive reactions of businessmen.(34) In the early stages of the upswing, conditions look favorable to the businessman. While he tries to acquire as much of the increased market as he can, in the aggregate businessman overshoot the mark considerably. With the overproduction, prices fall and businessmen become pessimistic. Each businessman tries to cut back as fast as he can and in the aggregate they overshoot the mark again causing shortages until the lower turning point occurs.(35)

Lescure's theory(36) in 1906 seems to be a forerunner of application or first use by the entrepreneur (innovator) of not just inventions but also new processes and new ideas. Innovation may be expressed as a change in technology or the adoption of a new production function and may or may not involve a change in capital equipment.(41)

Schumpeter feels that, in a dynamic economy, innovations disturb the scene and cause business cycles.(42) Innovation is a slow but not unimportant process associated with long cycles. While innovations are not continuous, coming in spurts or waves, the process of assimilation of a particular innovation is continuous, first, slow to be adopted, then rapid, then tapering off like an S-shaped curve. Entrepreneurs are driven by the profit motive and are competitive, but at the same time they are reluctant to be the first to take a great risk lest it fail. But once others start taking profits by a new process, the rest are quick to imitate until almost everyone in the industry has adopted it. The economy expands while innovations are put into effect and contracts as society adjusts to the changes these innovations demand.(43)

In the expansionary boom, prices rise as resources are bid up in the process of expanding productive capacity. In due time, the general adop-

tion of the innovation substantially increases the flow of consumer goods and the boom is checked by the painful process of adapting the economic society to the new levels of costs and prices and the new production function.(44)

The economy is in the grips of multiple cycles (cycles within cycles), caused by greater and lesser innovations with different gestation periods. The first or primary upswing starts when an entrepreneur is able through innovation to improve his profit situation. He borrows funds to innovate and bids resources away from other uses. There is an increased flow of spending in the economy; prices rise; imitators follow; and there is a new wave of investment and general expansion until the increased flow of consumer goods hits the market.(45)

With the general optimism there is much speculative activity which leads to greater expansion than the productive advantages warrant. As a result of the primary upswing, a new, higher equilibrium is reached and innovations which previously were not economically feasible are now launched causing a full scale boom. But when the primary wave turns, the excessive expansion becomes manifest, causing the contraction to be carried beyond the equilibrium point where the primary wave would have brought it. Pessimism takes over leading to a deflationary spiral and what Schumpeter calls "abnormal liquidation" because of the unwarranted expansion. The turning point and the return to equilibrium will occur only after uneconomic positions are liquidated and the debt structure is corrected.(46)

Schumpeter feels that cycles are essential to process; the destruction is necessary to spur innovation. Booms cause depressions and the depressions continue until the painful readjustment takes place and a new, higher equilibrium is achieved.(47)

Non-Monetary Overinvestment Theories

Arthur Spiethoff developed a non-monetary overinvestment theory in which cycles were characterized by relative overproduction of capital goods and underproduction of consumer goods. With conditions of idle capital, low interest and wage rates, and bank rates below investment yields, entrepreneurs see opportunities to expand markets and technological developments and an upswing starts. Durable goods industries expand; prices and profits rise; and more investment is attracted. The crisis arises from overinvestment and overproduction of capital goods with

underproduction of consumer goods at the same time. Resources committed to durable goods, and the relative scarcity of consumer goods, distort prices and profits. Finally the new capacity comes into production, flooding the market with goods; prices fall; labor is laid off; investment falls; and a general contraction takes place. The lower turning point is reached when prices and costs have dropped enough to attract investment, but a reversal may not take place without some outside stimulant.(48)

Cassel was concerned with overinvestment in relation to available savings.(49) Like Schumpeter, Cassel saw the forces of progress as the cause of cycles but unlike Schumpeter, he "attributes the end of expansion to excessive investment outrunning the available supplies of capital."(50)

Cassel's forces of progress are irregular and, besides innovation, also include such things as the opening up of new countries and population growth. These are a stimulus to the economy offering new opportunities to expand the use of fixed capital.(51)

As the beginning of expansion, when profits are still high, saving and the formation of capital are at their highest. As wages and rents rise, profits become pinched and as this happens, the level of savings becomes relatively inadequate. The greatest savers find incomes pinched and wage earners increase consumption. "Even though the volume of savings does not fall, it may cease to increase, and may become inadequate for the increasing needs of the business world."(52)

Interest rates rise causing a falling price for the instruments of production (since they are now capitalized at a higher rate). At the time when a large volume of such instruments (including construction) is completed, the demand for capital for the necessary payments is at a peak. This causes a capital shortage. Producers of capital goods have great difficulty selling them and may even have difficulty financing their current costs of production. General inability to complete undertakings already begun causes some to be abandoned at great loss.(53)

In short, in the late stages of the upswing, investment is greater than savings, causing interest rates to rise. This causes entrepreneurs to become pessimistic and investment collapses causing the downturn. At the bottom of the cycle, the opposite effect causes the upturn.(54)

Cassel felt that expansion commonly ends abruptly in catastrophe with many bankruptcies, great losses, and destruction of confidence in general because entrepreneurs overestimate the community's capacity to save.(55) Like Schumpeter, Cassel felt that cycles were an inevitable part of progress.(56)

Other theorists including Tugan-Baranowsky, Aftalion, Pigou, Schumpeter, and Robertson may be called, at least in part, non-monetary overinvestment theorists. They all emphasize the role of the entrepreneur, the overproduction resulting from overinvestment, and the cycle period being connected with the length of time it takes to put new equipment into production.(57)

Monetary Theories

Knut Wicksell developed a monetary theory of the business cycle in his "cumulative process" which demonstrates what happens when the real rate of interest (return to physical capital) diverges from the money rate of interest.(58) Wicksell's equilibrium or normalcy is when the money rate and the real rate of interest are the same, investment equals saving, and the price level is constant.(59) In disequilibrium, saving does not equal investment and there will be a general expansion or contraction of the economy until the money rate is back in line with the real rate of interest.(60) If the money rate of interest is relatively low, saving is discouraged; consumption rises; entrepreneurs see profit opportunities; investment is stimulated; and prices rise. Eventually there will be a shortage of loanable funds and the money interest rate will rise. If the money rate is greater than the real rate, the opposite takes place; production is discouraged; prices fall; profits decline; and there is a general contraction.(61)

Wicksell thought that the economy could be regulated by use of the bank discount rate. He was an important forerunner of Keynes and Hicks.(62)

Hawtrey developed a similar monetary theory of a self-generating cycle with a cumulative process of expansion and contraction.(63) He believed that all changes in the level of economic activity are due to changes in the flow of money. The economy expands or contracts directly with the money supply. A frequent criticism of this is that small changes in the money supply have little effect, but Hawtrey suggests that wholesalers (and other middlemen between producers and retailers) are more sensitive to small changes in the interest rate than others because of their

heavy reliance on credit to handle costs of holding inventories. Lower interest rates lead to expanded inventories which leads to increased orders and an expansion of business. Higher interest rates have the opposite effect.(64)

At the peak of the expansion phase of Hawtrey's cycle, financial structures are strained and excess reserves are being drawn down. With the shortage of money and possible inflation, interest rates rise, then inventories are reduced, and the economy begins to contract. With the contraction there is a drive toward liquidity, loans contract, and bank reserves begin to accumulate. After the deflation has proceeded for a time, interest rates become low enough to encourage some entrepreneurs to begin using loan funds again and a reversal starts. As the expansion develops for a time, surpluses disappear until the economy reaches the peak of the expansion again.(65)

Hawtrey's popular theory was offered during the gold standard. He believed the gold standard's fixed legal reserves imposed a flat ceiling upon expansion movements and caused their reversal. With the collapse of the gold standard, Hawtrey thought that these cyclical fluctuations would continue but they would lose their regular periodicity.(66)

Monetary Overinvestment Theories

Ludwig Mises incorporated his theory of cycles into the Austrian School's general theory and treats cycles "as the result of a continuous tendency among politicians and businessmen to favor inflation of bank credit — the 'inflation ideology' of central banking authorities."(67) This results in periods of low money rates and rising prices of capital goods relative to consumer goods. Even at full employment, banks offer more credit which adds no net capital goods but carries on expansion by withdrawing from other areas. Finally prices of consumer goods decline; banks stop extending credit; and a crisis develops.(68)

Frederick A. Hayek, Mises' pupil, developed a more elaborate and complete monetary overinvestment theory.(69) He emphasizes that cycles start from an initial disturbance in the form of a "persistent tendency to create new bank credit in the shape of unwarranted advances to enterprisers."(70)

It is the elasticity of the money supply which allows disequilibria. Voluntary saving is related to production that can be maintained, but

new credit currency allows mal-investments in capital which are not productive enough to be maintained. Credit currency is inflationary and cannot be maintained indefinitely. "The enterpriser, anticipating rising prices, and aided by money rates below the equilibrium rate, plunges into over-investment." (71)

Spending of new credit on investment raises costs and prices before the incomes of consumers can rise so that there is "forced saving" in the form of inflation. The crisis comes when bank reserves are strained and credit ceases; new securities become difficult to dispose of; and over-expanded investment programs are checked. Demand shifts to consumption goods as lagging incomes finally catch up with prices, until consumption demand becomes too great and prices of consumption goods rise. At this level, inflation is renewed, credit expanded further, and there are higher market rates of interest and wages. Finally, profits and expansion cease as money rates equal the normal rate. Uncompleted investments are lost, unemployment develops, and depression sets in (72)

Theories of this type are closely connected with the concept of "neutral" money, and "generally regard money as a mechanism which should not be maintained for control purposes, but should be provided in sufficient quantity to avoid disturbances from this source." (73)

See appendix for modern theories of business cycles.

III ARGUMENT

All of the efforts described above to identify and explain cycles called a great deal of attention to the problem of business cycles. Economists could no longer ignore business cycles and just wait for the long run and equilibrium. It became increasingly apparent that Classical theory just could not handle business cycles. Exogenous theories for the most part failed to explain cycles and endogenous theories all violated some part of Classical theory because in the Classical model the system tends **automatically** to equilibrium, it does not tend to cyclical movements.

Classical theory was neat and logical but it just was not coming to grips with reality. Nevertheless, assaults upon orthodox doctrine were largely unsuccessful because it is difficult to get rid of an old theory without having an immediate replacement. (74)

Even so, economists continued to do a great deal of valuable study on the nature and causes of cycles and much of their work contributed to

Keynes' **General Theory**.(75) Robertson's work on hoarding and its significance for the saving-investment problem was very important.(76) Tugan-Baranowsky and Wicksell called attention to the discrepancy between saving and investment.(77) Theories involving the dynamic role of investment, the relation of saving and investment, innovations, time lags, the use of fixed capital, and the idea of derived demand (Tugan-Baranowsky, Wicksell, Spiethoff, Schumpeter, Aftalion) "penetrated deeply not only into the special area of cycle theory, but also into general theoretical considerations with respect to the basic functioning of the economy as a whole."(78) Keynes' approach to Aggregate Demand stems from the work of Wicksell, Tugan-Baranowsky, and Spiethoff.(79) Also, Keynes incorporated (and added to) Wicksell's investment-demand analysis in his system.(80) Hansen's **A Guide to Keynes** lists many other examples of the influence of Neo-Classicalists on Keynes, especially in regard to Section I of Chapter 16 and Chapter 18 of **The General Theory**. But, for all of the contributions of the Neo-Classicalists, it was not until Keynes that any theory capable of replacing the Classical theory emerged.

With the deepening of the Great Depression, belief in the explanations of the Classical theory slowly withered. Unemployment rose as wages collapsed along with the collapse of prices and interest rates. "The departures from full employment were proving to be anything but temporary. The 'automatic countering forces' were neither automatic nor countering Standard economic theory, with its preoccupation on the long run, was proving largely irrelevant."(81)

The time was ripe and the theoretical background was laid. **The General Theory** was an inevitable book and if Keynes hadn't written it, someone else would have. Keynes' **General Theory** 'launched macroeconomics as one of the two branches into which the broad discipline of economics is now divided.'(82)

IV SUMMARY

Classical theory ignored business cycles as temporary phenomena of no consequence. Work was done in identifying cycles and quite a variety of theories were developed to explain cycles. As a result of this work, and as a result of deep depressions, cycles could not be ignored. The Neo-Classicalist cycle theorists contributed a great deal to what is now modern macroeconomics. The time was ripe and the Neo Classical theorists had

laid the groundwork so that Keynes' General Theory was an inevitable book, providing a theory to replace the Classical theory which was not coming to grips with reality.

V CONCLUSION

Crises and business cycle theories pointed up the failings of the Classical theory and led to the inevitable **General Theory** which provided a theory to replace the Classical theory and was the start of macroeconomics.

APPENDIX

MODERN THEORY

Cobweb Theorem

The cobweb theorem is probably one of the simplest dynamic models and explains the cyclical movements of prices and outputs of some commodities. The amount supplied is a function of the price in the previous period while the amount demanded is a function of the price in the present period. If, in one period, the price is above the equilibrium level, the result will be that the quantity supplied in the next period will be above the equilibrium level. And, since quantity is then above the equilibrium level, price will be below the equilibrium, et cetera. If the supply curve is steeper than the demand curve, the cycles converge to equilibrium. If the absolute values of the slopes of the demand and supply curves are equal, the cycles will continue undiminished. If the demand curve is steeper than the supply curve, the amplitude of the cycle increases over time.(83)

The Multiplier

Increased investment leads to increased income, which leads to both increased consumption and increased saving. The amount of these increases depends on the marginal propensity to consume which is the functional relationship between a given level of income and the amount of consumption out of that level of income. Thus, on an individual basis, the resulting increase in consumption is less than the total increase in investment and income. On the other hand, aggregate income and aggregate consumption increases by a greater amount than the increase in investment because of the multiplier effect.(84)

When the new investment is first made there is a primary increase in aggregate income in all industries immediately affected. As this is spent, and on each round of subsequent spending, it gives rise to secondary increases in aggregate income. Part of the new income is spent on consumer goods, giving rise to further income which in turn is partially spent, et cetera. The sum of the secondary income depends on how much is saved (or on the leakages from the income stream), or on the marginal propensity to consume.(85)

If, for example, for each additional dollar of income, $1/3$ is saved and $2/3$ is spent, then the marginal propensity to consume is $2/3$, ($MPC = 2/3$), and the total income produced by one dollar of investment is \$3. The ratio of total added income to the amount of investment is 3 to 1 so the multiplier is 3 thus, the multiplier depends on the marginal propensity to consume and can be expressed as $1/(1-MPC)$. From the above example, the multiplier would be $1/(1 - 2/3) = 1/(1/3) = 3$. This means that the smaller the leakage in income (that is, the smaller the portion saved or otherwise leaked from income that does not go to consumption), the larger the multiplier. Thus spendthrift communities would suffer wider fluctuations of income from changes in investment than would thrifty communities; and in a slump, a larger addition to investment would be necessary for recovery in the more thrifty community.(86) "When looked at as a cumulative process which undergoes expansions and contractions, the multiplier can produce wavelike movements in income that help to explain business cycles."(87)

The Accelerator

Through the multiplier, changes in investment cause changes in income, while through the accelerator, changes in output cause changes in investment. The accelerator principle shows that net investment is a function of the rate of change of final output rather than of the absolute level of output. The accelerator shows why the demand for capital fluctuates much more violently than the demand for goods.(88)

The accelerator coefficient, A , is the technical relationship between a given level of output and the quantity of capital necessary to produce that output. Thus $A = K/Y$ where K is the capital stock and Y is total output (or income). Assuming no change in technology, an increase in output, once full capacity is achieved, will require additional capital equipment in the proportion indicated by A . $A = K/Y$ is generally called

the average capital-output ratio when discussing the economy as a whole. If technology remains at a constant level, then the average and marginal capital-output ratios are equal. $A = K/Y = \Delta K / \Delta Y$. K is the same thing as net investment, I , so $A = I / \Delta Y$. Then multiplying both sides of the equation by ΔY , the result is $A (\Delta Y) = \Delta I$, which is the formal algebraic expression for the accelerator principle. That is, some multiple of the change in output equals the required net investment, and that multiple is the capital-output ratio. In general, the accelerator principle demonstrates that small changes in output may result in large changes in net investment.(89)

The accelerator principle assumes a stable or constant capital-output ratio. As long as consumption rises at a steady rate, net investment demand will be constant. For example, if the accelerator $A = I / \Delta Y$ or $A = 1 / C$ where C is consumption, and $A = \$2$ and consumption in period 2 exceeds that of period 1 by \$10, then businessmen need \$20 worth of capital goods to meet that demand. If consumption remains at this higher level of period 2, for all future periods, there will be no more (net) investment. But if consumption in each period is \$10 greater than the previous period, (net) investment will be a constant \$20 in each period.(90)

Net investment declines when consumption increases at a decreasing rate. For example, if consumption in period 2 is \$10 greater than in period 1, then (net) investment is \$20. If then, in period 3 consumption is \$5 more than in period 2, then (net) investment is \$10 or the rate of net investment decreases. Similarly, if consumption rises at an increasing rate, then the rate of net investment will increase.(91)

The accelerator principle does not always operate automatically because firms do not usually maintain rigid capital-output ratios through all phases of the business cycle.

Interactions of the Accelerator and Multiplier

Interactions of the accelerator and multiplier can generate different types of cyclical patterns in income and investment, depending on the values of the coefficients.

Hicks' model illustrates the business cycle as a period of expansion, followed by a period of contraction, followed by cumulative expansion again, et cetera.(92) Through the accelerator, the economy can experience

cumulative expansion (explosive growth) or cumulative contraction, but the accelerator does not lead to cyclical fluctuations by itself. Rather, it is a cumulative movement either up or down. Something else causes the reversals.(93)

A rise in spending, say, induces a rise in consumption and income, via the multiplier, which induces a rise in investment, via the accelerator, which further induces rises in income and consumption, et cetera. As long as consumption increases at an increasing rate, through the accelerator, the economy may experience a self-reinforcing expansion. If consumption slows, the economy may contract as the accelerator causes an absolute decrease in investment.(94)

The full-employment ceiling limits explosive growth. At the point of full-employment, further growth of output would be physically impossible. The economy may "bump along the ceiling" for a short time until the accelerator takes effect on the slowing down of the economy's growth. "The mere decrease in the amount of increase in output between periods is sufficient to bring about a decrease in total output, or a downturn"(95) At full-employment, incomes stop rising, causing net investment to go to zero (via the accelerator). Reduced investment causes a reduce in income via the multiplier. Thus the economy goes into a cumulative contraction, and disinvestment takes place. There is a lower limit to disinvesting, when businessmen run out of their capital stock altogether. The economy may "bounce along the disinvestment floor" until the cessation of disinvestment leads to a rise in investment which raises incomes and the cumulative process upward begins again. Thus, the system oscillates between "ceiling" and "floor" in a cyclical manner. (The one exception, where there would be equilibrium instead of cycles, is if there is no net investment but all worn out capital is constantly replaced.)(96)

Samuelson's model introduces time lags.(97) Through the accelerator, in the Hicks model, the level of investment of period 2 is determined by the net change in income from period 1 to period 2. However, there is usually a lag in time for business decisions to change investment to be carried out. Capital stock is not changed immediately upon a change in national income and investment decisions are more likely made at intervals instead of continuously. To reflect this, rewrite the accelerator equation as $I = A (Y_t - Y_{t-1})$ where a period of time, t , is the time length between investment decisions. The subscripts are each set back one period on the Y 's to allow time for the businessman to obtain information

from the period previous to t in order to act in period t . The time lag causes the system to have a tendency to always overshoot the mark and fluctuations occur even without the influence of a "floor" and "ceiling" as in Hicks' model.(98)

For example, let $MPC = .5$ and the accelerator coefficient $A = 2$ and the initial values of income for Period 0 = 4 and Period 1 = 5. Each period's expenditure is the income for the next period. Let C be consumption, E be expenditure, and I is net investment. In Period 0, $C = 2$ because income, $Y = 4$ and $MPC = .5$. In Period 1, $C = 2.5$ because $Y = 5$ and $MPC = .5$. In Period 0, $E = 5$ because in Period 1, $Y = 5$. And since in Period 0, $C = 2$, $E = 5$, and $E = C + I$, solving for I results in $I = 3$. Therefore, from Period 0 to Period 1 $Y = 1$ and $C = .5$. Then in Period 1, $I = 1$ and all the successive values of C , I , Y , et cetera can be calculated and tabulated (see table at the end of appendix). It may be noted that the result will show fluctuations in income.(99)

Net investment is proportional to the difference between this and last period's consumption. Since the income of this period is equal to last period's expenditure, there are two time lags which stretch out into a two-period lag when combined. Thus, through the accelerator-multiplier interaction, consumption affects income two periods away.(100)

Considering the turning points of the income cycle, where consumption is increasing most rapidly, investment is at its highest level. As some point after this, when consumption is rising more slowly, but is greater in amount, and investment is less, expenditure will reach its highest point. The peak in income will be reached one period later than that of expenditure. Peak expenditure will follow the point of most rapid increase of consumption (or income) and the highest level of investment. At some point of higher consumption, with a slower rate of increase, and a lower level of investment, expenditure reaches a peak. One period later, income reaches a peak.(101)

Depending on the values of MPC and of A , the fluctuations will have different patterns. If $(MPC) \cdot (A) = 1$ then there will be a neutral or stable cycle or an endless oscillation. If $(MPC) \cdot (A)$ is less than 1 the cycles will eventually converge to an equilibrium position. If $(MPC) \cdot (A)$ is greater than 1 the cycles will diverge more and more from equilibrium.(102)

FOOTNOTES

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الدورات التجارية

ونشوء الاقتصاد الكلي

د. عبد الوهاب الامين

الفرض من هذا البحث هو محاولة وصفية لفهم النظريات المبدئية لطبيعة واسباب الدورات التجارية ومن ثم توضيح نشوء الاقتصاد الكلي كنتيجة للدراسات المتعلقة بالدورات التجارية .

يشير البحث بأنه اذا كانت النظرية الكلاسيكية منطقية في تحليلها في استبعاد حدوث الدورات التجارية او النظر اليها كظواهر مؤقتة ليست ذات أهمية تذكر ، وذلك بسبب اتجاه النظام بصورة تلقائية نحو التوازن في الاجل الطويل (على اساس مجموعة من الافتراضات) ، فانها لم تستطع مجابهة الحقائق التاريخية .

لذلك أصبح من الصعب على الاقتصاديين تجاهل الدورات التجارية في الحياة الاقتصادية وقبول الانتظار للاجل الطويل لتحقيق التوازن . وقد نتج عن ذلك ظهور العديد من الدراسات القيمة حول الموضوع . فالدراسات التي قام بها بعض الاقتصاديين من أمثال السير دينس روبرتسن حول الاكتناز وأهميته بالنسبة لمشكلة الادخار والاستثمار كانت على جانب كبير من الأهمية . كما توغلت النظريات المتعلقة بدور الاستثمار الديناميكي والعلاقة بينه وبين الادخار ونظرية الابداعات ، الفارق الزمني ، استخدام رأس المال الثابت وفكرة الطلب المشتق ليس فقط في مجال نظرية الدورات بل كذلك بالنسبة للاعتبارات النظرية العامة فيما يتعلق بأداء الاقتصاد ككل .

ويبدو أن كينز قد استلهم نهجه في الطلب الكلي من تلك المساهمات التي سبقته . وبحدوث الكساد الكبير تلاشى الاعتقاد بالنظرية الكلاسيكية تدريجيا ، حيث ثبت بأن القوى التلقائية لم تكن آلية ، كما أن النظرية الاقتصادية التقليدية التي تعتمد على الاجل الطويل لم تعد ملائمة . ومن هنا مهد الطريق لظهور كتاب النظرية العامة لكينز الذي كان بمثابة مرحلة الانطلاق بالنسبة لنشوء الاقتصاد الكلي كأحد فرعى علم الاقتصاد المعاصر .