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A comparative analysis of Keynesian and Swedish theory of economic fluctuations

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A COMPARATIVE ANALYSIS OF KEYNESIAN AND SWEDISH THEORY OF ECONOMIC FLUCTUATIONS

A Dissertation Presented

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(Member) (Member)

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A COMPARATIVE ANALYSIS OF KEYNESIAN AND SWEDISH THEORY OF ECONOMIC FLUCTUATIONS

A Summary

The purpose of this study is to examine critically both Keynesian and Swedish theories of economic fluctuations. It is a well known fact that in Sweden K. Wicksell was very skeptical about Say's law. With his skepticism, Wicksell occupied a position close to Keynes' General Theory. However, Wicksell could not present a convincing theory of the existence of general unemployment, because he did not observe the downward rigidity of wages or the Keynesian liquidity trap.

With the Wicksellian tradition, some of the Swedish economists who belonged to the Stockholm School took a similar position to Keynes in explaining general unemployment in the early 1930's. Especially, B. Ohlin illustrated the possibility of general unemployment through the downward rigidity of wages and the rate of interest. Therefore, K.G. Landgren maintained that Ohlin initiated a Swedish Keynesian Revolution in his report which was submitted to the Swedish government in 1934.

However, Landgren's contentions include some serious contradictions, because Ohlin himself strongly opposed Keynes' multiplier notion in the March and June 1937 issues of the Economic Journal. As far as we know, these contradictions have never been disentangled by anybody.

Above all, in the aforementioned Economic Journal articles, Ohlin criticized Keynes, maintaining that the value of the multiplier or the inverse value of the marginal propensity to save may, by no means, be

a constant over the cycle. Ohlin correctly observed the interaction between the shift of the savings function and the cyclical movements of the economy. This point has escaped both Landgren and other economists, because they did not compare Ohlin and Keynes in the light of post-Keynesian dynamics.

We note that if Ohlin's analysis is extended along the line of post-Keynesian cyclical growth theory, especially the dynamics of the savings function à la Duesenberry et al., it is easy to reconcile the aforementioned Ohlinian paradox. Therefore, we can see why Ohlin would believe on sound theoretical grounds that the value of the multiplier varies over the cycle. Although we must look to Duesenberry and others for the complete theory of the savings function, we see that Ohlin had analyzed the dynamics of the savings function correctly even before those post-Keynesians. This point provides us with an important difference between Keynes and Ohlin.

On the other hand, it seems rather difficult to credit the Stockholm School with a complete model of cyclical growth only by reference to the dynamic instruments involved in Ohlin's theory. He still lacks a fully integrated theory of the dynamics of investment function, although he makes keen observations on the savings function.

On the post-Keynesian front, some believe that the ratchet effect is an automatic force which equilibrates the natural G_n and the warranted rate of growth G_w, to employ the terminology of Harrod. Some people incorporate capacity income into the savings function via the ratchet effect to fill the gap between G_n and G_w. We have demonstrated that there is no mechanism by which the ratchet effect can be assumed to operate so that

at the peak of the cycle income will equal capacity output. Thus, in our model the Duesenberry ratchet and demonstration effects play a role in determining the floor-level of income similar to the causal role assigned by Ohlin's intuitive theory of cyclical consumer behavior pioneered in his "Some Notes" (pp. 62-63).

Such a model incorporating the Ohlin-Duesenberry hypothesis about cyclical consumer behavior may hopefully be refined for the future development of a more complete theory of business fluctuations in growing advanced market economies.

PREFACE

It is a matter of common knowledge among economists that the 1930's was a most significant decade, one which constituted the cornerstone of modern economic thinking. It is widely known that a group of young economists in Sweden, described by Professor Ohlin[1] as "the Stockholm School," initiated a "new economics" incorporating "new economic policies" that proved to be parallel to Keynes' line of thought. To combat unemployment in Sweden, public works projects financed by contemporarily unorthodox loans were undertaken. This move, made by the Social Democrats in 1932 under the leadership of E. Wigforrs, attracted world-wide attention.

It is not surprising that some Swedish economists investigated the existence of mass unemployment and general overproduction in Sweden within the traditional Wicksellian analytic framework. Actually, some economists, as well as a number of economic policy makers, reached a theoretical position close to the one expounded by Keynes in his General Theory. They accomplished this partly by independent means and partly under the influence of Keynes' pre-General Theory economic contributions.

Professor K.G. Landgren illuminates that most important decade of Swedish doctrinal development in the book entitled Den 'Nya Economien' i Sverige (The "New Economics" in Sweden).[2] This book was quite con-

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1 B. Ohlin, "Some Notes on Stockholm School Savings and Investment," I, II, Economic Journal, 1937.

2 K.G. Landgren, Den 'Nya Ekonomien' i Sverige; J.M. Keynes, E. Wigforrs, B. Ohlin och utvecklingen 1927-39, Almquist and Wicksell, Stockholm, 1960, ss. 1-319.

troversial. Indeed, one entire volume and a part of Ekonomisk Tidskrift[3] were dedicated to a symposium in Landgren's book, and many contemporary Swedish economists participated in that symposium. Generally, Landgren's book was not well received by the Swedish economists, perhaps due to the same Swedish attitude toward classical economists as toward Keynes; Keynes himself did admit: "I must ask forgiveness if, in the pursuit of sharp distinction, my controversy is itself too keen."[4] In fact, in the aforementioned book by Landgren, a host of Swedish authorities, such as Professors Cassel, Davidson, Hecksher, Lindahl and Myrdal were treated like fools due to their slowness in understanding and appreciating Keynes' theory.[5]

His discourtesy to the Swedish authorities aside, it seems to the present writer that the symposium in Ekonomisk Tidskrift centered upon the adequacy of selecting the criteria for the Keynesian Revolution, which Landgren obviously took from Professor Klein's contribution.[6] Clearly Landgren accepts the criteria of the Keynesian Revolution à la Professor Klein and applies them to the various Swedish economists, reaching the conclusion that only Ohlin had initiated a Keynesian Revo-

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3 Ekonomisk Tidskrift, "Stockholmsskolan; Ideer, Tillkomst och Utveckling, Ett Symposium," Arg 62, 1960.

4 J.M. Keynes, The General Theory of Employment, Interest and Money, Macmillan and Co. LTD, London, 1936, p.v.

5 Landgren, Ibid., s. 306.

6 L.R. Klein, The Keynesian Revolution, Macmillan & Co. LTD, 1952.

lution there, even before the publication of General Theory.[7] Throughout the symposium, the Swedish economists could not come to an agreement on what Keynes actually proved in the General Theory. More importantly, some of the contributors, especially Professor Lundberg, opposed the acceptance of the comparative static criteria of the Keynesian Revolution as expounded at that time by Professor Klein and many other writers. Lundberg's contribution was recognized by economists only after the 1954 publication of Professor Schumpeter's History of Economic Analysis, rather than by his own book, Studies in the Theory of Economic Expansion,[8] which appeared in 1937. Schumpeter described Lundberg as a better Keynesian than Keynes himself. Lundberg modestly denied this and postulated that Schumpeter probably wanted to show that some unknown economist from a backwash country had essentially the same ideas that many people had later found so breathtakingly new in Keynes' General Theory. However, Lundberg maintains the the Stockholm School people were following, to some extent successfully, the reasoning which such economists as Sir Roy Harrod and Sir John Hicks (A Contribution to the Theory of the Business Cycle, 1950) adopted. That is to say, Lundberg argues that the Stockholm School people, represented by Ohlin, were directing their thoughts toward post-Keynesian dynamics, even before the post-Keynesian

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7 This interesting debate as well as Landgren's contributions were introduced by Professor D. Winch. Winch's paper is a summary of Landgren's Swedish original (cf. D. Winch, "The Keynesian Revolution in Sweden," Journal of Political Economy, LXXIV, April 1966).

8 E. Lundberg, Studies in the Theory of Economic Expansion, Kelley & Millman, 1937.

were to do so.[9]

It is a well-known fact that Professor Hicks noticed the dynamic aspects of the writings of the Swedish economists. The so-called "intertemporal analysis" by Lindahl and Myrdal were especially esteemed by Hicks in his various writings.[10] However, intertemporal analysis can hardly be called dynamics. Upon closer examination of the Stockholm School, intertemporal analysis cannot be said to describe dynamics. As Lundberg rightly pointed out, the Stockholm School people were striving for the direction indicated by the framework of post-Keynesian business cycle and growth analysis.

The purpose of this study is to compare some of the Swedish theories with post-Keynesian contributions in the light of dynamic post-Keynesian growth and cycles analysis, rather than the static Keynesian Revolution. In 1964, Professor F.H. Hahn and R.C.O. Matthews[11] wrote one of the best survey articles on economic growth. However, due partly to the time interval they cover, which excludes anything before Harrod's milestone 1939 article, and partly to language obstacles, the entire contribution of the Swedish economists has escaped their attention. Re-

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9 E. Lundberg, "Om att Begripa Keynes och att Forstå Andra; Några Marginalanteckningar till Landgrens Avhndling," (So as to Grasp Keynes and to Understand Others; Some Marginal Comments on Landgren's Discussion) Ekonomisk Tidskrift, 1960, ss. 195-205.

10 J.R. Hicks, Value and Capital, Clarendon Press, 1939, Ch. XIV, pp. 172-201. J.R. Hicks, Capital and Growth, Clarendon Press, 1965, Ch. VI, pp. 58-75.

11 F.H. Hahn and R.C.O. Matthews, "The Theory of Economic Growth; A Survey," Economic Journal, vol. LXXIV, Dec. 1964, pp. 779-902.

cently a Swede, Professor Leijonhufvud,[12] wrote on a related topic. He, who would seemingly be in a better position than the present writer to comment on Swedish contributions, never refers to any Swedish works. The communications gap due to language barriers will hopefully be ameliorated through the subsequent analysis. However, the following chapters are not English translations of the Swedish writings by a Japanese. The main purpose of this study is to analyze the strategic contemporary implications of growth and cycle theory through a comparison of the tools developed by the post-Keynesians and the "Stockholm School."

Some introductory remarks on the respective chapters are in order: Chapter I: Keynes' static analysis and post-Keynesian dynamics[13] constitute, naturally, the basis of the present study. In this chapter we will explore the essential core of Keynes' theory, and the connection

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12 A. Leijonhufvud, On Keynesian Economics and the Economics of Keynes, Oxford University Press, 1968. Leijonhufvud, "Keynes and the Keynesians; A Suggested Interpretation," American Economic Review, May 1967. Book review by C.H. Siven, Swedish Journal of Economics, vol. 72, No. 1, Jan. 1970.

13 J.M. Keynes, Ibid. R.F. Harrod, "An Essay in Dynamic Theory," Economic Journal, 1939. R.F. Harrod, Towards A Dynamic Economics, Macmillan & Co. LTD, 1948. R.F. Harrod, Money, Macmillan St. Martins Press, 1969, Esp. Ch. 7-8. E. Domar, "Expansion and Employment," American Economic Review, 1947. E. Domar, "Capital Expansion, Rate of Growth and Employment," Econometrica, 1946. R.F. Harrod, "Domar and Dynamic Economics," Economic Journal, 1959. K.K. Kurihara, Introduction to Keynesian Dynamics, George Allen & Unwin LTD, 1956. K.K. Kurihara ed. Post-Keynesian Economics, Rutgers University Press, 1954. W.J. Baumol, Economic Dynamics, Macmillan, 1951. S.S. Alexander, "Mr. Harrod's Dynamic Model," Economic Journal, 1950. H. Rose, "The Possibility of Warranted Growth," Economic Journal, 1959.

between Keynes and post-Keynesian dynamics will be examined by means of a simple model.

Chapter II: The relation between the so-called Scandinavian School; Wicksell, Lindahl, Myrdal et al., will be examined in the light of the monetary cycle. The instruments developed in Chapter I will be fully applied.

Chapter III: The standard post-Keynesian model discussed in Chapter I will be dynamized so as to bring about a non-linear cyclical model. The methods developed by Professor La Tourette[14] and the author[15] will be applied. Professor La Tourette extended H. Pilvin's model[16] to explain Harrod-Domar type technical changes, while this author applies elsewhere the Pilvin-La Tourette analysis to compare the growth models of two countries so as to explain the "Keynes-Kurihara theorem." This method is used to generate a non-linear investment function à la Kaldor, Goodwin, and Kurihara.

Chapter IV: The models discussed in Chapter II-III are, if anything, cyclical models void of any growth trend. However, in an actual economy, growth and cycles are not separate entities. Any business cycle theory will be incomplete unless it can explain both cycles and growth.

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14 J.E. La Tourette, "Technical Change and Equilibrium Growth in the Harrod-Domar Model," Kyklos, 1964. J.E. La Tourette, "A Diagrammatical Exposition of Neutral and Non Neutral Technical Changes in Harrod-Domar Model," Economia Internazionale, 1967.

15 S. Minabe, "Keynes-Kurihara Instability Theorem," submitted to Economic Studies Quarterly, Japan, Feb. 1970.

16 H. Pilvin, "A Geometric Analysis of Recent Growth Models," American Economic Review, Sept. 1952.

As one of the growth factors, we note the two Duesenberry effects. However, these same effects are not applicable in their original form. Thus we examine the relationship between the "demonstration effects" and the "ratchet effects." In this chapter, we prove that these two effects may be reduced to the same logic. Thus we are justified in combining these two effects in the same savings function. We argue that the demonstration effects are related to the continuous shifts of the savings function and the ratchet effects are the cyclical shift-elements.

Chapter V: The preliminary works investigated in the previous two chapters are extended to produce our own cyclical growth model. The essential structure of this model is the combination of the modified Duesenberry savings function and the modified Kaldorian non-linear investment function. The author believes that an important contribution has been added to the existing post-Keynesian cyclical growth theory in this chapter.

Chapter VI: The contributions by the Stockholm School, especially those of Professor B. Ohlin, are examined in the light of the post-Keynesian cyclical growth pattern prepared in the previous chapter.

Chapter VII: Summary and conclusions. In this chapter, the author presents (a) the general purpose of the study, (b) the similarities and the differences between the post-Keynesian and the Swedish theory of economic fluctuations, and (c) the contributions and the limitations of the respective theories. Throughout this study we prove that a part of the important contribution made by post-Keynesian economists in the field of consumption theory was observed by Ohlin in 1934. That is the dynamic relationship between the secularly shifting savings function and cyclical growth was correctly analyzed by him. This very point makes the crucial difference

between the Stockholm School and Keynes. In conclusion, the study of the two systems of economic fluctuations is useful in order to establish a more complete dynamic theory in the future.

Mathematical formulations and diagrams are frequently applied. However, to us, it is very essential that mathematical methods are strictly subordinate to economic analysis.

In conclusion, although the primary purpose of this study is to present a comparative analysis of the Keynesian and the Swedish theories of economic fluctuations, the resulting analysis is useful in explaining the experience of the American economy.

Finally, it is our pleasure to find that Professor Kurihara has recently espoused the same line of thought in Essays in Honour of Sir Roy Harrod.[17]

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17 K.K. Kurihara, "The Gap Between Actual and Potential Output in Growing Advanced Economies," Induction, Growth and Trade, Clarendon Press, 1970, pp. 105-119.

CHAPTER I

THE SEMINAL CONTRIBUTIONS OF KEYNES, HARROD AND HICKS*

The purpose of this chapter is, first of all, to construct an analytical basis for comparing the Swedish contributions to growth and cycle theory with those of the Keynesians. We start with a very simple model, namely, the standard income-expenditure model of the IS and LM curves. It has been more than a quarter of a century since Professor Hicks devised these curves.[1] Without any essential modifications,[2] extensions or criticism, this analytical apparatus has occupied an indisputably primary position in macroeconomics as well as numerous peda-

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* In the earlier stage of this work, I had useful comments from Professor M. Bronfenbrenner of Duke University.

1 J.R. Hicks, "Mr. Keynes and the Classics; A Suggested Interpretation," Econometrica, 1937 and A.E.A. Readings in Income Distribution, pp. 461-476 and M.G. Muller ed. Readings in Macroeconomics, Holt, Rinehart and Winston, Inc. 1966.

2 It was slightly modified by Hicks throughout the famous Hicks-Patinkin debates. J.R. Hicks, "The Classics Again," Critical Essays in Monetary Theory, Clarendon Press, 1967, pp. 144-154. D. Patinkin, "Price Flexibility and Full Employment," American Economic Review (A.E.R.), vol. 38, Sept. 1948 and cf. "Hicks-Patinkin Debates," in Economic Journal (E.J.), 1957-1958.

gogical textbooks.[3] The IS and LM curves were originally employed to reconcile the classical thought and the General Theory, but have now been widely accepted as a way of distinguishing, with various post-Keynesian modifications, the Keynesians from the classists mainly because of their simple and convenient forms. However, this analytical instrument has become too familiar to us, and people are inclined to forget the essential assumptions[4] underlying the same curves. It would be suitable for us to reflect upon the crucial assumptions, validity, and the extent of application of these still useful instru-

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3 R.G.D. Allen, Macroeconomic Theory, Macmillan St. Martin's Press, 1968, Ch. 7. G. Ackley, Macroeconomic Theory, Macmillan, 1961. M. Bailey, National Income and Price Level, Ch. 1-5. W. Smith, "A Graphical Exposition of the Complete Keynesian System," Muller ed. Readings in Macroeconomics, Ch. 4. A.P. Lerner, "The General Theory (1)," S.E. Harris ed. The New Economics, Ch. 2. L.R. Klein, Ibid. F. Modigliani, "Liquidity Preference and the Theory of Interest and Money," A.E.A. Readings in Monetary Theory. H.G. Johnson, "The General Theory After Twenty-Five Years," A.E.R., May 1961. A. Hansen, A Guide to Keynes, McGraw Hill, 1953. J.R. Hicks, A Contribution to the Theory of the Trade Cycle, Clarendon Press, 1950, Ch. 11-12 etc.

4 For example, in a recent issue of the A.E.R., Professor D. Wrightsman ("IS, LM and External Equilibrium; A Graphical Analysis," A.E.R., vol. LX, No. 1, 1970) intended to extend the IS, LM analysis so as to incorporate the trade balance. He imposes one additional equilibrium condition, or the balance of trade line EE onto the usual IS, LM. However, this kind of extension, even though it may be very fascinating to incorporate some other equilibrium condition, is simply not possible. The Wrightsman model consists of the following equations (the economic meaning and notations are explained in the arguments in the text).

$$I(Y, i) - S(Y, i) = 0 \qquad (1\text{-}n\text{-}1)$$

$$L(Y, i) - \bar{M} = 0 \qquad (1\text{-}n\text{-}2)$$

$$E(Y, i) = 0 \qquad (1\text{-}n\text{-}3)$$

4 cont.

where (1-n-1) and (1-n-2) respectively describe the IS and LM functions and EE denotes the balance of trade. For simplicity let us linearize the set of equations (1-n-1) to (1-n-3) as,

$$AX = b \qquad (1\text{-}n\text{-}4)$$

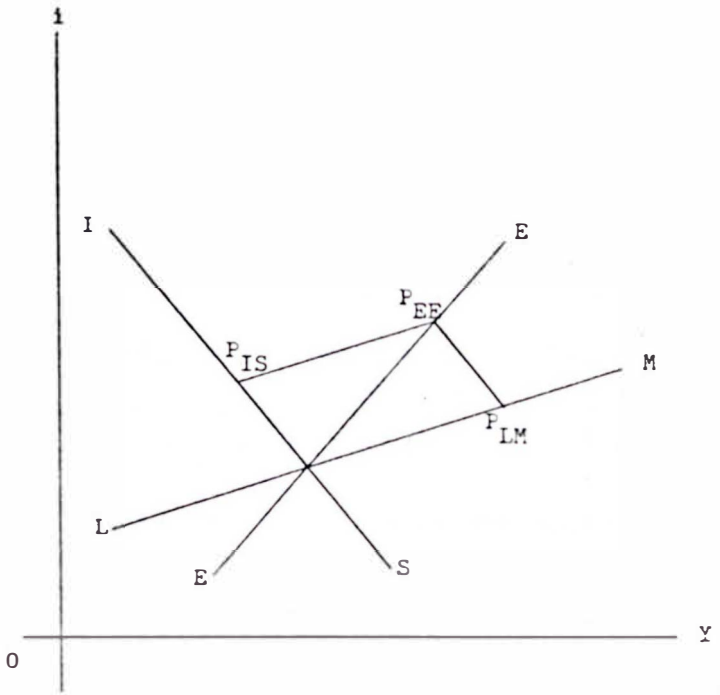
where A is a 3x2 matrix, X=col(Y, i) and b=col(b_1, b_2, b_3) which is a constant term vector. Looking at it this way, it is immediately obvious that (1-n-4) is not linearly independent. Only two out of three equations are independent. Diagrammatically, one of the equilibrium conditions, which is denoted as one line in the Figure 1-n-1, is completely described by the other two. For example, if we have the IS and LM curves, then any point on EE can be expressed by a linear combination of two different points, each one on IS and LM. This in turn implies, in economic terms, that if we have knowledge about any two markets out of three, then all information about the remaining one can be obtained from the previous two. Namely, if we have information about the goods market, then we know everything about the international trade market. Therefore, the imposition of an additional equilibrium condition on IS, LM is simply impossible.

It is surprising to note that this false application of the IS, LM curves which was initiated by Professor R. Mundell in "The Appropriate Use of Monetary and Fiscal Policies under Fixed Exchange Rates," IMF Staff Papers, 1962 is currently popular among some of the international trade theorists (also cf. Blomiqvist, A.G. "A Note on the Appropriate Use of Monetary and Fiscal Policy under Fixed Exchange Rates," The Swedish Journal of Economics, vol. 72, 1970, and D.J. and A.F. Ott, "The Workings of the Fiscal Rule in a Closed and an Open Economy," Economia Internazionale, vol. XXIII, No. 1, 1970). However, my analysis suggests that these attempts represent an inappropriate application of the IS, LM model. (cf. S. Minabe, "On IS, LM and External Equilibrium," Mimeo. Sept. 1970).

Also, recently the IS, LM analysis otherwise known as the standard income-expenditure analysis was accused of containing the assumption of wage-rigidity by A. Leijonhufvud (cf. the footnote in the Preface p.). Although his contentions provide us with an interesting topic, we will not develop it further here. (cf. S. Minabe, "The Logical Inconsistency of the Clower-Leijonhufvud Position on the Keynesian Revolution," under revision according to Professor R.F. Wright's advice, Dec. 1970).

4 cont.

Figure 1-n-1



ments here. Also, the connection between Keynesian analysis and post-Keynesian dynamics, especially those works of Sir Roy Harrod and Sir John Hicks will be explored.

Let us take a three-commodity case, i.e., goods, money and bonds. According to Walras' Law, if we have an equilibrium in two markets, then it will bring about a general equilibrium in the economy. The equilibrium conditions in the goods-market and money-market are respectively denoted as:

(1-1) the equilibrium condition of the goods-market,

$$I(Y, i) - S(Y, i) = 0,$$

and

(1-2) the equilibrium condition of the money-market,

$$L(Y, i) - \bar{M} = 0$$

where I, S, and L are the investment, savings and liquidity preference functions, respectively. These functions are assumed to depend on money income, Y, and the rate of interest, i. $\bar{M}$ is the given money supply. The equations (1-1) and (1-2) respectively express the IS and LM curves. Using total differentiation, we obtain the following expressions as the slopes of IS and LM.

$$(di/dY)_{IS} = - \frac{\frac{\partial I}{Y} - \frac{\partial S}{Y}}{\frac{\partial I}{\partial i} - \frac{\partial S}{\partial i}} \qquad (1\text{-}1)'$$

$$(di/dY)_{LM} = -\frac{\frac{\partial L}{\partial Y}}{\frac{\partial L}{\partial i}} \qquad (1\text{-}2)'$$

If we assume $(\partial I/\partial Y) = (\partial S/\partial i) = 0$ and take the inverse value of (1-1)', we then have

$$(dY/di)_{IS} = (\partial I/\partial i)/(\partial S/\partial Y) \qquad (1\text{-}1)''$$

It denotes the ratio of the increase in income to the changes in the rate of interest via changes in investment. Thus, the IS curve is usually downward sloping in the (Y, i) plane, under the aforementioned assumptions (also cf. Chapter II).

The slope of the LM curve, or (1-2)' depends on the functions of money.[5] Traditional monetary theory implies,

$$\frac{\partial L}{\partial i} < 0 \quad \text{and} \quad \frac{\partial L}{\partial Y} > 0 .$$

The first inequality shows that the demand for cash balances as an asset is negatively related to the rate of interest,[6] while on the other hand,

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5 For more detail cf. S. Minabe, "A Note on Post-Keynesian Monetary Theory," Mimeo., March 1970. (Accepted by American Economist, Sept. 1970.)

6 A.G. Hart and P.B. Kenen, Money Debt and Economic Activity, 3rd ed. D. Patinkin, Money Interest and Prices, Harper & Row, 2nd ed. 1965. J.R. Hicks, Critical Essays. H.G. Johnson, Essays in Monetary Economics, George Allen & Unwin, 1967. J. Tobin, Unpublished Mimeo., (1964). D. Robertson, Money, Ch. 1. J. Tobin, Mimeo. Ch. 2. J. Hicks, "Liquidity," E.J., Dec. 1962. J.M. Keynes, General Theory, Ch. 13. J. Tobin, "Liquidity Preference as Behavior Towards Risk," Review of Economic Studies, Oct. 1939. S.C. Tsiang, "A Note on Speculation and Economic Stability," Economica, Nov. 1943. F. Machlup, "Bank Deposits and the Stock Market in the Cycle," A.E.R., vol. 30, March 1940.

the second inequality indicates that the demand for money as a medium of exchange is positively related to the level of income.[7] Generally, money functions simultaneously as a medium of exchange and as an asset, and the curve LM has an upward slope. Thus we have the typical IS and LM curves in the Figure 1-1.

The money income Y is measured along the horizontal axis and the rate of interest i along the vertical axis. N^f denotes the full employment level of income. The IS curve becomes flat to the right of N^f, since labor is already fully employed. As a consequence, any increase in income to the right of N^f is monetary and the real income in terms of wage units will drop to N^f.[8] The economy is in a true inflation. With the intersection of the IS and LM curves to the left of N^f, the distance $N^f - N^k$ indicates the Keynesian unemployment due to the lack of effective demand (the actual rate of interest i^k is higher than the full employment level of interest).

Coming back to the relationship (1-1)' if we assume that $\frac{\partial I}{\partial i} - \frac{\partial S}{\partial i} = 0$, which means that both investment and savings are perfectly inelastic to the changes in the rate of interest, then the curve IS becomes vertical in Figure 1-1. If this is true, then the monetary side of the economy

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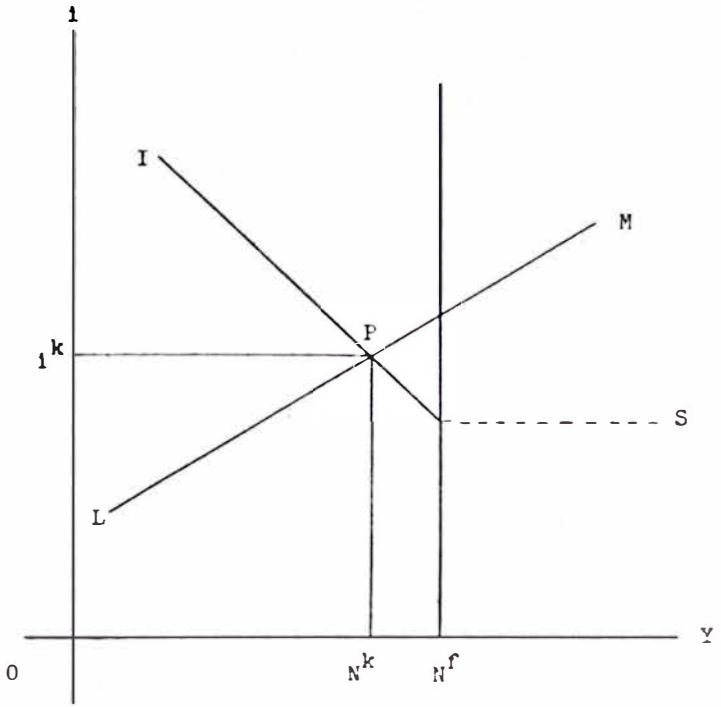
7 A. Marshall, Commerce and Credit, London, 1932, pp. 43-50 also pp. 282-284. A.C. Pigou, "The Value of Money," A.E.A., Readings in Monetary Theory, pp. 162-183. I. Fisher, The Purchasing Power of Money, (rev. ed. 1931) Ch. 4-8. D. Rovertson, Ibid., Ch. 2. J.R. Hicks, "A Suggestion for Simplifying the Theory of Money," A.E.A., Readings in Monetary Theory, pp. 13-32. M. Freadman, ed. Studies in the Quantity Theory of Money, Ch. 1.

8 J.R. Hicks, "A Rehabilitation of 'Classical Economics'?", E.J., LXVII, 1957. J.R. Hicks, "The 'Classics' Again," Critical Essays in Monetary Theory, Ch. 8, esp. pp. 145-146.

Figure 1-1



represented by the LM curve does not have any influence on the real part of the economy. Also in (1-2)', if money is used exclusively as an asset, then $\frac{\partial L}{\partial Y} = 0$ and LM becomes horizontal.[9] In these two cases, monetary policy is rendered ineffective for increasing employment.[10]

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9 The shape of the LM curve was fully discussed by the author elsewhere (cf. "A Note on the Post Keynesian Monetary Theory," forthcoming in American Economists, 1971). Strictly speaking, a part of the transaction demand for money depends on rate of interest. (cf. W. Baumol, "The Transaction Demand for Cash; An Inventory Theoretical Approach," Quarterly Journal of Economics (Q.J.E.), 1952. J. Tobin, "The Interest Elasticity of Transaction Demand for Cash," Review of Economics and Statistics, 1956. J.R. Hicks, Critical Essays. P. Davidson, "Money Portfolio Balance Capital Accumulation and Economic Growth," Econometrica, vol. 36-2, 1968. D. Patinkin, Money Interest and Prices, esp. Ch. VII, Harper & Row, 2nd ed. 1965 etc.)

10 It is interesting to note the essential core of the "Keynesian Revolution" as expounded by Professor Klein and the resurgence of the classical arguments by Professor Patinkin in terms of IS, LM. In the classical system, money is used exclusively as a medium of exchange

$$\left[\frac{\partial L}{\partial I} = 0 \text{ in } (1\text{-}2)' \right]$$

and with Say's Law, LM is a vertical line which goes through N^f. (cf. O. Lange, "Say's Law; A Restatement and Criticism." in Studies in Mathematical Economics and Econometrics, Lange, McIntyre and Yntema ed. J.R. Hicks, Value and Capital, Ch. 12. D. Patinkin, "The Indeterminancey of Absolute Prices in Classical Economic Theory," Econometrica, vol. 17, Jan. 1949. D. Patinkin, "Liquidity Preference and Loanable Funds; Stock and Flow Analysis," Economica, Nov. 1958. S. Valvanis, "A Denial of Patinkin's Contribution," Kyklos, vol. 8, 1955. Becker and Baumol, "The Classical Monetary Theory; The Outcome of the Discussion," Economica, 1952. G.C. Archbald and R.G. Lipsey, "Monetary and Value Theory; A Critique of Lange and Patinkin," Review of Economic Studies, Oct. 1958. S.C. Tsiang, "Walras' Law, Say's Law and Liquidity Preference in General Equilibrium Analysis," International Economic Review, 1966.)

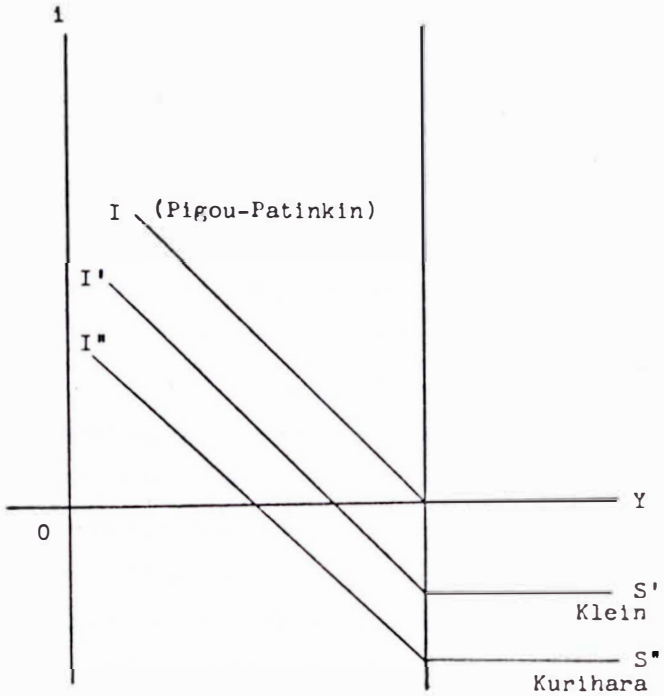
$$I(Y^f, i) - S(Y^f, i) = 0 \qquad (1\text{-}n\text{-}5)$$

$$L(Y^f, i) - \bar{M} = 0, \qquad (1\text{-}n\text{-}6)$$

where Y^f is a full-employment income which is a constant. This system does not have a solution (especially a non-negative solution, cf. Fig. 1-n-2. Both Patinkin and Pigou admit this and try to rescue this inconsistency of the classical system by incorporating an additional automatic price mechanism, namely, the general price level, P, via the "real balance" effect (M/P). They maintain that the IS curve will be shifted at least to the I'S' via real balance effects. Professor Kurihara, however, argues that real balance effects may work inversely and push the IS curve further down-

10 cont.
ward (cf. K.K. Kurihara, "Real Balances, Expectations and Employment," E.J., June 1960), depending on the consumers' and businessmen's expectation of the general price level.

Figure 1-n-2



At the outset of our IS, LM argument, we made the assumption, $\partial I/\partial Y = \partial S/\partial i = 0$; namely, the propensity to invest $\partial I/\partial Y$ and the elasticity of savings to the rate of interest are both zero. Formally speaking, we can introduce some assumptions so that $\frac{\partial I}{\partial Y} \neq 0$, $\frac{\partial S}{\partial I} \neq 0$. In this case, the IS curve may not be downward sloping at all, but it is rather upward sloping. We will apply this very fact in the next chapter, where we will discuss the Scandinavian Monetary Cycle.

More significantly, it is widely acknowledged that the General Theory deals mainly with the economics of depression. This also applies to the IS, LM argument, since we have the assumption $\frac{\partial I}{\partial Y} = 0$, which in turn implies that even though money income increases, investment may not increase. In other words, according to this assumption, at any level of money income, an increase in income does not require new investment. However, this assumption may not be acceptable in the long-run analysis as amplified in the subsequent chapters (cf. Chapter III).

In this chapter we have explored in detail the familiar IS, LM curves, since they provide us with an immediate instrument of analysis to use in Chapter II and subsequent chapters. A very efficient medicine for a particular disease is hazardous to the human body. A somewhat similar analogy applies to the use of the IS, LM curves (cf. footnote 4). Here we examined the basic assumptions, the validity, the applicability and the possibility of extending the

analysis of these same curves. Also the Klein version of the Keynesian Revolution was examined (cf. footnote 10). Finally, the relationship between the IS, LM analysis and post-Keynesian dynamics was explained. We will return to this point again in Chapter III.

CHAPTER II

THE SEMINAL CONTRIBUTIONS OF WICKSELL, LINDAHL, MYRDAL AND LUNDBERG

It is a well-known fact that a group of economists who were active in the 1930's were named the Stockholm School by Professor B. Ohlin[1] in the famous article that appeared in the Economic Journal. Of the group, the contributions of Professors E. Lindahl, G. Myrdal, D. Hammarshjöld, A. Johanson and E. Lundberg (and of course including Professor Ohlin himself), are especially important. On the other hand, the theoretical positions of these economists are tacitly different as well as individualistic. According to the Swedish writers[2] in the history of economic thought, even these people whom we know as members of the Stockholm School did not recognize the formation of such a school until Ohlin's paper was published. Moreover, it is interesting to note that Ohlin himself is

[1] B. Ohlin, "Some Notes."

[2] cf K.G. Landgren, Ibid. T. Fernholm, "Ideutveckling, Ekonomiskpolitik och Ekonomisk Teori, Kommentarer till Karl-Gustav Landgren, Den 'Nya Ekonomien' I Sverige," (The Development of Idea, Economic Policy and Economic Theory, The Comments on Karl-Gustav Landgren, Ibid.) Ekonomisk Tidskrift, Arg 62, 1960. E. Wigforss, "Den Nya Ekonomiska Politiken," (The New Economic Policy) Ekonomisk Tidskrift, Arg 62, 1960. E. Lundberg, Ibid., Ekonomisk Tidskrift, Arg 62, 1960. Replikkskrifte Kring Landgrens bok av H. Hegeland. (Book review on Landgren's book), Ekonomisk Tidskrift, Arg 62, Leif Bjork, "En Sovjetekonom om Stockholms-skolan," (A Soviet Economist on the Stockholm School) Ekonomisk Tidskrift, Arg 62, 1960. G. Lindahl, "Erik Lindahl och 30 - talets syselsattningsproblem (E. Lindahl and Employment Problem of 1930's), Ekonomisk Tidskrift, Arg 62, 1960. H. Hegeland, "Genmale till K.-G. Landgrens replik i forra numeret," (Answer to the K.G. Landgren's Comment in the previous issue) Ekonomisk Tidskrift, Arg 62, 1960. H. Dickson, "Grundzuge der Swedischen Wirtshaftstheorie, vor allem der Stockholmer Schule, Warend der letzten 25 Hahre," Weltwirtshaftliches Archev, 1951, N:r 1. (These contributions are available also in Japanese in the form of an unauthorized translation by S. Minabe.)

readily distinguishable from the other Swedish economists in his theoretical and economic policy proposals in Arbetsloshetsutredning (which was active from 1931 on, and whose English translation is: The Committee on Remedies for Unemployment), a committee appointed by the Swedish government. K.G. Landgren even maintains that only Ohlin initiated the "Keynesian Revolution" in Sweden in the aforementioned Ohlin report to the government (B. Ohlin, Penningpolitik Offentliga Arbeten, Subventioner och Tullar som medel mot Arbetlöshet; Bidrag till expansions teori, Arbetlöshetsutredningens betankande II, S.O.U. 1934) (Monetary Policy Public Work, Subsidies and Tariff Policy as Remedies for Unemployment). Even though Ohlin refers to these people as the "Stockholm School," perhaps it would be more suitable for them to be classified, if anything, under the Swedish School or as neo-Wicksellians.[3] Therefore, in this chapter we will confine ourselves to the economic thought of the neo-Wicksellians including Wicksell himself and we will come to Ohlin's theory later (Chapter VI of this study).

In "Some Notes on the Stockholm Theory,"[4] Ohlin pointed out the following characteristics which are common to the Stockholm School economists.

(a) "A theory of output as a whole" in the Wicksellian tradition. Wicksell broke with Say's doctrine that supply creates its own demand and

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[3] Also cf. Landgren, Ibid. T. Palander, "Om Stockholmsskolans Begrepp och Metoder, Metodologiska Reflexioner Kring Myrdals Monetary Equilibrium," (This excellent introduction to the Stockholm School is available in English, "On the Concept and Method of the Stockholm School,: translation by R.S. Stedman, International Economic Papers, No. 3, 1953.) Ekonomisk Tidskrift, N:r 1, 1941.

[4] B. Ohlin, Ibid., pp. 53-55

with the accepted view that relative prices and the theory of money are two different things.

(b) The Wicksellian process analysis. Credit and savings have a time dimension. For this and other reasons he came to study time-using processes.

(c) The Myrdalian ex-ante and ex-post analysis.

(d) The monetary equilibrium analysis, or savings = investment or the Lindahlian version of multiplier theory. Finally,

(e) Economics of unused resources. The analysis covers on the whole the same field of theoretical problems as those in Keynes' General Theory.

In fact, the contributions of the Wicksellians and neo-Wicksellians cover a broad range of economic analyses, the most famous ones being capital theory, monetary theory, methodological arguments in period analyses, the theory of unused capacity and unemployment. The complete exploration of this School is far beyond the scope of the present study. Here we will confine ourselves to the Wicksellian and neo-Wicksellian theories of economic fluctuations as compared to those of the Keynesians. Methodological arguments aside,[5] the central theme of the Wicksellian and

[5] As a matter of fact, the Wicksellian and neo-Wicksellian contributions are rather familiar to us, since Wicksell, Lindahl, Myrdal and Lundberg's main contributions are translated into English (Ohlin's report to the aforementioned committee is not yet published in English). Palander's International Economic Papers - article provides us with an excellent introduction to the same School, theoretically as well as methodologically. Also, Baumol's Economic Dynamics has one chapter on "Period Analysis" which is a good summary of H. Brems, "Om Stockholmsskolens Begreber og Metoder," Ekonomisk Tidskrift, 1944 (On the concepts and methods of the Stockholm School, which is only available in Danish). Professor Hicks has chapters on Swedish Economic thinking in Capital and Growth.

Here we will not go into the Swedish methodology. The Myrdal-Lindahl criticism on the Wicksellian natural rate of interest is essentially the problem of cost-push and demand-pull inflation. Wicksell's cumulative process and its elaborations by neo-Wicksellians are a problem of business cycles. These two points are the most significant contributions by the Swedish economists and they still have many implications applicable today. Here we describe them rather theoretically but not too methodologically.

neo-Wicksellian developments can be reduced to two important points: (1) the imminent criticism of Wicksell's notion of the rate of interest or a construction of consistent monetary equilibrium and (2) the elaborations of the Wicksellian cumulative process. The first argument, i.e., the criticism of the natural rate of interest is necessary so as to endow a rationale to the Wicksellian cumulative process. This point will also be amplified subsequently.

The crucial propositions suggested by Wicksell are: there is a certain rate of interest on loans which is neutral in respect to commodity prices, and which tends neither to raise nor to lower them. This is necessarily the same as the rate of interest which would be determined by supply if no use were made of money and loans were made directly in the form of real capital goods. It comes to much the same thing to describe it as the current value of the natural rate of interest on capital.[6] In other words, Wicksell defined his equilibrium (what Myrdal calls the monetary equilibrium) in three different ways: (1) by the return on capital, (2) by the equality of savings (or to use Myrdal's terminology, "free capital disposal") and investment, or (3) by the constancy of the price level.[7] Then Wicksell describes his so-called cumulative process as follows: at any moment and in every economic situation there is a certain level of the average rate of interest such that the general level of prices has no tendency to move either upwards or downwards. This we call the normal rate of interest. Its magnitude is determined by the current level of the

[6] K. Wicksell, Interest and Prices: A Study of the Causes Regulating the Value of Money, Translated by R.F. Kahn, 1965, Ch. 8-9, pp. 102-156.

[7] K. Wicksell, Ibid., Ch. 8. T. Palander, Ibid., p. 8.

rate of return on capital, and rises and falls with it.

If for any reason whatever, the money rate of interest is set and maintained below this normal level, no matter how small the gap, prices will rise and will go on rising, or if they were already in the process of falling, they will fall more slowly and eventually begin to rise.

If on the other hand, the market rate of interest is maintained even little above the current level of the natural rate, prices will fall continuously and without limit.[8]

The most important contributions of the neo-Wicksellians focused on the monetary equilibrium condition and the cumulative processes of Wicksell,

While Wicksell himself maintains that the monetary equilibrium conditions, namely:

(1) market rate of interest = natural rate of interest,

(2) savings = investment, and

(3) the stability of the general price level are equivalent to one another, Myrdal[9] denied this. According to Myrdal, the equilibrium conditions (1) and (2) are equivalent. However, condition (3) may not be equivalent to the former two. Namely, Myrdal argues that condition (3) is irrelevant to monetary equilibrium, or in other words, the general price level may change under the condition that savings be equal to

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[8] K. Wicksell, Ibid., p. 120. C.W. Baird, "Knut Wicksell on the Integration of Monetary and Value Theory," Swedish Journal of Economics, Vol. 72, 1970, No. 2 June, pp. 101-102.

[9] G. Myrdal, "Om Penningteoretick Jämvikt: En Studie Över Den Normala Rantan i Wicksells Penninglara," (On Monetary Equilibrium Theory: A Study on the "normal rate of interest" in Wicksell's Monetary Theory) Ekonomisk Tidskrift, Arg 33, 1931, ss. 191-302. A Revised German Edition, Der Gleichgewichtsbegriff als Instrument der geldtheoretischen Analyse, Vienna, 1933. The English edition of Myrdal's book is quite different from the Swedish and German versions (cf. also T. Palander's paper).

investment. Furthermore, E. Lindahl[10] also denies the Wicksellian equivalence arguments along with Myrdal and also rejects Wicksell's notion of the normal rate of interest associated with the constant-price concept.

However, both Myrdal's and Lindahl's contentions are very hazy on this point, and so we must conclude that they have failed to prove that the first two criteria of Wicksell's monetary equilibrium are not equivalent to the third one, namely, the constant price level.

In this chapter, we will show that under a certain assumption Wicksell is quite right, while under a different assumption Myrdal and Lindahl are correct. We can prove this by applying our basic model developed in the previous chapter. Also, we can give a clear exposition of the Wicksellian cumulative process or what we call the neo-Wicksellian monetary cycle, also in terms of our fundamental equations (1-1) and (1-2) in Chapter I.

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[10] E. Lindahl, Penningpolitikens Mål, Malmo, 1929, ss. 1-98.)The Target of Monetary Policy) E.Lindahl, Penningpolitikens Medel, Malmö, 1930, ss. 1-180. (The Instruments of Monetary Policy). These Lindahl books are translated into English under the title, Study in the Theory of Money and Capital, London, 1939. Also cf. D. Davidson's criticism D. Davidson, "Knut Wicksell, Geldzins und Guterpreise: Eine Studie über den Tauschwert des Geldes Bestimmenden Ursachen, Jena 1898," Ekonomisk Tidskrift, 1899, ss. 234-248. (In this book review, Davidson argued that if, ceteris paribus, the technical productivity of the means of Production increases for some reason, the price level for finished goods must decrease correspondingly or else the whole monetary system falls out of equilibrium and a typical cumulative process upwards is started. Also, B. Ohlin criticized the Wicksellian normal rate of interest theory from an unique point. Ohlin argues that the prefix "natural" or "normal" implies something normative and that people may prefer a moderate inflation to the large-scale deflation of employment like the mass unemployment of the 1930's. B. Ohlin, "Till frågan om penningteoriens upplggning," (A Review on Monetary Theory) Ekonomisk Tidskrift, Arg 35, 1933, ss. 46-81.

In fact, the basic characteristics of Wicksell, the neo-Wicksellians and the Keynesian arguments are essentially the same. Here we use a slightly modified model for the following discussions.

$$I(Y, i_n) - S(Y, i_n) = 0 \qquad (2\text{-}1)$$
$$L(Y, i_m) - \bar{M} = 0 \quad .^{11}$$

As is immediately evident, the essential difference between this model and fundamental equations (1-1) and (1-2) lies in the fact that we have two rates of interest, i_n and i_m which respectively denote the natural and market rates of interest. By definition (in equation 2-1) the natural rate of interest equates savings and investment at a given level of money income. The natural rate of interest is known to be a concept almost similar to the marginal efficiency of capital concept of Keynes. Namely, Wicksell comes close to the Keynesian marginal efficiency of capital concept but on different grounds, i.e., Wicksell held that the marginal productivity of capital declined through time and therefore its share of total output would become smaller. Therefore, the equality between the natural rate of interest and the market rate of interest in equilibrium implies that the marginal efficiency of capital is approximately equal to the natural rate of interest or, to put it differently,

[11] Formally, our model is not uniquely determined. In order to have a consistent model (in the sense that we have shown in footnote 4, in the previous chapter), firstly, we should not distinguish between i_n and i_m explicitly, and should use only i as the rate of interest and, secondly, accept Wicksell's assumption that the rate of wage is perfectly flexible and in the short-run with a given supply of labor Y is a given constant or a constant level of income at full employment. The last point is believed to be the reason why Wicksell could not explain general unemployment, despite the fact that he came very close to Keynes, which will be explained more in the later chapters. Here we use the somewhat conventional formula in order to illustrate the Wicksellian cumulative process in the framework of the IS, LM curves.

the demand price of capital is equal to the supply price of capital.[12] On the other hand, i_m denotes the market rate of interest. At a given level of income Y, it equates the demand and supply of money. In the Wicksellian system, $\bar{M}$ is an instrument of the banking authorities. The i_m is determined in the money market.[13] If we suppose that the monetary equilibrium (2-1) and (2-2), to use Myrdal's terminology, holds, then

$$i_n = i_m$$[14]

or, the natural rate of interest must be equal to the market rate of interest. The position of the Wicksellian equilbrium is illustrated by the point p in Figure 2-1. At point p in Figure 2-1, the following conditions are fulfilled:

(1) Savings = Investment, which is equivalent to

(2) $i_n = i_m$

(3) no tendency of prices to change (no excess demand for goods)

and finally,

(4) full employment.[15]

The basic structure of the Wicksellian and neo-Wicksellian theories are essentially the same. It is said that the majority of the Swedish economists were rather derogatory in respect to the General Theory, taking it as a modified argument of Wicksell.[16] The central difference between

[12] M. Keynes, The General Theory, Ch. 11-12. K. Wicksell, G. Myrdal, E. Lindahl, Ibid. B. Ohlin, Till Frågan.

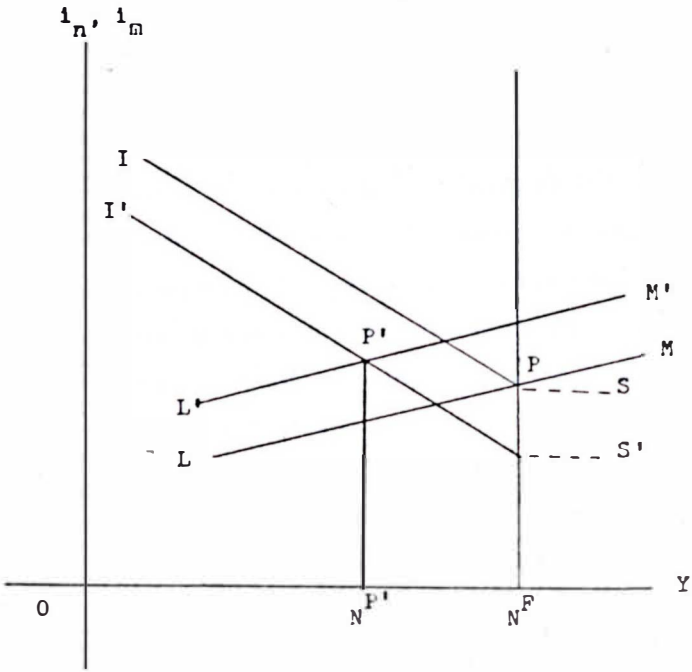
[13] Wicksell's position on money, concerning the functions of money, is almost the same as Keynes. cf. K. Wicksell, Lectures on Political Economy, vol. 2, Ch. 1-3. J.R. Hicks, Critical Essays, Ch. 1-3. J.M. Keynes, The General Theory, Ch. 13-17.

[14] cf. footnote 11.

[15] cf. footnote 11 and later discussion.

[16] K.G. Landgren, Ibid., Kapitel XII, Vissa andra svenska ekonomers relationer till Keynes (Some other economists' relationship to Keynes).

Figure 2-1



Keynes and Wicksell lies in the fact that Wicksell did not explore the inefficiency of the automatic price mechanism (for example, wage rigidity or the liquidity trap) to the full extent that Keynes did.[17] In any case, under the assumptions set out in the previous chapter, nothing is wrong with Wicksell's criteria of monetary equilibrium. They are definitely consistent.

It is a rather common fact, concerning the neo-Wicksellians or the Stockholm School, that these economists did not believe in the efficient workings of the automatic price mechanism.[18] Indeed, so as to prove the lack of equivalence of Wicksell's criteria of monetary equilibrium, Myrdal and Lindahl incorporate the imperfections of markets. In other words, both of them try to show that prices may be changing (rising) even under the condition of savings = investment. Myrdal especially noticed the inability of the wage rate to rise or fall due to the imperfections of the market and the immobility of labor.[19] However, as pointed out by T. Palander, their contentions at this point are extremely hazy. Furthermore, they may not have successfully proven their point.[20] More precisely, the stickiness of wages may not be enough for their arguments. It requires a stronger assumption.

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[17] cf. J.R. Hicks, A Contribution to the Theory of the Trade Cycle, Ch. 11. E. Lindahl, "The Preface to the Japanese Version of Studies in the Theory of Money and Capital." T. Palander, "Keynes' Allmäna Teori och dess Tillampning inom Rente-Multiplidator-och Pristeorien," (Keynes' General Theory and its implication to the Interest-multiplier and Price Theory) Ekonomisk Tidskrift, Arg 45, 1942.

[18] cf. B. Ohlin, "Some Notes," E.J.

[19] cf. Myrdal, Monetary Equilibrium, Ch. 3.

[20] T. Palander, "On the Concepts ---," Ekonomisk Tidskrift.

The Lindahl and Myrdal position can be illustrated by applying a simple comparative static method to our IS - LM framework. According to these people, if we delete the assumption of a perfect market for labor, then the wage rate may rise even to the left of N^f, or full employment. Let us suppose a once-for-all money wage change in the economy.

This change has effects on the economy through two channels via the IS, LM curves. The shape of the LM curve is, as explained in Chapter I, determined by the demand-supply functions of money. The demand for money as a medium of exchange from both consumers and business firms will be increased by that wage change, because in the short run such a change would, ceteris paribus, bring out a proportional increase in general prices (cf. J.R. Hicks, "Mr. Keynes"). The effect of the money wage increase on the demand for money as an asset is not clear. However, it certainly has a negative effect on the demand for money for amenity purposes à la Pigou and Patinkin. On the other hand, empirical evidence indicates that the demand for cash for this purpose is negligibly small. Therefore, we may conclude that at a given supply of money, such a change in money demand will make the LM curve shift upward, that is from LM to L'M' in Figure 2-1.

A once-for-all change in the money-wage rate will not have any significant effect on investment demand, because the marginal efficiency of capital schedule will not be affected by that change. The prime cost of production of capital will rise. On the other hand, the prices of all products are also expected to rise. For this reason the demand schedule of capital goods will not change. If we turn to consumption demand, the problem revolves around who suffers and who gains in the

general price rise. With a given pattern of income distribution, the welfare position of the fixed income class (including renters, pensioners, graduate students, etc.) will be worse. On the other hand, the welfare position of entrepreneurs would increase through the general price rise. If we assume the marginal and average propensities to consume of the fixed income class to be higher than those of the entrepreneurs at a given rate of interest,[21] the IS curve will shift to the left, that is from IS to I'S' in Figure 2-1. Thus, the Lindahl and Myrdal positions can be illustrated by P' instead of by the Wicksellian equilibrium Point P in the same diagram.

In the remaining part of this chapter, we will examine the celebrated Wicksellian cumulative process by applying our modified fundamental equations.

$$I(Y, i_n) - S(Y, i_n) = 0 \qquad (2\text{-}1)$$

$$L(Y, i_m) - \bar{M} = 0 \qquad (2\text{-}2)$$

Again, i_n indicates Wicksell's natural rate of interest which equates savings and investment at a given level of income, while i_m is the market rate of interest.[22]

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[21] This assumption may not be correct, if we accept Professor Friedman's permanent income hypothesis. According to this hypothesis, the underlying consumption function is the same for both; observed differences in their behavior are attributable to differences in the ratio of the variance of permanent income to the variance of total income. We will discuss Friedman's contributions on the consumption function in Chapter IV of this study. However, for the above argument, cf. M. Friedman, A Theory of Consumption Function, Princeton University Press, 1957, esp. Ch. 4, pp. 38-109.

[22] Also D. Hammarskjöld takes the same position concerning the Wicksellian natural rate of interest in "Utkast till en algebraisk metod for dynamisk prisanalys" (An Outline of Algebraic Method for Dynamic Price Analysis), Ekonomisk Tidskrift, Arg 34, 1932.

From (2-1), we have

$$(di/dY)_{IS} = -\frac{\frac{\partial I}{\partial Y} - \frac{\partial S}{\partial Y}}{\frac{\partial I}{\partial i_n} - \frac{\partial S}{\partial i_n}} = -\frac{\frac{\partial I}{\partial Y} - (1 - \frac{\partial C}{\partial Y}}{\frac{\partial I}{\partial i_n} - \frac{\partial S}{\partial i_n}}$$

as the slope of the IS curve. C is the consumption demand and $(\partial C/\partial Y)$ the marginal propensity to consume. Let us assume,

$$\frac{\partial I}{\partial Y} + \frac{\partial C}{\partial Y} > 1$$

which implies the instability condition of the simple Keynesian system.[23] In other words, the increase in effective demand induced by an increase in income Y is greater than the increase in income itself. Therefore, the natural rate of interest must rise in order to maintain the equilibrium condition (2-1).[24]

Here we incorporate Wicksell's assumption about the dynamic process of the economy:

$$dI/dt = I(i_n - i_m) \gtrless 0, \text{ if } i_n - i_m \gtrless 0,$$

$$dI/dt = 0, \text{ if } i_n = i_m \qquad (2\text{-}3)$$

Investment demand is an increasing function of the difference between the natural rate of interest and the market rate of interest. Thus, if the natural rate of interest exceeds the market rate of interest, then investment demand tends to increase and vice versa. The difference between savings and investment is assumed to be financed by the new creation of money by the monetary authorities.

[23] cf. Culbertson, Macroeconomic Theory and Stabilization Policy, Ch. 16, pp. 303-335, 1968.

[24] J.M. Culbertson, Ibid.

Taking (2-1) - (2-3) into account, we have cyclical movements along with the Wicksellian cumulative process in Figure 2-2. In the same figure, the IS and the LM curves indicate the initial positions of those curves. The IS curve is made steeper than the LM curve on Culbertson's assumption.[25] This assumption implies that the initial equilibrium point A is unstable, because to the right of A, $i_n > i_m$ the economy tends to expand according to (2-3). The converse holds valid for the left of A.[26]

According to Culbertson:

> "Beginning from point A after a period of contraction (cf. Figure 2-2), an economy upswing finds the banking system able over some range to expand its money and credit, thus keeping the increase in the rate of interest smaller than it otherwise would have been, and smaller than the increase required to choke off the upswing. This induced money creation holds the rising rate of interest below the more rapidly rising natural rate of interest. Expansion continues until the banking system runs short of reserves. This ends the positive monetary feedback and makes the relevant LM curve the more steeply sloping LM_2. (Also, cf. Ibid., p. 325.)
>
> At this point, the market interest rate begins to rise rapidly, reaching the natural rate and halting the economic expansion. With the banking system now in a precarious position for want of reserves and other factors also contributing to a reversal, economic construction begins. During this process, induced reduction in money supply occurs, thus preventing the market rate of interest from declining as rapidly as the natural rate, as indicated by LM_3. Contraction continues until the monetary system again provides a boundary. The banks pile up enough excess reserves to halt their positive monetary feedback, the interest rate drops more rapidly, as indicated by LM_4, until it reaches the natural rate. The economy is now set for expansion."[27]

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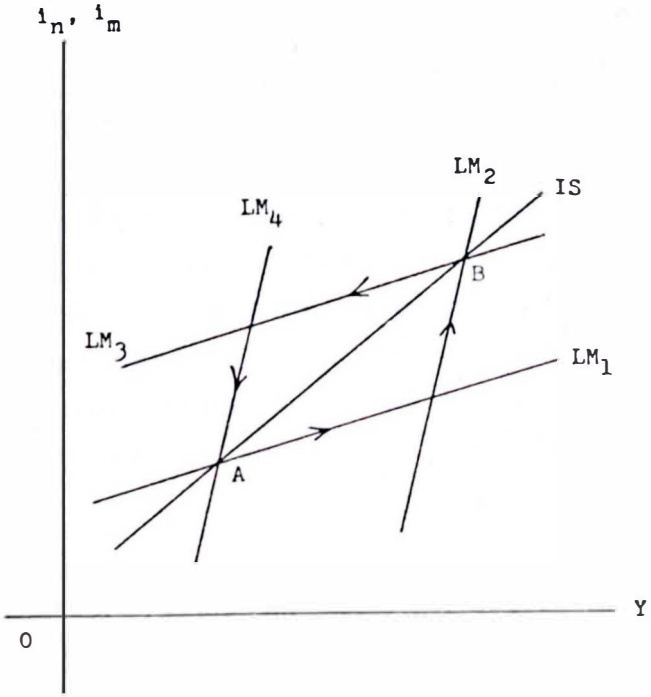
[25] Culbertson, Ibid., p.324

[26] It is interesting to note that in the usual IS-LM argument, the stability condition of equilibrium presupposes exactly opposite values of the slopes (or more precisely the absolute values of the slopes of two curves. (J.R. Hicks, The Trade Cycle, Ch. 11-12. W. Baumol, Economic Dynamics, Ch. 7. P.A. Samuelson, "A Survey of Contemporary Economics," H.S. Ellis, ed., pp. 252-287). In the usual case, the instability condition of equilibrium assumes, therefore, an LM curve steeper than an IS curve.

[27] Culbertson, Ibid., p. 325. The brackets are mine.

Figure 2-2 [28]



[28] Culbertson, Ibid., p. 323

It is interesting to note that the initial equilibrium point A is unstable, while point B is a short-run stable equilibrium (the slope of the LM curve is greater than the slope of the IS curve). Although the basic structure of the IS, LM curves is linear here, as we will see in the next chapter, we have a similar assumption about the instability conditions when we come to discuss the non-linear Kaldorian system.

However, this type of business cycle theory is too formalistic to be realistic. It makes very special assumptions about the propensities to save and to invest as well as about the behavior of the financial institutions. Furthermore, in an actual economy, cyclical movements are rather less regular while the economy grows cyclically. For these reasons, the monetary cycle expounded in this chapter is not widely accepted as a valid theory of fluctuations, especially as a cyclical growth theory. We will discuss cyclical growth theories in the subsequent chapters.

CHAPTER III

THE NON-LINEAR MODELS OF THE POST-KEYNESIANS*

In Chapter I, we have presented a basic model which forms the framework of the present study. In Chapter II, we have compared some aspects of Swedish monetary cycle theory with post-Keynesian theories in the light of our basic model. In this chapter starting from the basic model once again, we will explore the relationships between the basic model, the Harrod, Domar, Hicks and Goodwin[1] type of linear system and the Kaldor and Kurihara non-linear model.[2]

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* The writer is grateful to Professor La Tourette for his helpful suggestions during the fall semester 1969 at the State University of New York at Binghamton.

[1] R. Goodwin, "The Non-Linear Accelerator and the Persistence of Business Cycle," Econometrica, Jan. 1951. The essential characteristics of the business cycle model developed by Goodwin have been proven by S. Ichimura to be a linear system in the style of Harrod, Domar and Hicks. (S. Ichimura, "Toward a General Nonlinear Macrodynamic Theory of Economic Fluctuations," K.K. Kurihara ed. Post-Keynesian Economics, 1954.) However, we will discuss another Goodwin model in the next chapter.

[2] Here we are not interested in the mathematics of proving the necessary and sufficient conditions of a limit cycle, since it has been already solved by H.Rose in "On the Non-Linear Theory of Employment Cycle," Review of Economic Studies, 1967. In this chapter, we will especially explore Kaldor's non-linear model so as to extend Goodwin ("A Model of Cyclical-Growth," in E. Lundberg ed. The Business Cycle in the Post-War World, Macmillan, 1955) and Matthews ("The Saving Function and the Problem of Trend and Cycle," Review of Economic Studies, 1955) model in the later chapters.

Furthermore, we should note, in the following argument, that the term Y indicates the real income rather than the money income, when compared with the previous two chapters.

When we had a downward sloping IS curve in Chapter I, we assumed that $\frac{\partial I}{\partial Y} - \frac{\partial S}{\partial i} = 0$ in the expression

$$(di/dY)_{IS} = - \frac{\frac{\partial I}{\partial Y} - \frac{\partial S}{\partial Y}}{\frac{\partial I}{\partial i} - \frac{\partial S}{\partial i}} \qquad (1\text{-}1)'$$

The assumption $\frac{\partial I}{\partial Y} = 0$ indicates that the propensity to invest is zero or, in other words, any expansion of the level of income does not induce new investment. As we have seen, it is easy to establish a cyclical movement in terms of the IS, LM model. However this type of cyclical theory requires quite unrealistic assumptions about the various propensities that underlie IS, LM. Also, this kind of analysis is too artificial.

In order to investigate long-run and cyclical growth, we must accept at least some different assumptions about $\frac{\partial I}{\partial Y}$. Harrod takes $\frac{I}{\Delta Y} \equiv \Delta K/\Delta Y = C_r$ (=constant), which in turn stands for the value of net investment required for the production of additional output.[3] Domar[4] uses the

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[3] R.F. Harrod, "An Essay in Dynamic Theory," E.J., 1939, pp. 14-33. R.F. Harrod, Towards a Dynamic Economics, Ch. 3, pp. 63-100. R.F. Harrod, Money, Ch. 8, pp. 185-205. R.F. Harrod, "Domar and Dynamic Economics," E.J., 1959, also in Muller ed. Macroeconomics, pp. 294-305.

[4] E. Domar, "Capital Expansion, Rate of Growth and Employment," Econometrica, April 1946. Domar, "Expansion and Employment" A.E.R., March 1947. Also cf. R.M. Solow, "A Contribution to the Theory of Economic Growth," Q.J.E., Feb. 1956. T. Swan, "Economic Growth and Capital Accumulation," Economic Record, Nov. 1956. J.E. Meade, A Neo-Classical Theory of Economic Growth. J. Tobin, "Money and Economic Growth," Econometrica, Oct. 1965. H.G. Johnson, "The Neo-Classical Growth Model," Economica, Aug. 1966. F.H. Hahn and R.C.O. Matthews, "The Theory of Economic Growth; A Survey," E.J., Dec. 1964. R.C.O. Matthews, The Trade Cycle, 1959, Ch. 2-6. P.A. Samuelson, "Interactions Between Multiplier Analysis and the Principle of Accumulations," Review of Economics and Statistics, 1939.

inverse expression $\frac{\Delta Y}{I} \equiv \Delta Y/\Delta K = \sigma$ or the increase in output from additional net investment. The crucial point of Harrod and Domar is that $\frac{I}{\Delta Y} = C_r = \frac{1}{\sigma}$ (Harrod claims this is the case in "Domar and Dynamic Economics" in dynamic equilibrium), the accelerator $I/\Delta Y$ = the marginal capital-output ratio $\Delta K/\Delta Y$ = Harrod's Capital-output ratio C_r = the inverse value of Domar's σ = a constant on favorable assumptions. On such assumptions the dual relationship between the Harrod and the Domar system can best be illustrated by the Pilvin-La Tourette[5] diagram.

In Figure 3-1, we measure real income Y, and productive capacity P along the horizontal axis and investment along the vertical axis. The sY line indicates the savings function, where s denotes the marginal propensity to save. Let us start from an initial equilibrium point $P_0 = (Y_0, I_0)$. Investment functions are denoted by Y_0I', Y_1I'' ---. At the point $P_0 = (Y_0, I_0)$ the static Keynesian equilibrium condition is fulfilled (notice, however, that this equilibrium position is not stable, since C_r is assumed to be greater than s). Assuming a given propensity to invest, C_r, income must increase from OY_0 to OY_1 so as to bring out a new equilibrium position (Y_1, I_1), with the slope of Y_0I' being the propensity to invest. At this new equilibrium point, income must increase

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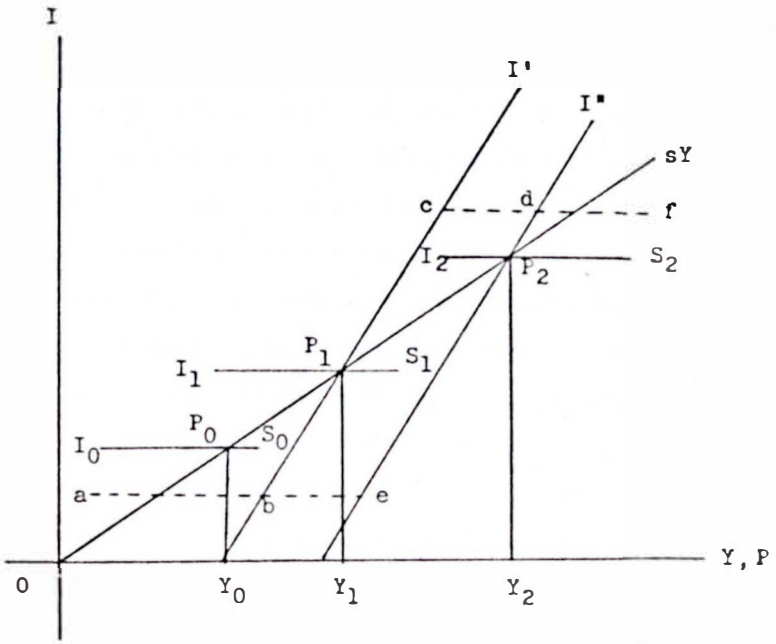
5 H. Pilvin, "A Geometric Analysis of Recent Growth Models," A.E.R. Sept. 1952. J. E. La Tourette, "Technological Change and Equilibrium Growth in the Harrod-Domar Model," Kyklos, 1964. J. E. La Tourette, "A Diagrammatical Exposition of Neutral and Non-Neutral Technical Change in Harrod-Domar Model," Economia Internationale, 1967. S. Minabe, "The Keynes-Kurihara Instability Theorem; A Further Comment," Mimeo., Sept. 1969.

Figure 3-1



from Y_1 to Y_2, etc. The increment of income must be greater and greater in order to have the Harrodian warranted rate of growth, Y_0Y_1, Y_1Y_2, Y_2Y_3, ---.

The same diagram can be applied in discussing Domar, if we take the lines Y_0P_1, Y_1P_2, --- to indicate the increased productive capacity of capital. If we again start from an initial point (Y_0, I_0), the level of investment I_0 would bring out Y_0Y_1 of potential output. Therefore, investment must increase from I_0 to I_1. The new investment I_1 will increase the potential output by Y_1Y_2. Again, in order to have a new equilibrium, we must have a larger investment, I_2. Along the equilibrium path, the increment of investment must be larger and larger, much like the changes in the level of income in the case of Harrod.

Thus, Figure 3-1 is convenient to show the familiar dual relationship between Harrod and Domar in a comparative static way under the limiting assumption of dynamic equilibrium. More important, the Figure 3-1 clearly suggests the relation which connects the Harrod, Domar, Hicks and Goodwin linear theories and the Kaldor and Kurihara non-linear theories. Professor Hicks' analysis is an especially good example of this type of connection.

Strictly speaking, the equilibrium points, P_0, P_1, P_2, --- etc. are unstable and they constitute the awkward Harrod's "knife-edge." Thus any divergence from the equilibrium would tend to become an explosive movement in the economy. To escape from the violent movements of the economy, Hicks imposes a full employment ceiling and an autonomous investment floor so as to make the investment function non-linear. Namely, in Figure 3-1, at the lower level of income, the investment function makes a floor which is supported by autonomous investment. Also, at a high level of income, the

investment function will flatten out, due to a given rate of growth of population and technological changes (à la Harrod's natural rate of growth). From these reasons, the investment function will reveal shapes like a - b - c - d, a - e - d - f, etc. in Figure 3-1, according to Hicks.[6]

Formally, Hicks' business cycle model is essentially a linear system. However, we have already come very close to the post-Keynesian non-linear business cycle theories of the Kaldor and Kurihara type.

So far, we have examined the Harrod, Domar, Hicks and Goodwin type of the linear cyclical growth system in the light of our IS, LM. Also we have indicated that original IS curve assumes $\frac{\partial I}{\partial Y} = 0$ in its slope, which in turn implies IS, LM analysis is a short-run and static analysis. If we suppose that $\frac{\partial I}{\partial Y}$ is a positive constant and $\frac{dI}{dY} + \frac{dC}{dY} > 0$ or $\frac{dI}{dY} > \frac{dS}{dY}$, then the system will lead us to the Harrod, Domar and Goodwin type of a linear cyclical growth model, as shown by the Pilven-La Tourette diagram. Also, we have indicated that if $\frac{\partial I}{\partial Y}$ is non-linear, then we will come to post-Keynesian non-linear cycle theories. Here we will closely examine these models, especially Kaldor's [7] since the Kaldorian type of non-linear

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6 J.R. Hicks, "Interaction Between the Multiplier Analysis and Principle of Acceleration," Review of Economics and Statistics, 1939. J.R. Hicks, A Contribution to the Theory of the Trade Cycle, 1950, Ch. 8. According to Hicks, both the floor and the ceiling move upward, so that in reality the a - e line would be higher vertically than the a - b line in Figure 3-1 and the same for c - d and c - f.

7 N. Kaldor, "A Model of the Trade Cycle," E.J., 1940 (Also Hansen Clemence ed. Readings in Business Cycles and National Income.) M. Kalecki, Theory of Economic Dynamics, Rinhart, 1954, Ch. 11-15. R.C.O. Matthews, The Trade Cycle, Ch. 2-6. P.A. Samuelson, "Interaction between the Multiplier Analysis and the Principle of Acceleration," Review of Economics and Statistics, 1939. L.A. Metzler, "The Nature and Stability of Inventory Cycle," Review of Economics and Statistics, 1941.

investment function will play a strategic role in generating fluctuations in our cyclical growth model of the later chapters. The essential point is that in the Kaldorian system neither the money supply $\bar{M}$ nor the rate of interest plays an important role in explaining cyclical movements, in contradistinction to the classical theories of the business cycle. Indeed, in the previous chapter, the supply of money and the rates of interest were crucial for cyclical movements. However, in the Kaldorian system, both the money supply and the rate of interest are not essential. Although Kaldor formally incorporates the classical concept of money as a medium of exchange, he tends to ignore the implications of this construction in deriving his cycle model.

If we omit the monetary side of an economy, then we have only,

$$I(Y) - S(Y) = 0 \qquad (3\text{-}1)$$

which is a so-called "simple" Keynesian system. This simple Keynesian system is either stable (if $\frac{dS}{dY}$ = const. > $\frac{dI}{dY}$ = const., which Kaldor claims in Keynes' case), or explosive ($\frac{dS}{dY}$ = const. < $\frac{dI}{dY}$ = const.), as long as the propensity to save and the propensity to invest are assumed to be constant. Kaldor sees the actual economy as unstable, but not explosive. Since the actual economy is neither as stable as in the Keynesian case nor explosive, the foregoing two assumptions about the propensities to save and to invest cannot be justified. Thus we are left with the conclusion that the I(Y) and S(Y) functions cannot both be linear.[8]

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[8] Kaldor, Ibid., p. 180. It should be noted in Kaldor's case that Y indicates gross income rather than net income.

Furthermore, Kaldor argues that there are good reasons for supposing that neither of them is linear.

These reasons by Kaldor are:

(1) Given the amount of real capital, low levels of activity can be carried out by existing capital so that they will not induce net investment. At the same time, gross investment will not be zero, for there is always some investment undertaken for long-run development purposes which is independent of current activity.

(2) Gross investment is small for unusually high levels of activity owing to the increasing costs of borrowing and construction as well as to the increasing difficulty of undertaking both.

(3) The accummulation of capital will tend to make it (investment) fall. In the familiar Keynesian terminology, this means that the marginal efficiency of capital tends to decline with the rapid growth of real capital, as it most likely does in highly industrial economies.

(4) There is a "customary standard of living" based on the normal level of income, which corresponds to normal rate of savings. Below that level of income, savings will be cut down drastically, and above that level, it will be increased considerably. Moreover, during periods of high activity, real income is redistributed in favor of profits, thus tending to increase the aggregate propensity to save, while during low activity, an increasing proportion of workers' earnings are paid out of capital funds, thus tending to decrease the aggregate propensity to save.

From these assumptions, we can summarize the Kaldorian model as:

$$I = I(Y, K), \quad \frac{\partial I}{\partial Y} > 0, \quad \frac{\partial I}{\partial K} < 0 \qquad (3\text{-}2)$$

$$S = S(Y, K), \quad \frac{\partial S}{\partial Y} > 0, \quad \frac{\partial S}{\partial K} > 0, \tag{3-3}$$

$$\frac{dY}{dt} = E(I-S), \quad \frac{dY}{dt} \gtrless 0 \text{ if } I-S \gtrless 0, \quad \frac{dY}{dt} = 0 \text{ if } I=S. \tag{3-4}$$

If we denote replacement investment as R, then we have,

$$R = R(Y, K) \tag{3-5}$$

The long-run stationary equilibrium is characterized by

$$R(Y, K) = I(Y, K) = S(Y, K)^{9} \tag{3-6}$$

From equation (3-3) and assumption (4) Kaldor draws his savings function, shown in Figure 3-2. As Kaldor himself maintains, we will have a cyclical movement, if we have a non-linear savings or investment function. Figure 3-2 illustrates a consumption-initiated cycle, assuming a linear investment function of the form $I=vY$, where v is a given constant. According to the Kaldorian assumption, the savings function shifts upward as a result of capital accumulation. Therefore, starting from an initial savings function S_0S_0, the same function will shift upward to S_1S_1. It is crucial to the Kaldorian cycle theory to assume that the economy is unstable in the neighborhood of the stationary state equilibrium. At point P_s in the same figure, the stationary equilibrium condition (3-6) is satisfied, since the replacement investment-line cuts the investment function at that point. On the other hand, point P_s is unstable, since the slope of investment function II is steeper than that of the savings function SS to cause centrifugal forces to work here. On the other hand, at the short-

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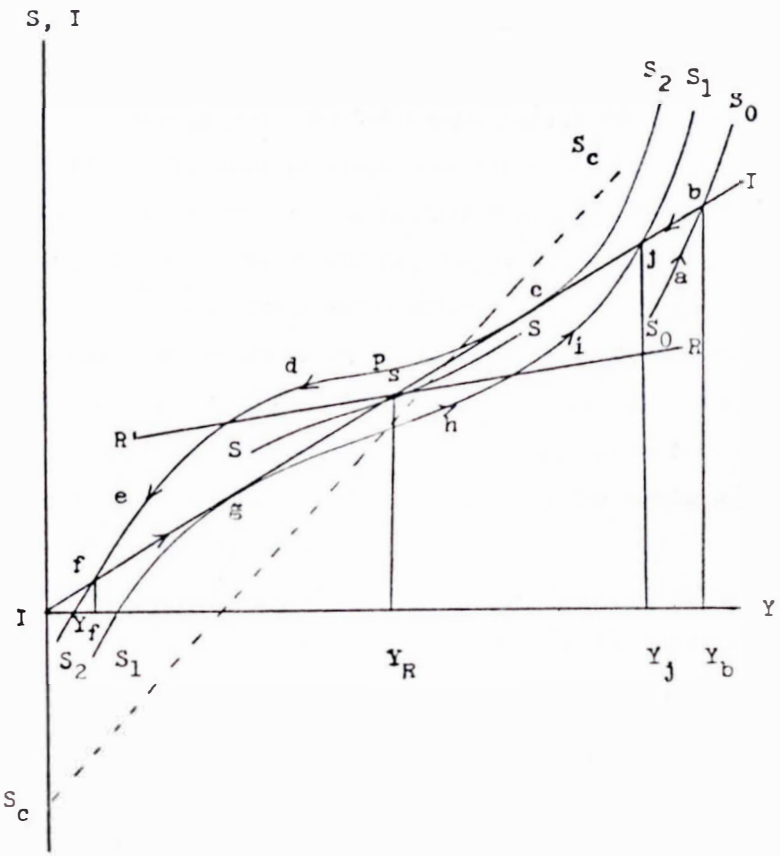
9 Also cf. S. Ichimura, Ibid., pp. 209-211.

Figure 3-2



run equilibrium point given by equation (3-4), the economy is temporarily stable. We will discuss stability conditions further when we expound an investment-initiated cycle.

Starting from the initial point a, the economy will move to the first short-run equilibrium point b. This point b is a temporal equilibrium, because the Kaldorian capital effect will shift the savings function to S_1S_1. Thus the economy moves from point b to point j. At point j, the capital effect is still working so as to shift the savings function further and to cause the economy to move to point c. If we take an instantaneous time interval, then the economy suddenly moves toward point f. At the lower level of income and of capital accumulation (viz. decumulation) the Kaldorian capital effect makes the economy move from point f to point g. Again, if we take an instantaneous time interval, then we shall see the economy shift to point j. Starting from point a, the economy makes a j-c-d---f---i---j cyclical movement.

This consumption-initiated cycle crucially depends on Kaldor's assumption about the shape of the savings function. However, the shapes of the savings function S_0S_0, S_1S_1, S_2S_2,etc. are not empirically convincing. If the savings function is linear with a negative intercept (cf. S_cS_c in the Figure), then the economy will have Keynesian stability without cyclical movements. (We will discuss the shape of the savings function further in Chapter IV and V.)

Furthermore, without much specification, Kaldor assumes a positive effect of capital accumulation on savings, i.e. $\frac{\partial S}{\partial K} > 0$. Kaldor himself attributes the rationale of this to the so-called "classical savings function"[10]

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[10] F. H. Hahn and R.C.O. Matthews, Ibid., pp. 793-801.

along with J. Robinson: The classical savings function is based on the hypotheses that the savings of profit earners and wage-earners are a function of their income, that the profit-earners' propensity to save is higher than that of wage-earners, and that the overall saving-income ratio depends on the distribution of income. Then Kaldor assumes that, as capital accumulation proceeds, the shift to profit-earnings (from wages) will accelerate,[11] which in turn will increase the propensity to save for the whole economy. However, Kaldor's contentions at this point are rather weak empirically. On the other hand, being associated with monetary theories, Pigou and Patinkin suggested some rather opposite effects of real wealth, $\frac{\partial S}{\partial K} < 0$.[12] Although the Pigou-Patinkin effect may not be important in the sense that it does not manifest itself significantly in an actual economy.[13] For the moment, let us accept a linear and non-shiftable savings function.

In the next chapter, we will see that the ratchet effect developed by Professor James Duesenberry plays a crucially important role as a shift element of the savings function, while still assuming the savings function to be essentially linear.

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11 Also cf. R.F. Harrod, The Trade Cycle, 1936.

12 cf. D. Patinkin, Money, Interest and Prices, second ed. Ch. 1-3. Appendix to Ch. 2, 1965. P. Meinich, "Money Illusion and the Real Balance Effects," Statsøkonomisk Tidskrift, LXXVIII, 1964.

13 L. R. Klein, "The Use of Econometric Models as a Guide to Economic Policy," Econometrica, April 1947.

The remaining part of this chapter is a description of Kaldor's investment cycle according to equation (3-2) and the assumptions (1) - (3). The following considerations provide us with a basis for Chapter V.

Figure 3-3 shows a slightly modified diagram of Kaldor.[14] In the same figure sY is the linear saving function, based on the assumption that autonomous consumption is zero. Thus it is a straight line which goes through the origin. RR is the level of replacement investment, where we assume the rate of replacement to be a constant proportion of the stock of capital. I_1, I_2, I_3, are the gross investment functions which correspond to the different levels of capital stock (K_1, K_2, K_3,---). According to the aforementioned assumptions about the investment function, these investment functions are non-linear. The point c denotes a long-run equilibrium point where some investment function intersects it simultaneously with RR and SS, thus fulfilling condition (3-6). However, this long-run equilibrium point is not a stable one, since at this point $\frac{\partial I}{\partial Y} > \frac{\partial S}{\partial Y}$ or the propensity to invest is greater than the propensity to save so as to make centrifugal forces operate. Therefore, any disturbances to the long-run equilibrium are supposed to be explosive in the neighborhood of c. In other words, if the economy is at c on II, then investment exceeds savings and the economy would expand according to equation (3-4).

If, for example, we start from the point k on I_1I_1, we are at an expansionary point since investment exceeds savings at this gross income level. As the income level expands, investment will also increase along

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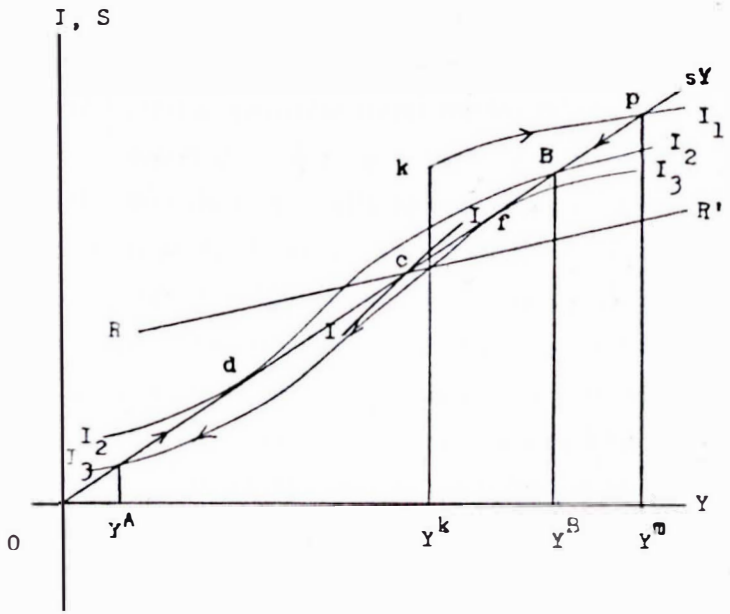
14 Kaldor, Ibid., p. 189.

Figure 3-3



the I_1I_1 curve until we come to the point p. At this point p, investment equals savings. Furthermore, at point p we have $\frac{\partial I}{\partial Y} < \frac{\partial S}{\partial Y}$. Therefore, this point is stable and a centrifugal force works here so as to give us a Keynesian equilibrium point. However, this Keynesian equilibrium point cannot be a long-run stable equilibrium point, since at point p the negative effect of capital accumulation starts working to make the investment function shift downward (here we assume a parallel shift of the investment function). Thus the economy will contract along the savings function until we come to point f. If we suppose a short time interval in the sense that the negative effect of capital accumulation will not work out in this time interval, then the economy shrinks suddenly to point A along I_3I_3.

At this low level of income Y^A, investment opportunity will increase, since the marginal efficiency of capital will increase while the cost of investment will decrease. Thus, the investment function shifts upward because of replacement demand. Point A cannot be maintained in the long-run. Gross investment is less than required to maintain this income level. The economy will proceed along the savings function, passing through short-run equilibrium points until point d is reached. If we take a short time interval again, the investment function will remain the same while the equilibrium point will move to point B. At this short-run equilibrium point B, the negative effect of capital on the investment function works again and pushes it downward. Thus the gross national income Y shows a cyclical movement between Y^A and Y^B in Figure 3-3.

In this chapter, we started from our basic model and then explored the relationship between the basic model and the Harrod, Domar, Hicks and Goodwin type cyclical growth model. Then we examined the dual aspects of

Harrod and Domar in the light of the Pilvin-La Tourette diagram. Also, the connection between linear cyclical models and the non-linear cycle model developed by Kaldor and Kurihara was examined.

One important problem will be immediately brought out. Both the Wicksell-Swedish School monetary cycle that was illustrated in the previous chapter and the Kaldorian non-linear cycle constitute a so-called "limit cycle" that is devoid of a growth trend.

In the next chapter, we will explore one of the most significant contributions by the post-Keynesians, which is also the most successful combination of empirical studies and theoretical studies, namely, the consumption function debate. This discussion will amplify the strong underlying growth forces embodied in the savings function.

CHAPTER IV

THE GROWTH TREND AND THE RATCHET EFFECT

On the Demonstration Effect and the Ratchet Effect*

In the celebrated study on consumption function,[1] Professor Duesenberry suggested that the irreversibility of income consumption relationship produces a "ratchet effect." Furthermore, he argues that this ratchet effect is an important link between the theory of development and trade cycle theory, since it explains why each cycle is at a higher level of income and consumption than the preceding one. He also suggests that use of an absolute income hypothesis in consumption function estimation implies some post-Keynesian form of stagnation thesis. According to his own hypothesis --- the relative income hypothesis --- the economy can only absorb increases in productivity if a boom of sufficient magnitude occurs periodically. He concludes his important contributions by denying that the gap between actual and potential income will widen progressively.[2]

As is well known, the consumption function debates following World War II centered around deriving a consumption function consistent with (1) the

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* Professor Bronfenbrenner of Duke University corrected the English involved in this chapter.

[1] J.S. Duesenberry, Income Saving and the Theory of Behavior, Harvard University Press, 1967.

[2] Duesenberry, Ibid., pp. 112-116.

Kuznets data, (2) the budget study data and (3) the Department of Commerce data. However, from the standpoint of dynamic theory, the essential importance of those debates may be traced to the different assumptions of Keynes and post-Keynesians on the one hand, and neo-classicals on the other. Thus, the problem seems to be whether the consumption function or the savings function is endowed with some automatic mechanism which effectively restores the capacity output by increasing the propensity to consume during a depression period.

As pointed out at the outset of this chapter, Duesenberry, without special specifications in his consumption function theory, suggested that the ratchet effect may constitute an efficient bridge between the actual and the capacity rates of growth of the economy. This position has been further expounded by some of the post-Keynesian economists, especially Professors Goodwin, Matthews, Cornwall, and some others (cf. next chapter). Furthermore, Professor M. Friedman[3] examines this essential problem in the following way:

> The doubts about the adequacy of the Keynesian consumption function raised by the empirical evidence were reinforced by the theoretical controversy about Keynes' proposition that there is no automatic force in a monetary economy to assure the existence of a full-employment equilibrium position. A number of writers, particularly Haberler and Pigou, demonstrated that this analytical proposition is invalid if consumption expenditure is taken to be a function not only of income but also of wealth or, to put it differently, if the average propensity to consume is taken to depend in a particular way on the ratio of wealth to income. This dependence is required for the so-called "Pigou effect." This

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[3] M. Friedman, A Theory of the Consumption Function, Princeton University Press, 1957.

> suggestion was widely accepted, not only because of its consistency with general economic theory, but also because it seemed to offer a plausible explanation for the high ratio of consumption to income in the immediate postwar period.[4]

The purpose of the present chapter and the following one is to examine critically the widely accepted idea that the consumption or the savings function itself includes some automatic mechanism to achieve what Harrod calls the natural rate of growth. We approach this problem by using Duesenberry's savings function,[5] because the analysis has been developed from Duesenberry's savings function rather than from Friedman's. In the next chapter we will examine the economic implications of the Duesenberry effects including the demonstration effect and the ratchet effect in a cyclical growth model of our own. Our conclusion in the next chapter is, as observed by Ohlin and Harrod[6] intuitively, that while Duesenberry effects are important in explaining the floor level of income, they are too weak to explain the ceiling level of income in the boom period.

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4 M. Friedman, Ibid., p. 5.

5 In the above book (footnote 3) Friedman presented a hypothesis about consumer behavior, the permanent income hypothesis. His consumption function is presented as having broader economic implications than any others, in the sense that it covers most of the significant consumption functions suggested by other people. Friedman proves that under certain assumptions both Duesenberry's and Modigliani's consumption functions are special cases of his own. The relation between Friedman's consumption function and Duesenberry's provides us with interesting implications, which we discuss in the appendix to this chapter.

6 R.F. Harrod, "Domar and Dynamic Economics," E. J., vol. 69, 1969. On Ohlin, cf. Ch. VI of this study.

According to the relative income hypothesis, Duesenberry incorporates the previous peak income in his consumption function. May it not be the capacity level of income at a certain time period? What is the relationship between the demonstration and the ratchet effects? Duesenberry himself answers the last question: "Our theory of the relation between income and saving really depends on the validity of a single hypothesis, viz. that the utility index is a function of relative rather than absolute consumption expenditure."[7] Furthermore, Duesenberry also argues: "There is a great deal of evidence to show that consumer tastes are socially determined. This does not mean that consumer tastes are governed by considerations of conspicuous consumption. Rather, it means that any individual desire to increase his expenditure is governed by the extent to which the goods consumed by others are demonstrably superior to the ones which he consumes."[8] In these quotations from Duesenberry, there lies the solution to the problem of whether the Duesenberry savings function includes any automatic mechanism connecting the actual and the natural rates of growth. This point seems to require a further exposition.

In the present chapter, we will examine the relation between the demonstration effect and the ratchet effect. Our conclusion is that both effects stem from similar consumer behavior. The underlying assumptions about the consumer behavior, or to put it differently, the underlying utility function

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7 Duesenberry, Ibid., p. 112.

8 J. Duesenberry, "Income-Consumption Relations and Their Implications," in Employment, and Public Policy, Essays in Honor of Alvin Hansen.

is similar in both hypotheses.[9] As a consequence, we can incorporate both the demonstration effect and the ratchet effect into one and the same savings function. (This may be useful in discussing short-run and long-run shifts of the savings function in cyclical growth models, as will be attempted in the next chapter.)

As Duesenberry argues, any psychological theory of saving should explain the resolution of the conflict between the desire for security and the desire for comfort.[10] Also, according to him, the level of saving actually achieved by anyone results from the conflict between his desire to improve his current standard of living and his desire to obtain future welfare by saving.[11] As is well-known, one of the most significant aspects of the consumption function debates was that people observed a consistent shift of the break-even or wolf point of the savings function, by which we mean the balance of income and consumption by an individual consumer, especially in the growing economy. According to Duesenberry's observations, in the 1920's the average urban family with a $1500 income (in 1940 prices) saved 8 percent of its income. In 1941, a similarly-placed family saved nothing. In this instance, one can hardly argue that

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9 Our conclusion here accords with Friedman's conclusion on Duesenberry's savings function, namely, that the Duesenberry savings function is a special case of his own. (cf. Friedman, Ibid., p. 226.) We will come to this point later again.

10 Duesenberry, "Income-Consumption."

11 Duesenberry, Income, Saving, p. 22. Also cf. Friedman, Ibid., Ch.2, pp. 7-19. B. Hansen, Finanspolitikens Ekonomiska Teori, Penningvärdeundersökningen: Del II, Kap. 7, ss. 121-138. (Economic Theory of Fiscal Policy) S.O.U. 1955.

the desire for saving had diminished in that period. For some reason, the forces leading to higher consumption increased during that period. The essential question here is why people with a given real income increase their average propensities to consume.

The above considerations led Duesenberry to what was a new hypothesis at that time, when compared with the absolute income hypothesis expounded by Keynes. When faced with the above consistent shifts of individual consumption toward a higher standard of living at a given level of income, Duesenberry argued that the sophisticated analyst might introduce a trend toward new commodities with higher qualities. However, Duesenberry doubts that the inflow of new commodities with higher qualities per se constitutes the actual drive to increase consumption expenditures at the expense of savings to be provided for the future. In order to explain the consistent shifts of consumption, he maintains that we must give up the traditional assumption about the consumer behavior of the independence of the utility function of each individual consumption unit. He thinks that a consumer's behavior is, by no means, independent of what the Joneses are doing. More precisely, Duesenberry considers that consumer choice is a social and cultural entity. Although the emergence of a sequence of new commodities with higher qualities may not bring about actual incentives to expenditure, contacts with higher-quality commodities will be converted into the drive toward higher aggregate consumption in the following way.

> "A family in given circumstances manages to achieve a modus operandi between its desire for increased consumption and its desire for saving. The solution, whatever it is, is a compromise. The family knows of the existence of higher quality goods and would prefer them to the ones now in use. But

> it could attain these by giving up saving. Once a compromise is reached the habit formation provides a protective wall against desires for higher quality goods. In given circumstances, the individuals in question come into contact with goods superior to the ones they use with a certain frequency. Each such contact is a demonstration of superiority of these goods and is a threat to the existence of the current consumption pattern. It is a threat because it makes active the latent preference for these goods. A certain effort required to resist the impulse to give up saving in favor of higher quality goods.
>
> Suppose the consumption patterns of other people are given. Consumption expenditure of a particular consumer will have to rise until the frequency of contact with superior goods is reduced to a certain level. This level of frequency has to be sufficiently low to permit resistance to all impulses to increase expenditures. The strength of the resistance will depend on the strength of desire for saving.
>
> It now becomes clear how the habit pattern can be broken without a change in income or prices. For any particular family the frequency of contact with superior goods will increase primarily as the consumption expenditures of others increase. When that occurs, impulses to increase expenditure will rise in frequency and strength, and resistance to them will be inadequate. The result will be an increase in expenditure at the expense of saving."[12]

Duesenberry calls this the "demonstration effect." He argues that mere knowledge of the existence of superior goods is not an effective habit breaker. Frequency of contact with them, or much information about them, may be.[13] The forces causing impulse to consume following informa-

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[12] Duesenberry, Ibid., pp. 26-27.

[13] The following expressions by Duesenberry may be interesting. "In this field it is not only true that what you don't know won't hurt you, but that what you do know does hurt you."

On this point, Friedman argues: "a unit consumes more partly to keep up with the Joneses, partly because it will have more opportunity to observe superior goods." (op.cit., p. 167)

tion about superior goods arise when an individual makes an unfavorable comparison of his living standard with that of someone else. Duesenberry assumes that the number and strength of impulses to increase consumption depend on the ratio of his expenditures to expenditures by other individuals. Dissatisfaction arises from the rejection of impulses to spend. Consequently, the dissatisfaction with his consumption standard which an individual must undergo is a function of the ratio of his expenditures to those of the people with whom he associates.[14]

Thus, he suggests a new form of the utility function:

$$U_i = U_i \ (C_i/\alpha_{ij}C_j) \qquad (4\text{-}1)$$

where U_i is the i-th individual's utility index, C_i is his consumption expenditure, C_j is the consumption of j-th individual and α_{ij} is the weight he applies to the expenditures of the j-th.

Although an individual may not be affected by the wealth position of his neighbors or may not know their saving, he is often influenced by how much they spend.[15]

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14 Duesenberry, Ibid., p. 32.

15 We can visualize the arguments here by drawing the present-future indifference curves in the (C_1, C_2) plane. Suppose a man's desire for current consumption C_1 is increased by the information about superior goods gained from his neighbor's increased consumption, while his desires for future consumption, C_2 do not change. Then, any increase in other people's consumption would shift his own map. His marginal rate of substitution between C_1 to C_2 will increase. The indifference maps become steeper against the C_1 axis by this. (also cf. Friedman, Ibid., pp. 7-19.)

Taking into account a life span of n years, Duesenberry suggests the following form of the utility function,

$$U_i = f_i \ (C_{i1}/R_i, \ \text{---} \ C_{in}/R_i, \ A_{i1}/R_i \ \text{---} \ A_{in}/R_i), \qquad (4\text{-}2)$$

where

$$R_i = \sum_j \alpha_{ij} C_j$$

and C_{ik} and A_{ik} indicate the sequence of consumption and real assets respectively at time k over an n-period time horizon. From (4-2), Duesenberry finally works out the consumption function as

$$C_i/R_i = f(Y_{i1}/R_i, \ \text{---} \ Y_{in}/R_i, \ r_1, \ r_2, \ \text{---} \ r_n) \qquad (4\text{-}3)$$

where Y_{ik} denotes the income of i-th individual at time k (k=1,...,n), and r_k is a rate of interest, at time k. With a given income distribution, a given sequence of the rate of interest over time, given current and (expected) future incomes and a given age distribution of population, the consumption function (4-3), aggregated over all consumers, represents the well-known relative income hypothesis. Under these assumptions it is easy to ascertain and test the basic characteristics of the consumption function (4-3): (1) At any one moment the proportion of income saved will be higher for the higher income groups than for lower income groups. (2) If income increases, while the proportional distribution remains constant, ex hypothesi, the ratio of aggregate saving to aggregate income will be constant. The first point indicates that the consumption function is a monotone increasing function of individuals' incomes at a given level of others' consumption. The second point implies that the propensity to save is invariant

with respect to uniform changes in the incomes of all individual consumers.[16]

For the purpose of obtaining a simpler expression, let us accept,

$$C_i/R_i = f\left(\frac{Y_{ik}}{R_i}\right) \quad (k = 1 \text{ --- } n) \qquad (4\text{-}4)$$

From this form of the consumption function, Duesenberry derives the following significant theorem: for any given relative income distribution, the percentage of income saved by a family will tend to be a unique, invariant, and increasing function of its percentile position in the income distribution. The percentage saved will be independent of the absolute level of income.[17]

In a growing economy, we have reason to believe that the wolf point of the aggregate consumption function is rising persistently. More importantly, Duesenberry observed strong shifts of the consumption function related to both the cycle and growth of the economy.[18] This consideration

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16 It is this form of consumption function that removes the inconsistency between Kuznets' data and the budget study data and reconciles both of them into a single function.

17 The working of the demonstration effect is slightly reinforced by long-run structural changes in the economy. Duesenberry estimated this for the several cases: growth of population, changes in age structure, resolution of racial discrimination, and urbanization. However, his observations on the cross section data do not always coincide with those of Friedman. According to Friedman's hypothesis, the changes in the propensity to save depend on permanent income after the change in the structure, and nothing would happen if that change does not bring out the changes in the permanent income. However, both of them obtained the same result for urbanization. This tendency increases the propensity to consume, because it diminishes the entrepreneural elements of farm families' incomes and increases the permanent incomes. (cf. Duesenberry, Income, Ch. 4, pp. 47-68, and Friedman, Ibid., Ch. 4, pp. 38-109.)

18 cf. Duesenberry, Income, Chart II, Average Income and Percent Saved Based on Surveys of 1901, 1935-36 and 1941.

leads us to Duesenberry's second hypothesis, i.e. the irreversibility of consumption or the ratchet effect. The psychological hypothesis underlying the argument is that it is harder for a family to reduce its expenditure from a high level than to refrain from the high expenditure in the first place. Families are willing to sacrifice savings in order to protect their living standard. If a family, Duesenberry argues, has a certain income y_0 higher than any income previously attained, it will save a certain amount. This amount will be a function of income $S_0 = f(y_0)$. If its income increases, the same function will hold. But if after the increase, income falls to the original level, its saving will be less than $f(y_0)$. If the family's income and savings are low throughout, it will have a deficit after the fall in income. If the family is in a higher bracket, it will simply save less after the fall in income than before. Furthermore, Duesenberry maintains that this last peak level of income influences not only the peak level of consumption corresponding to that income, but also current consumption, because the consumption of the following peak years depends on the peak level of consumption.[19] In principle a weighted average of all the incomes from the peak year to the current year ought to be used. But with only few observations, it would be impossible to estimate the weights. In what follows, Duesenberry argues, we may consider the relation of current consumption to the ratio (current income/highest peak income), but the results are to be taken only as approximations to the true relation. Thus, he suggests

$$s_t/y_t = a(y_t/y_0) + b \qquad (4\text{-}5)$$

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19 Duesenberry, "Income-Consumption."

as a savings function where s_t, y_t indicate respectively current savings and income, while a, b are statistically-determined constants.

Our next problem is the relationship between the consumption function (4-4) which embodies the demonstration effect and the savings function (4-5) which incorporates the ratchet effect. More precisely, what does Duesenberry mean when he maintains that both of his consumption functions depend on a single hypothesis? The implied answer is that the majority of people are governed by the same sort of impulses to expand the current level of consumption at the expense of future security or savings, being driven by the past experiences of higher consumption as in the case of their neighbor's consumption in the demonstration effect. The higher is the past level of consumption, the stronger will be the inducement to higher (current) consumption, even though the current income is falling. This means that the higher past consumption experience shifts the present-future indifference maps; as a result, the indifference curves become steeper against the current consumption axis. The marginal rate of substitution between current consumption and future consumption becomes higher. Thus, people increase their current consumption at the expense of savings or by borrowing, if they have experienced higher consumption in the past.

This explains how higher past consumption causes the impulses to achieve higher current consumption. Those people who realized a high standard of living for a certain time interval will accumulate information about goods superior to those which they can afford to buy with already diminished current income. Furthermore, those people may have wider knowledge about superior goods that are newly produced. To put this another way, if we interpret a particular consumer in the past as his own closest

neighbor, he will try to get as accurate information about superior commodities as possible. Once he has experienced a higher consumption level, his dissatisfaction about current consumption grows, even though his current income has fallen due to depression or unemployment. At the same time, he will have information about superior goods from his neighbors (the demonstration effect proper); also, it would be difficult to curtail his own standard of living relatively to those neighbors after his income falls.

In this way, the sequence of past incomes influences the current level of consumption via past levels of consumption. This is also the way in which incomes enter the consumption function or the savings function *ex post*, according to the Duesenberry hypothesis.

Let us assume that the following expression indicates the accumulated information about commodities from past consumption.

$$R'_i = \sum_0^t \theta_i(t)\ C_{it}, \quad \text{or} \quad R'_i = \int_0^t \theta_i(t)\ C_t dt \qquad (4\text{-}6)$$

where *i* denotes the i-th individual and C_{it} is his consumption at time *t*. In equation (4-6) the first expression covers a discrete time interval, while the second one a continuous case. In the same equation θ_i is a weight attached to the past consumption. Consumption habits dating from his childhood will not have uniform importance in his current situation. (Duesenberry takes the past peak consumption level as the most influential to current consumption, cf. his $a(y_t/y_0)$term.) Therefore, the weights attached to the past levels of consumption must be in a descending order

at time goes back.[20]

For the reasons explained above, current consumption will be discounted by the past consumption-factor (4-6). Therefore, ceteris paribus (under the given influence of the neighbors or with a given demonstration) we have the following expression for the utility function for the i-th individual,

$$U_i = U_i \ (C_{it}/R'_i)$$

If we take the Duesenberry position and suppose that the previous level of consumption alone is the relevant discount factor of the current consumption, then we will have the Duesenberry savings function (4-6) after necessary maximization procedures.[21] Let us suppose that the i-th individual got the last peak income Y_0 at time $t=t_0$. According to the Duesenberry assumption, R'_i will be,

$$\theta_i \ (t_0) \ C_{it_0} = \theta'_i \ (t_0) \ Y_0$$

where the weight θ'_i incorporates the marginal (=average) propensity to consume at the peak of the past cycle at time $t=t_0$. Thus the above utility function will be,

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20 A suitable weight for our purpose was suggested by Professor Phillip Cagan in Friedman, Ibid., p. 143. Here we simply assume that we have such a weight. We will consider the Cagan weights in the appendix to this chapter.

21 Ceteris paribus, in the Duesenberry case current consumption is determined only by the current income and the previous peak income. This point invited Friedman's criticism, which will be examined in the appendix to this chapter.

$$U_i = U_i \left[C_{it} / \theta'_i \left(t_0 \right) Y_{i0} \right]$$

From this utility function we will have a saving function based on the relative income hypothesis. Ceteris paribus (with a given demonstration effect, a given amount of real wealth, a given anticipated sequence of future rates of interest, and possibly a given expectation of the relative income or the ratio between the current income and the previous peak income.)

The foregoing analysis is an exposition of Dusenberry's proposition that his consumption functions depend on a single hypothesis.

Now, let us expand Duesenberry's consumption function further. Since the current level of consumption is affected both by the consumption levels of close neighbors and by his own past consumption, (especially at the last peak of the business cycle), we will have the following utility function,

$$U_i = U_i \left(C_{it} / R_i, C_{it} / R'_i \right)$$

with the same ceteris paribus assumptions.

From the above utility function, we will have,

$$S_t = a' y_t + b' \left(y_t / R_t \right) + c' \left(y_t / y_0 \right) + d' \qquad (4\text{-}7)$$

where S_t is the current savings, while a', b', c' and d' are statistical constants. The current savings depnd on current income y_t and the ratio of current income to the last peak income. (We will use a slightly modified form of the savings function in the next chapter.)

Applying the above savings function, in which the first bracket indicates the demonstration effect and the second the ratchet effect, we are justified in drawing continuous shifts of the savings function in a cyclically growing economy. In Figure 4-1, we measure the level of income at time $\underline{t}$, Y_t along the vertical axis and time $\underline{t}$ along the horizontal axis. We assume that the level of income is rising cyclically around the Harrodian warranted rate of growth, EE'. The level of income, y_t, is assumed to reach peak levels at time t_0, t_1, --- and to attain the levels of income, y_{t0}, y_{t1}, --- . If we start from an initial peak income of y_{t0} at t_0, people would wish to maintain this level of consumption even if their income is presently declining (the ratchet effect). At time t=t', the initial peak income is restored over the first cycle. This economy reaches the second peak income, y_{t1} at $t=t_1$. Again, people want to maintain their new levels of consumption thereafter. Therefore, if we in Figure 4-2 measure savings along the vertical axis and time along the horizontal axis, then we have the savings function at $t=t_0$ as S_0S_0; this savings function will shift to S_1S_1 in the peak of the next boom (the ratchet effect). Remembering that the demonstration effect is continuously working, the savings function will be shifting continuously to the right along the horizontal axis even between the time interval $t=t_0$ and $t=t_1$ and so on.

In this chapter we have explored the relation between the ratchet effect and the demonstration effect of the Duesenberry savings function, and found that both effects originate from a single hypothesis (the relative income hypothesis). Without any detailed explanation, Friedman maintains that the ratchet effect is a special case of the demonstration

Figure 4-1

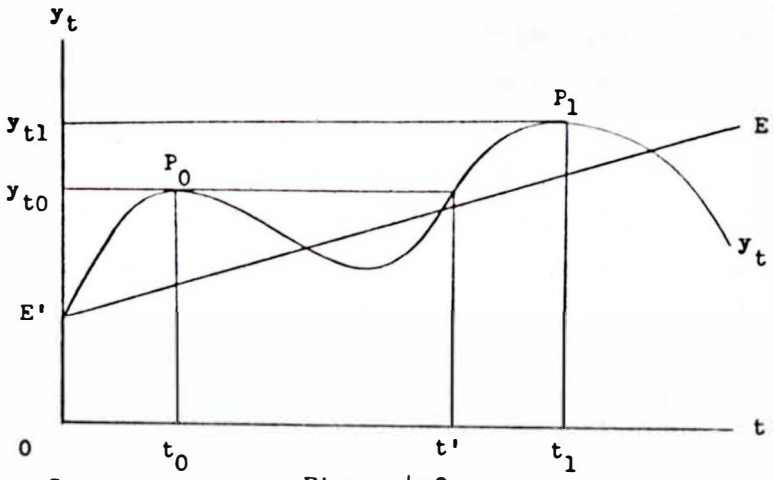
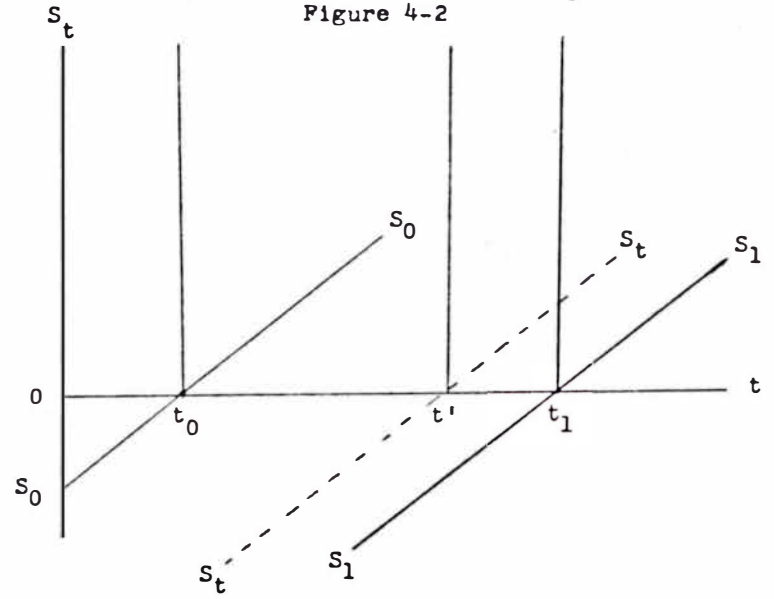


Figure 4-2



effect and that both effects are special cases of his own permanent income hypothesis. The comparison of our interpretation and his will be interesting. We will attempt an exposition in the appendix to this chapter. We have developed a slightly expanded savings function showing continuous movements of the break-even points. Finally, the foregoing analysis indicates that the Duesenberry savings function does not provide any direct link between capacity output and actual output. Therefore, we cannot depend on the Duesenberry effects for the guarantee of the full-employment rate of growth.

APPENDIX TO CHAPTER IV

Professor Friedman's Interpretation of the Relative Income Hypothesis

In Chapter IV, we have tried to show that Duesenberry's two hypotheses, the demonstration effect and the ratchet effect, can ultimately be reduced to a single relative income hypothesis. This is also pointed out by Friedman in the following way: Duesenberry based the same hypothesis (relative income hypothesis)[22] on a theoretical structure that emphasizes the desire to emulate one's neighbor, and on the demonstration by neighbors of qualities of hitherto unknown or unused consumption goods. In addition, Duesenberry suggested that the relative income hypothesis could be used to interpret aggregate data by expressing the ratio of consumption to income, as a function of the ratio of current income to the highest level previously reached.[23] Thus, what we have done here is shown how two hypotheses are consistently related to Friedman's contention.

On the other hand, Friedman himself examined the relation between his permanent income hypothesis and the relative income hypothesis expounded by Duesenberry, Modigliani, et al. The first purpose of this appendix is to compare Friedman's interpretations and our own. Secondly, we intend to examine the possibility of incorporating capacity income or

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22 The bracket is mine.

23 Friedman, Ibid., p. 4, p. 226.

the natural rate of growth into Friedman's consumption function.[24] (The immediate answer to the second problem is negative, since permanent income is not defined under the assumption of full employment. The former is irrelevant to the latter.[25]) Furthermore, Friedman does not examine how any automatic mechanism in market economies may have favorable influences on the resolution of cyclical movements.[26] However, he suggests at least technically, a way to incorporate a growth trend, possibly a natural rate of growth, when he compares his own consumption function with the relative income hypothesis. However, the foregone conclusion is that we have no economic rationale to bring capacity output or income of ex-ante into the consumption function.

Friedman's permanent income hypothesis can be represented completely in the following simple forms:

$$C_p = k\ (i, w, u)\ y_p \qquad (4\text{-}8)$$

$$y = y_p + y_t \qquad (4\text{-}9)$$

$$C = C_p + C_t \ . \qquad (4\text{-}10)$$

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24 This point is less important to Friedman himself, because in general he does not make an income-expenditure analysis in explaining economic phenomena. Therefore, neither the consumption function nor the investment function per se may not be of primary importance to him.

25 Friedman, Ibid., Ch. 3, esp. pp. 24-25.

26 cf. p. 60 of the present chapter. Also cf. Friedman, Ibid., pp. 233-239.

Equation (4-8) defines a relation between permanent income and permanent consumption. It specifies that the ratio between them is independent of permanent income but that it depends on other variables, such as: (1) the rate of interest $\underline{i}$, (2) the ratio of nonhuman wealth to income $\underline{w}$ and (3) the consumer unit's preferences for consumption versus addition to wealth, $\underline{u}$.[27]

Friedman considers the form,

$$C_0/y_t = f\ (y_t/y_0) \qquad (4\text{-}11)$$

as the Duesenberry-Modigliani consumption function.[28] Then, in equation (4-8), transforming k(i, w, u) into

$$K\ (i, w, u) = k$$

and dividing both sides of (4-8) by y_t, we get,

$$C_p/y_t = k\ (y_p/y_t). \qquad (4\text{-}12)$$

Thus, we can interpret (4-11) as an estimate of the right-hand side of (4-12). A plausible way, according to Friedman, is to regard y_0 itself as an estimate of the permanent component, since this would remain unchanged during a slump and subsequent recovery to a new peak. Furthermore, he argues, it seems more reasonable to regard a weighted average of y_0 and y_t as an estimate of y_p say:

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27 Friedman, Ibid., Ch. 3, pp. 20-37 and Ch. 9, pp. 220-239.

28 We obtain the Duesenberry function (4-5) by a Taylor expansion of (4-11). (cf. Friedman, p. 139).

$$y_p = w_1 y_0 + w_1 y_t, \; w_1 + w_2 = 1 \qquad (4\text{-}13)$$

Thus from the permanent income hypothesis, we can derive the relative income hypothesis (the ratchet effect).

However, Friedman thinks that permanent income should be estimated for a longer period, not just for two periods, (the current period and the previous peak). He argues that the length of time interval should be determined from the data available rather than from any a priori considerations. Also, the choice of the peak income as an important component in estimating the permanent income seems arbitrary. Thus, he suggests an alternative way in which a weighted average of longer series of years is constructed, allowing both the weights and the number of years to be determined by the data.

Friedman assumes measured income as a continuous function of time,

$$y(t). \qquad (4\text{-}14)$$

Then he constructs an estimate of the permanent income at time T as

$$\text{Estimate of } y_p(T) = \int_0^T w(t-T)y(t)dt \qquad (4\text{-}15)$$

where

$$\int_0^T w\,(t-T)\,dt = 1. \qquad (4\text{-}16)$$

He applies Cagan's device for the appropriate weight in order to give a relatively high weight to the current income and declining values as one goes backward in time:

$$w(t-T) = \beta e^{\beta(t-T)} \quad ^{29} \qquad (4\text{-}17)$$

He then assumes that the expected value of permanent income is revised over time at a rate that is proportional to the difference between expected and actual income, or

$$dy_p/dT = \beta [y(t) - y_p(t)] . \qquad (4\text{-}18)$$

with a suitable ajustment to make the constant term zero, he solves the above differential equation,

$$y_p(T) = \beta \int_0^T e^{\beta(t-T)} y(t)dt . \qquad (4\text{-}19)$$

Then he argues:

> "One obvious defect of this approach is that it does not allow for predicted growth. Being an average of earlier observations, the estimate y_p is necessarily between the lowest and the highest, so that this method of estimation applied to a steadily growing series yields estimated values systematically below the observed values. To allow for this, we can suppose y_p to be estimated in two parts: first, a trend value which is taken to grow at a constant rate, and second, a weighted average of adjusted deviations of past values from the trend, the adjustment being made to allow for the trend change itself."[30]

This would give:

$$y_p(T) = y_0 e^T + \beta \int_0^T e^{\beta(t-T)} [y(t) - y_0 e^{\alpha t}] e^{\alpha(t-T)} dt \qquad (4\text{-}20)$$

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[29] The same weight may be useful when we derive R'_i in the above argument.

[30] Friedman, Ibid., p. 144.

where $\underline{\alpha}$ is the estimated rate of growth and y_0, the value of income at the time taken as zero. This expression reduces to the much simpler form:

$$y_p(T) = \beta \int_0^T e^{(\beta-\alpha)(t-T)} y(t)dt \qquad (4\text{-}21)$$

Finally, he gets the consumption function of the form,

$$C(t) = k \int_0^T e^{(\beta-\alpha)(t-T)} y(t)dt. \qquad (4\text{-}22)$$

The consumption function (4-17) would probably be a better expression, if we take the position that the Duesenberry peak income represents permanent income. In some places, Duesenberry himself takes such a position as to justify Friedman's argument. Duesenberry writes:

> "At first glance then it would seem reasonable to suppose that current consumption depends on the ratio of current income to some weighted average of past income, with weights decreasing as the time interval involved grows longer."[31]

If we compare our own discussion in the present chapter with Friedman's in the light of the permanent income hypothesis, especially equation (4-8), our analysis concerns $\underline{u}$ in $\underline{k}$ term rather than y_p. From the foregoing analysis and on the permanent income hypothesis, the definition of y_p does not require the assumption of full employment income (cf. equations (4-15) and (4-20)). Therefore, there exists no direct relation between capacity income and the permanent income. Automatic mechanisms, if they operate, must take another channel, through $\underline{k}$. For example, the rate of interest $\underline{i}$ or the Pigou effect through real wealth, or the ratchet effect through the $\underline{u}$ term may work countercyclically by changing the value of $\underline{k}$. However, these effects must be examined in a

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31 Duesenberry, "Income-Consumption."

general equilibrium setting. We cannot make any judgment about the efficiency of those mechanisms by dealing only with consumption functions.

Another way to incorporate capacity growth rather than the capacity income would be to use the natural rate of growth as the trend term in equations like (4-20). However, the problem is one of economic rationale to do so. For Friedman's purpose of deriving the permanent income, this procedure was not suitable, since accepting the permanent income hypothesis would not make people necessarily and fully employed throughout their lives.

In the next chapter we will examine the economic implications of the Duesenberry effects, both the demonstration effect and the ratchet effect, in a cyclical growth model.

CHAPTER V

A GROWTH AND CYCLE MODEL

Non-Linear Investment Function Cum Ratchet Effect

Recently the interest in cyclical growth theories has subsided considerably among economists. As a matter of fact, we have not seen too many cyclical growth theories since Professor Hugh Rose's[1] excellent contribution along the neo-Keynesian line of thought. The reason may be that the free market economies have been working relatively well during the past 20 years. Japan, West Germany, Italy and France provide us with good examples.[2] Some economists seem inclined to forget business fluctuations in an age of a rapidly growing economy. The recent unpopularity of business cycle theories may relect the fact that some market economies have achieved remarkable growth. However, empirical evidence indicates that all advanced market economies have thus far exhibited cyclical movements (for empirical evidence for the post-war period, see footnote 2 of this chapter). As a consequence, it is still important to investigate the problem of cyclical growth.

The purpose of this chapter is to present our own cyclical growth model. It will be immediately obvious that our arguments are an exten-

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1 H. Rose, "On the Non-Linear Theory of Employment Cycle," Review of Economic Studies, 1967.

2 cf. Figure provided by E. Lundberg in Instability and Economic Growth, 1968, pp. 103-109.

sion of Harrod, Kaldor, Goodwin,[3] Matthews[4] and Morishima.[5] Our purpose here is rather modest; we do not intend to present a complete theory of cyclical growth, but rather to make a small contribution to the traditional post-Keynesian cyclical growth theory. However, the difference between ours and those of predecessors should be amply clear.

The crucial difference between our model and especially those of the Duesenberry, Goodwin and Matthews type is, as we shall see shortly, that while Duesenberry, Goodwin and Matthews regard the ratchet effect as the link between the warranted (actual) rate of growth and the potential rate of growth à la Harrod, we do not take this position. Rather we oppose the Duesenberry, Goodwin and Matthews position in this chapter. Like other post-Keynesian economists, we also consider that the dynamic process of an economy is determined by the interaction of savings and investment. Especially, Matthews emphasized the ratchet effect as a powerful instrument of explaining the growth-trend of boom income. However, we do not use the ratchet effect to explain the growth of peak income (or growth of capacity output). In our cyclical growth model to be presented later, we shall give emphasis to this short-run dynamics or a short-run shift of the savings function. (Therefore, the relationship

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3 R. M. Goodwin, "A Model of Cyclical Growth," in The Business Cycle in the Post-War World, E. Lundberg, ed. 1955, p. 211.

4 R.C.O. Matthews, "The Saving Function and the Problem of Trade Cycle," Review of Economic Studies, 1955. R.C.O. Matthews, The Trade Cycle, 1956. R.C.O. Matthews, "Capital Stock Adjustment Theories of the Trade Cycle and the Problem of Policy," in Post-Keynesian Economics, K. K. Kurihara, ed. 1954.

5 M. Morishima, Shihonshugi no Hendō Riron, (A Business Cycle Theory of the Capitalistic Economy), Sobunsha Japan, 1955, Ch. 4, pp. 101-112.

between the long-run marginal-average propensity to save and the short-run one discussed in the consumption debate does not concern us here. We will discuss this point later.) The shifts of the savings function reflect the upward shifts of the bottom level of income over time, since autonomous consumption increases over time. According to the Hansen and Samuelson type of the multiplier-acceleration principle, the higher bottom may constitute a trigger for an upward swing of the economy. In other words, the shift of the autonomous consumption (the terminology "autonomous" may not be appropriate in this context, since its economic rationale was fully examined in the previous chapter) may be usefully applied in our cyclical growth model as an intrinsic force to generate the floor level of income, instead of Professor Hicks' autonomous investment.

Being published in 1955, Morishima's analysis does not investigate fully the shifts of the savings function. Thus his analysis lacks sufficient expositions of the shifts of the savings function. However, he has an ingenious point. That is, he incorporated the Kaldorian non-linear investment function into the Duesenberry system. As has already been made clear, Duesenberry's consumption function arguments are incomplete as a cyclical growth theory, since we presuppose the cyclical movemats in discussing the ratchet effect. The cyclical movements must be explained by some mechanism. Morishima tactfully combined Duesenberry's savings function with the Kaldorian investment function as an extension of Duesenberry, Goodwin and Matthews. Clearly we owe this point to Morishima. In conclusion, we will present in this chapter our own cyclical growth model, one that is slightly more convincing than Duesenberry,

Goodwin, Matthews and Morishima in that we pursue cyclical growth via the endogenous forces of the economy.

As we have already noted, the Harrodian dynamic system has two rather dichotomized growth paths. These are the warranted and natural rates of growth. Since these two rates of growth have quite different and mutually independent determinants,[6] there is no reason to suppose that those rates would coincide except by accident or by design. Furthermore, even though we may realize the coincidence, this golden age path may be highly unstable.

Thus, as has been pointed out by Hahn and Matthews in their celebrated review article, almost all contemporary dynamic theories and policies postulate an equilibrating mechanism between these two rates of growth in order to realize the golden age path. Duesenberry sees some strong forces operating with the savings function which connects the two rates of growth. This point was first incorporated explicitly into a cyclical growth model by Goodwin. This argument was further elaborated by Matthews. Furthermore, Professor J. Cornwall recently expanded the Duesenberry, Goodwin and Matthews line of thought into a new growth policy model.[7] The central idea of all these people is that the savings function is endowed with the forces which would match the

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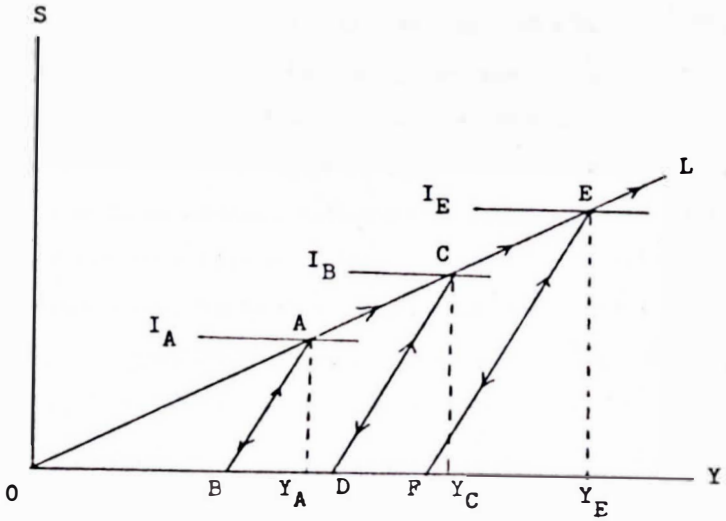
6 F. H. Hahn and R.C.O. Matthews, Ibid.

7 J. Cornwall, "The Role of Demand and Investment in Long-Term Growth," Q.J.E., vol. 134, Feb. 1970. S. Minabe, "Some Comments on the Role of Demand and Investment," Q.J.E., vol. 135, May 1971.

warranted rate of growth G_w with the natural rate of growth G_n. Thus, at the peak of each cycle, the warranted rate of growth coincides with the natural rate of growth via Duesenberry's ratchet effect. However, this point may not be supported either theoretically or empirically. We do not see such a force in the savings function itself.

Our arguments here can be proven by a relatively simple model. Goodwin and Matthews use Figure 5-1 in order to explain their cyclical growth model. It is essential to the understanding of Figure 5-1 that we assume a constant capital-output ratio at a constant rate of interest. According to Duesenberry's consumption function, Goodwin and Matthews argue that the proportion of income saved will be lower the lower is the relation of current income to the past highest income. When income rises again, the rate of savings will be restored to its normal level. In Figure 5-1, savings is measured along the vertical axis, income along the horizontal axis. The line OL shows the proportion of income which would be saved if the current level of income were the highest ever attained, so that consumers have not experienced any higher standard in the past. This proportion is supposed to be constant. Let A be the point reached at the top of boom. During the ensuing contraction, the ratio of income to past highest income will diminish, and savings will fall at a faster proportion than income, along the path AB. When the recovery comes, savings and income rise along the same path again until point A is reached. The former levels of both consumption and savings now being restored, further increases in income will be allocated between the two in the normal way indicated by OL. Income and savings will move from A to C. At C another recession sets in, and savings and income fol-

Figure 5-1 [8]



[8] Matthews, Ibid., p. 77. Goodwin, Ibid., p. 213. It is interesting to notice the similarity between Figure 5-1 and the Pilvin-La Tourette diagram, Figure 3-1.

low the path CD, and so on.[9]

Thus according to Duesenberry, Goodwin, Matthews and Cornwall, an economy will bring out the cyclical movements indicated by the arrows illustrated in Figure 5-1, namely, AB - BA - AC - CD - DC - CE. The points, A, C, E, --- indicate the peak of the booms, Y_A Y_C Y_E being the peak income levels, provided that each level of savings is met by the investment I_A, I_C, --- . The slope of OL, in which the propensity to save is assumed to be constant, reflects the long-run stable relationship between savings and income indicated by Kuznets. On the other hand, AB, CD, EF show the movements along the savings function in the short-run, the basic consumption level moving to the right. Thus, the savings function itself is endowed with the forces to reach the natural rate of growth level of income only in the boom period as will be explained a little later. The peak incomes are coinciding with the natural rate of growth. Accordingly, the savings function may connect the natural rate of growth and the warranted rate of growth.

This argument is based on Matthews' assumption that the force of the boom is normally such as to carry the economy up to the full employment ceiling, and in the second place, the ceiling itself rises at the pace determined by the growth of productivity and the labor force. The extent to which the income reached at the peak of one boom surpasses that reached at the peak of the previous one depends, therefore, on the natural or maximum rate of growth that is physically possible. A direct link is

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9 Matthews, Ibid., pp. 77-78. Matthews extended the Duesenberry-Goodwin model in order to incorporate the changes in income distribution. However, essential characteristics of the former two were not changed by Matthews.

thus established between the demand and supply sides of the problem. Namely, Duesenberry's ratchet effects connect the demand side and supply side of the model. This consideration leads Matthews to accept the following savings function

$$\frac{S}{Y} = a_1 - a_2\frac{NP}{Y} - a_3\frac{K}{Y} - a_4\frac{\pi_0}{Y}, \qquad a_1 \geq 0 \text{ and constant,} \tag{5-1}$$

where Y denotes the current income, N is the number of workers, P is the capacity of labor, K is the capital stock and π_0 is the past highest profit. Furthermore, Cornwall has recently suggested the following form of consumption function,

$$C = mY_t + nX_t \tag{5-2}$$ [10]

where X_t is the current capacity output, with m and n being fixed parameters. Thus the ratchet effect constitutes the connection between capacity output and the actual output (which is the warranted level of ex-post output). This consideration has been extended to the long-run growth policy by Cornwall.

However, we cannot depend on the ratchet effect too much in order to realize the golden age equilibrium at the peak of each cycle. This can be seen in several ways. If we take England as an example, Lundberg's observation[11] shows that the peak level of income in the boom periods had regularly hit the capacity output during the period between 1950 and 1964.

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10 Cornwall, Ibid., p. 54.

11 Lundberg, Ibid., p. 108.

Also the same study indicates that in Japan's case,[12] the actual rate of growth and the capacity rate of growth almost coincided during the same time period. These examples may justify Matthews-Cornwall's assumption. However, empirical observations of the United States present an example counter to the aforementioned assumption. Namely, during 1950 and 1964, the peak incomes of the U. S. economy never hit the capacity output level. Furthermore, the discrepancy between the capacity rate of growth and the actual rate of growth is secularly expanding during the same time period.[13] In this case, the peak income and the capacity output are different and they do not have any direct connection. The U. S. situation can be illustrated in Figure 5-2. In this figure, we measure the actual savings S_a and the capacity savings S_p which respectively correspond to the actual peak income, Y_a and the capacity peak income Y_p. A_a, C_a, E_a --- indicate the actual peak levels of income which are lower than the capacity peak levels of income, A_p, C_p, E_p ---. The actual peak incomes never hit the capacity output and the actual economy makes the cyclical movements along the path A_aBA_a-C_aDC_a-E_a-, but not A_pBA_p-C_p-E_pF. The differences between the capacity output and the actual output expand,

$$(Y_p^0 - Y_a^0) < (Y_p^1 - Y_a^1) \text{ ---}.$$

Therefore the ratchet effect, in itself, is irrelevant to the capacity levels of income.

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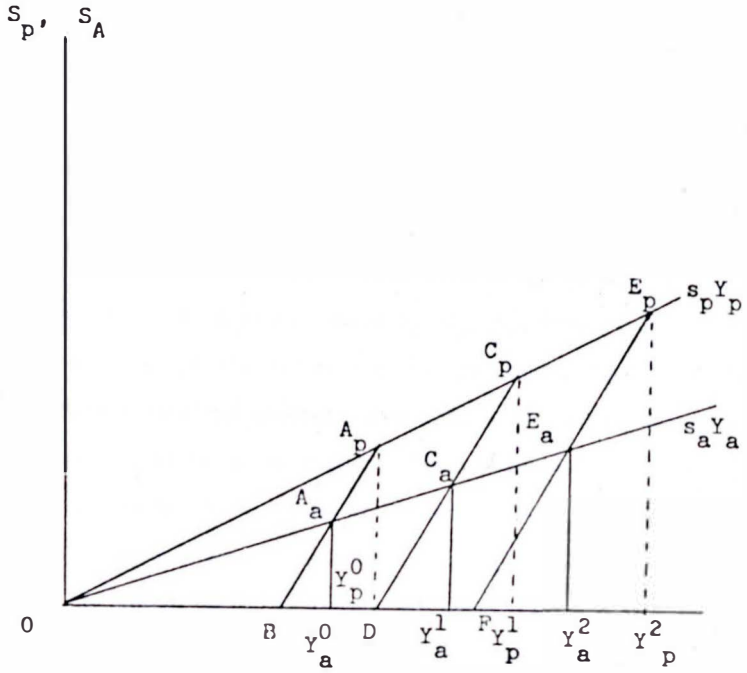
12 Lundberg, Ibid., p. 106.

13 Lundberg, Ibid., p. 109. Furthermore, in 1962 the Council of Economic Advisors (under the Kennedy Administration) noted the same phenomenon and they strongly warned that the "GNP gap" of the U. S. economy would continuously widen over a business cycle, if we left the U.S. economy to laissez-faire. (cf. M.E. Levy, Fiscal Policy Cycle and Growth, pp. 7-37, 1963.)

Figure 5-2



The direct connection between the ratchet effect and the capacity output must be rejected also on theoretical grounds. As has been observed in the previous chapter, people discount the current level of consumption by the previous peak-level of consumption. This fact is indicated as the term,

$$\frac{Y_t}{\theta'_i(t_0)Y_0} \qquad (5\text{-}3)$$

in our savings function. Namely, the ratchet effect is derived as a special form of the demonstration effect. Therefore, what is relevant to the ratchet effect is the actual peak incomes Y_0s or A_a, C_a, E_a, --- in Figure 5-2, but not capacity output A_p, C_p, E_p, ---.

Furthermore, according to our argument in the previous chapter, the ratchet effect and the demonstration effect work simultaneously. If this is true, then starting from the first peak income A_a, the second peak income may be attained at E_a instead of C_a. Namely, the short-run savings function shifts from A_aB to E_aF. In this case, the gap between the actual level of income and potential level of income will expand more.

From these observations, there exists no direct connection between the capacity income and the warranted (or actual) level of income via the ratchet effect. In terms of our Figure 5-2, the upper parts of the short-run savings function A_aA_p, C_aC_p, E_aE_p, etc. are simply non-existent. Therefore, it seems empirically implausible to argue that the Duesenberry effect provides us with an automatic mechanism to achieve a golden age dynamic equilibrium.

So far, we have investigated the implications of the shifts of the savings function for the growth trend of an economy. It is essential to the discussions of the previous chapter and the present chapter that an economy somehow reveals its cyclical movements. In other words, the ratchet effect presupposes cyclical movements. In order to have a complete cyclical growth theory, we must still explain the forces which generate the cycles.[14] So far we have done so with two types of cyclical movements. One is the Scandinavian monetary cycle in Chapter II, and the other is the Kaldorian cycle in Chapter III. The common feature of these two models is the fact that they lack a growth trend. Namely, an economy follows cyclical movements within a certain scale of income. In Kaldor's case, the cyclical movement without a growth trend arises due to the fact that the non-linear investment function shifts up and down vertically according to the effects of capital accumulation. This assumption set by Kaldor and Kalecki must be re-examined.

In the previous chapter, we have examined the dynamic implications of the savings function and obtained,

$$S_i = S'_i \left(\frac{Y_t}{R_i}, \frac{Y_t}{R'_i} \right) \qquad \text{(cf. p. 77)}$$

as the savings function. Here, let us modify the above expression as,

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14 This has been attempted by Duesenberry himself. Duesenberry, Business Cycles and Economic Growth, N. Y. 1958. However, unfortunately this analysis has a fatal contradiction and as a result, it is not acceptable as a cyclical growth theory. cf. S. Minabe, "Some Comments," Ch. II.

$$S = (Y_t, t) \qquad (5\text{-}4)$$

$$= aY_t - b(t) - c(t)$$

$$b(t) = \frac{1}{R} \quad \text{and} \quad c(t) = \frac{1}{R'} .$$ [15]

From the expression (5-4), we can have a kind of indifference map in the (Y_t, t) plane. In equation (5-4) aY_t indicates the part of consumption that is related to the current income, $-b(t)$ indicates the demonstration effect, and $-c(t)$ is the ratchet effect. The last two terms represent the shift-elements of the savings function.

The Kaldorian investment function is expressed in Chapter IV, as

$$I = I(Y_t, K), \quad \frac{\partial I}{\partial Y} > 0, \quad \frac{\partial I}{\partial K} < 0 .$$ [16] $$(3\text{-}2)$$

This investment function is non-linear, as has been explained in Chapter III. Also, the same function shifts vertically due to the capital effects. This is the reason why we have cyclical movements without a growth trend in Chapter III.

Since we have drawn the S-shaped curves as the investment function in Figre 3-3, this function becomes perfectly elastic beyond certain ranges of the levels of income in the (Y, I) plane, beyond which new investment is not profitable. However, this domain of income will move to the right,

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15 Here we assume, $R_1=R$, $R'_1=R'$. Namely, for simplicity, we neglect redistribution effects.

16 Here Y_t is gross income rather than net income. Accordingly, also in the savings function (5-3), we take Y_t as gross income. However, this change of interpretation is immaterial.

as economic growth proceeds. Here one must distinguish between the intra cyclical shifts of the investment function due to capital accumulation and decumulation and the inter cyclical shifts due to the growth which change the profitability of investment over the long run. We assume that the inter cyclical shifts occur when the economy is above the previous peak income, moving to the new peak.

Taking into account the above factor about the investment function, we have the following system as our post-Keynesian cyclical growth model.

$$I_t = I_t(Y_t, K_t) + \gamma(t) \tag{5-5}$$

where the first bracket is essentially Kaldor's non-linear investment function (3-2) and the last term represents the shift elements of inter cyclical movements, or the changes in the profitability over cyclical growth.

$$S_t = aY_t - b(t) - c(t) \tag{5-6}$$

$$\frac{dY}{dt} = E(I_t - S_t), \quad \frac{dY_t}{dt} \gtrless 0, \quad \text{if } I_t - S_t \gtrless 0, \tag{5-7}$$

$$\frac{dY_t}{dt} = 0, \text{ if } I_t = S_t .$$

$$R = R(Y_t, K_t) \tag{5-8}$$

$$R(Y_t, K_t) = I(Y_t, K_t) = S. \tag{5-9}$$

The equation (5-6) is the savings function which incorporates both the demonstration effect and the ratchet effect. (5-7) is the dynamic process of the model. (5-8) is replacement investment and finally (5-9) denotes

the stationary state of the economy. The essential characteristics of the model (5-5) - (5-9) are the same as the Kaldorian model in Chapter III except for our assumptions about the shifts of the investment function and the savings function, associated with long-run economic growth.

The dynamics of our model is illustrated in Figures 5-3 --- 5-5. In Figure 5-3, S_0, S_1, S_2, --- are the savings function while I_0, I_1, I_2, --- are the investment functions. If we start from the initial point i (Y_i, i) in Figure 5-3, investment exceeds savings at this point. Moreover, this level of investment also exceeds the replacement investment. As a result, the economy is in a cyclical expansion phase. The economy proceeds from i to a in which a short-run Keynesian equilibrium is realized ($I_0 = S_0$). However, this equilibrium is a temporary one since, due to the negative capital effects, the investment function shifts downward. The economy will move along the new savings function (which is not drawn) up to point b, where the investment function I_1 touches the savings function. If we take an instantaneous time interval, then the equilibrium point shifts from b to c. The point c is the first bottom income. At point c, the level of investment is smaller than the replacement investment. Therefore, due to the effects of capital decumulation, the investment function shifts upward. Then investment exceeds savings and the economy expands until point B, the second peak. It is to be noted that only when income exceeds A during the second expansion will we have the inter-cyclical savings and investment function shifts. Thus the economy moves along i-A-b-c-d-B---, B_0 and the peak incomes (Y_A, Y_B, ---) and the bottom incomes (Y_{L0}, Y_{L1}, ---) are growing.

Figure 5-3

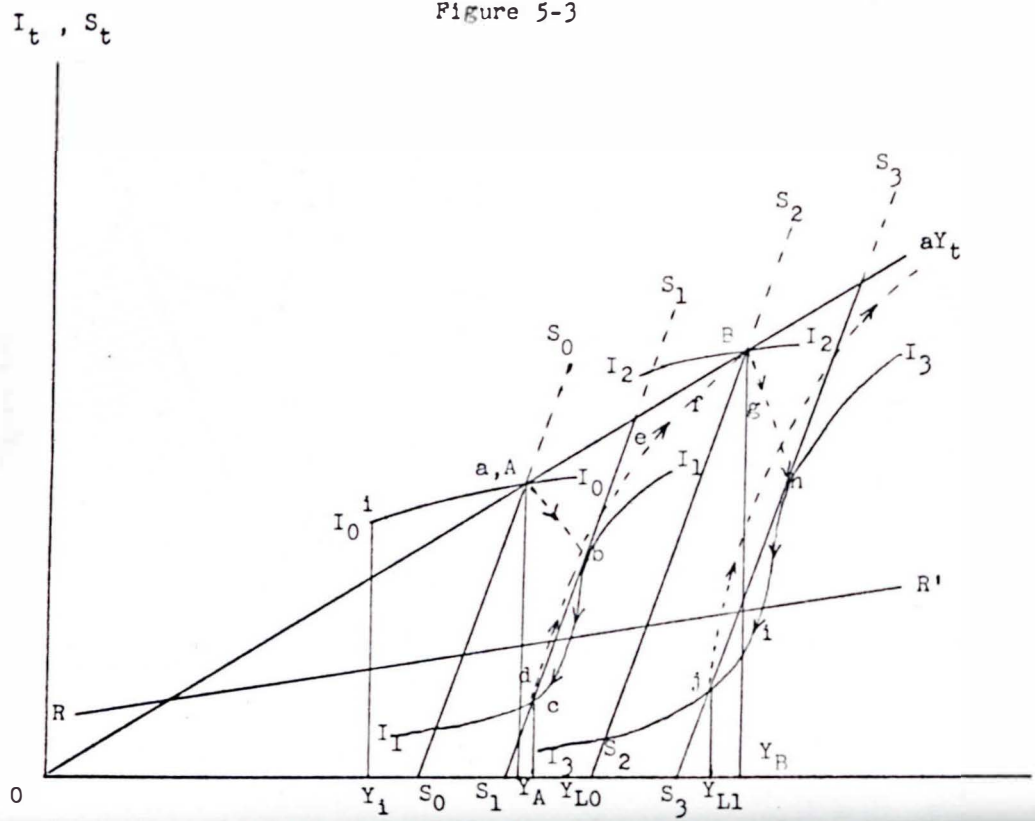

I_t , S_t
S_3
S_2
aY_t
S_1
S_0
B
I_2
I_2
I_3
f
g
e
I_1
a, A
I_0
h
i
I_0
b
R'
R
d
c
i
j
I_1
I_3
S_2
Y_R
0
Y_i
S_0
S_1
Y_A
Y_{LO}
S_3
Y_{L1}

Figure 5-4

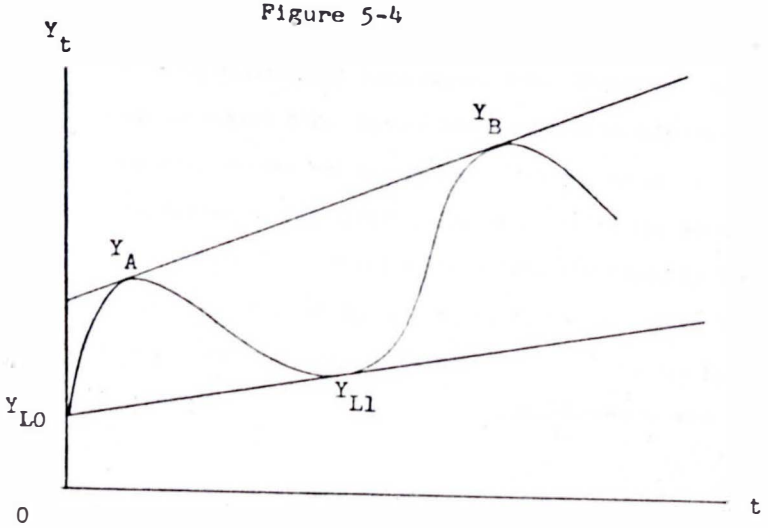
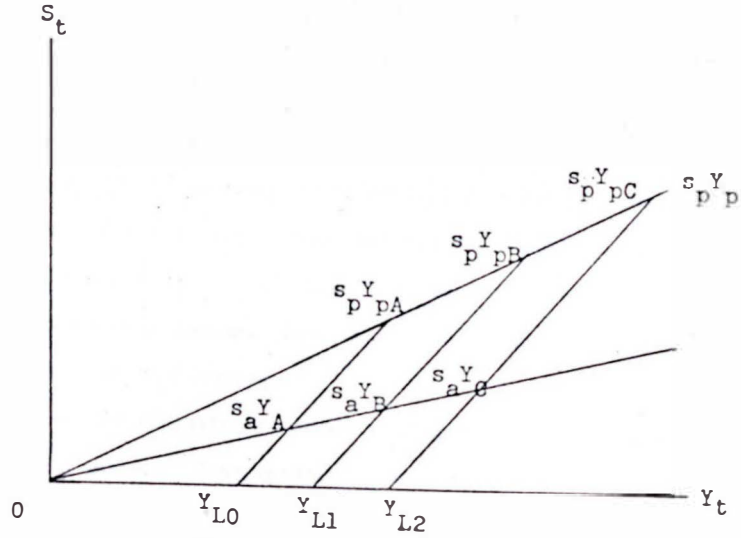


Figure 5-5



The last relationship, namely, the rise of peak and bottom levels of income over time is transcribed into Figure 5-4. Figure 5-5 is essentially the same as Figure 5-2. Again, there exists no guarantee of coincidence of capacity income and actual peak income. As mentioned earlier, exogenous forces may be operative so as to shift the investment function inter-cyclically. In order to attain the capacity income level, the level of investment at the peaks, A, B, --- in Figure 5-3, must be such that the actual capacity incomes at the peak, Y_A, Y_B, Y_C are respectively equal to Y_{pA}, Y_{pB}, Y_{pC}, ---. This, however, may not necessarily be true.

Duesenberry, Goodwin, Matthews, Morishima and Cornwall noticed that the ratchet effect was the important link between capacity output or the natural rate of growth and the warranted (and actual) rate of growth à la Harrod. This implies that, at least, the peak incomes of the boom periods must regularly hit capacity income. In other words, the economy is endowed with the automatic forces necessary to climb up to capacity output. This idea may not be valid. In this chapter, we have examined the implications of the Duesenberry effects, i.e. both the demonstration effect and the ratchet effect. These effects are directly relevant to the growth of the bottom income. However, they are rather irrelevant to the growth of the peak income. Investment plays a crucial role in realizing a golden age equilibrium.

Then, with the apparatus prepared in Chapter III - IV, we have described cyclical growth. This cyclical growth model is constructed

straightforwardly along the traditional post-Keynesian analysis. However, in certain aspects, it is more Keynesian than the existent post-Keynesian theories in denying the peak income as equaling capacity income. We attribute important upward forces to the investment function rather than to the consumption function via the ratchet effect.

CHAPTER VI

GROWTH AND CYCLE MODEL À LA STOCKHOLM SCHOOL*

The purpose of this chapter is to examine cyclical growth models expounded by the Stockholm School, which is believed to be represented by B. Ohlin (cf. our Preface). Ohlin's contribution was compared with Keynes' General Theory by K. G. Landgren (also cf. our Preface). However, his discussion of the Stockholm School is partially incorrect in some significant aspects. As will be seen presently, Ohlin attacked Keynes in a well-known Economic Journal article on several points. These criticisms of Ohlin's against Keynes can only be correctly appreciated in the light of post-Keynesian dynamics, especially the dynamics of the savings function (cf. Chapter IV and V).[1]

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*The present form of this chapter is a revised version of the original one following the advice made by Professor M. Leiman of the Department of Economics, State University of New York at Binghamton.

[1] An excellent survey on the Swedish economics from K. Wicksell to the Stockholm School was written by B. Seligman in his Main Currents in Modern Economics, Free Press of Glencoe, 1962, esp. Ch. 7, pp. 539-605. His analysis is useful in order to gain a deeper perspective on the economic thought of that period in Sweden. He also approaches the contributions of G. Cassel and E. Lundberg in the light of post-Keynesian cyclical growth theory. (cf. Ibid., pp. 584-585, 601). On the other hand, Seligman's investigation of Ohlin who seems to be the most important economist in the early 1930's does not go far beyond Ohlin's own article 'Some Notes" (cf. Ibid., pp. 587-591). Also see E. Lundberg, Studies in the Theory of Economic Expansion, Kelley and Millman, esp. Ch. 1 - 2, pp. 1-50.

As has already been pointed out in the preface of this study, K. G. Landgren maintained that Ohlin alone initiated the "Keynesian Revolution" in Sweden. However, paradoxically, it is common knowledge that Ohlin[2] criticized Keynes in the famous Economic Journal article. Indeed, Ohlin's attitude toward the General Theory was quite strong and he even rejected Keynes' multiplier notion as a tautology. Then, how can people reconcile the fact that Ohlin initiated the "Keynesian Revolution" during the period 1927[3]-1934[4] and the fact that he criticized Keynes severely

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2 B. Ohlin, "Some Notes," cf. footnote 1 in the Preface of this study. In that article, Ohlin criticized Keynes in that he maintained that the multiplier theory expounded by Keynes (and Professor R. F. Kahn) was not originated by Keynes. He argued that this idea could be traced back to the basic equation of Professor Lindahl, E (1-s)=PQ (where E is total income, PQ is consumption demand and s is the marginal and average propensity to save), which appeared in Lindahl's Penningpolitikens Medel (Malmö, 1930, Sweden, ss. 11-18). It is easy to see that the above expression leads us to the Keynesian multiplier, if we transform PQ=E-I, where I is new investment. Thus Ohlin has E(1-k)=I, where k is the propensity to consume. Then he attacks: "Thus, either Keynes' reasoning is ex-post, and then it explains nothing, or it is ex-ante, and then it is entirely wrong." ("Some Notes," pp. 236-237) The Ohlin criticism against Keynes is interpreted by most economists in the light that either Ohlin attacked Keynes on an unimportant point or that Ohlin was wrong. However, if we read the General Theory and take the expression E(1-k)=I as the definition of the multiplier (cf. General Theory, pp. 113-119), then Ohlin is perfectly correct on this point. We had to wait until Hicks, J. Robinson and other post-Keynesians wrote on the dynamic multiplier process in order to understand it. However, this argument is less important from a dynamic cyclical-growth point of view.

3 Ohlin's Seat Produktionen i Gang (Set the Production Going) was published in 1927, in Danish, in which Ohlin described the dynamic multiplier process.

4 Ohlin's most important contribution, Penningpolitik---, which is his report submitted to the Swedish Unemployment Committee was published this year.

in the Economic Journal? One of the resolutions suggested by Landgren was that Ohlin did not know what he actually had done in the past, when he wrote the Economic Journal article.[5] This view has been accepted among some scholars in the history of economic thought.[6] However, things are not that simple. Upon closer examination of Ohlin, we will see that he describes the investment function as non-linear. According to Ohlin, the demand for capital goods like a machine (en maskin) is determined by the comparison between the subjective value of the revenue or the capitalized yield of the capital goods (total outlay minus the operational cost) and the replacement cost of those goods, (cf. Penningpolitik s. 11 and "Some Notes," p. 61). However, Ohlin argues that the entrepreneurs do not necessarily carry out all the investments that are profitable to them (cf. Penningpolitik, s. 11). The investment demand also depends on the present and future availability of credit and liquidity.

In "Some Notes" Ohlin himself summerizes the investment demand as follows:

> "The investment plans are of course based on expected revenue from the investment in question and on the expected costs entailed, including the expected rate of interest. In brief, the plans are based on the profit expectations. But it would be wrong to assume that entrepreneurs plan to carry out all the investments which they expect to pay. (Keynes' statement that the investment demand for capital goods depends on the relation of marginal efficiency of capital to the rate of interest rate amounts particularly to this.) Of all the possible investments which seem profitable, only some are planned

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5 K. G. Landgren, Ibid., Kap. 11, "Reaktionen i Serige mot Keynes' General Theory," (The Reaction in Sweden against Keynes' General Theory) ss. 247-269.

6 cf. D. Winch's article in the footnote 7 of the Preface.

> for the next period and actually begun. This may be due to the fact that the present cash and credit resources of the firms are not large enough to permit more, or that the expected cash and credit resources put a check to the investment. Sometimes, however, strong business firms which could easily borrow huge sums for profitable-looking investment prefer not to do so. They are averse to an increase of their indebtedness. It is an open question whether this can be regarded as evidence that they reckon on unfavorable developments, which would make the investment unprofitable, as probable enough to make it not worthwhile, or whether the explanation must run in other terms. (I am looking forward to a paper by Dr. Kalecki on this subject.)[7] In any case, it is clear that the cash and credit resources, which the firm has at its disposal at the beginning of the period and acquires during the period, provide an upper limit for its ability to buy and that the expectations concerning them set a limit to its investment plans; while the profit expectations and the expectations with regard to future cash and credit resources influence the desire to buy." ("Some Notes," pp. 61-62)

Judging from the above quotation, Ohlin's investment function may not be a simple linear relation, but it has an upper bound set by the credit and monetary position of the firm. More importantly, as has been already seen in Chapter III, the Hicksian linear system is very close to the post-Keynesian non-linear system in terms of the Pilvin-La Tourette diagram. In a setting more dynamic than the aforementioned investment demand, Ohlin has very interesting observations to make on investment behavior.

> "Investment activities depend on general judgement about the future. Let us start with a certain assumption about the growth rate of total production and the level and the rate of growth of income. If the judgement about the future happens to be incorrect, then to that extent there exists 'false investment' in the sense that the productive capacity is un-

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[7] M. Kalecki, Theory of Economic Dynamics, Rinehart & Co. Inc., 1954, Part 4, pp. 91-109.

> necessarily too large. The relation between investment and productive capacity at a different time (although they may be consistent with some uniform development of total production) is not static, but depends on the process of the foregoing developments, especially its velocity which in turn cannot be constant in the long-run. The above-mentioned relation in the different stages of production can be reduced to this: consumption goods proper, capital goods in the consumption-goods sector and capital goods in the capital-goods sector, implies that a constant rate of growth of one sector may bring about a non-uniform development in the rest of the sectors. In other words, (1) the investment volume has a certain relation with actual and expected values of the rate of growth of consumption-goods output; (2) consumption-goods output is related to the total income through the propensity to consume and the total income which stems from total production."

What Ohlin tries to convey by the above complicated expression seems to be that the investment demand depends on the rate of growth of consumer demand which in turn depends on the rate of growth of total income. The important point is that Ohlin does not take the productive capacity of new investment as a constant. Also, as will be shown shortly, Ohlin does not consider the marginal propensity to save to remain constant. The latter must be determined by the intrinsic forces of the economy over the cycle. (This position is common to the Swedish economists in the early 1930's. We will return to this point presently.)

> "As long as the firms do not have unfavorable anticipations about the future, the new investment will proceed. However, according to Ohlin, a strong tendency to a downturn will appear in the capital-goods sector, because excessive capital equipment have been built relatively to the consumption-goods sector. Furthermore, there exists a limit to the supply of factors of production and the development of new technology. These latter facts provide us with a ceiling of economic growth." (cf. Penningpolitik, ss. 52-53.)

This is the reason why we describe the Ohlinian investment function as a non-linear relation.

He clearly indicated the shifts of the savings function in the short-run, which will be amplified shortly. Some findings of the post-Keynesian economists such as Professor Duesenberry and Professor Friedman (Although Professor Friedman would be somewhat upset at finding himself thus classified) dealing with the consumption function argument must be attributed to Ohlin who first expounded them. Ohlin also has the concept of the warranted rate of growth and its instability which was expounded by Harrod. For these reasons, we can conclude that Ohlin accomplished some part of post-Keynesian dynamics or cyclical growth theory even before Keynes and the post-Keynesians, although this fact does not diminish the merit of Keynes or of the post-Keynesians.

In his report to the Swedish Unemployment Committee, as we have already pointed out, Ohlin clearly has the notion of the interaction of the multiplier and the acceleration principle,[8] the non-linearity of the investment function, and short-run shifts of savings function, which are all ideas embodied in the post-Keynesian theory of balanced growth. From these, one may be tempted to conclude that Ohlin accomplished not only the Keynesian Revolution in Sweden but also anticipated post-Keynesian cyclical growth theory even before Keynes and the post-Keynesians. However, this is not true. As Ohlin himself admits in the Economic Journal, his theory may not be good enough to be accepted as a complete theory of cyclical growth. It is also rather difficult for us to organize a cyclical

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8 B. Ohlin, Penningpolitik ---, 1934, Kap. 2, "Expansions-och Kontraktronsprocesser," ss. 24-49. (The expansion and contraction processes.) B. Ohlin, "Till frågan om penningteoriens Uppläggning," (Some Notes for the Enlightment of the Monetary Theory) Ekonomisk Tidskrift, 1933, ss. 45-81, esp. ss. 63-73.

growth model based on Ohlin's arguments. Even though it may be possible for us to construct a cyclical growth model by assembling various instruments gleaned from his Swedish writings and call it Ohlin's cyclical growth model, this favor will do Ohlin more harm than good. Therefore, rather unfortunately, we must confine ourselves to some, but not all, of the important contributions by Ohlin without attempting to set up a model.[9]

The ultimate purpose of Ohlin in Penningpolitik, Offentliga Arbeten, Subventioner, och Tullar som Medel mot Arbetlöshet (The Monetary Policy, Public Works, Subsidies, and Tariff as the Instruments against Unemployment, S. O. U.) 1934, is to investigate the policy measures against un-

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9 In the E.J. article, Ohlin named the following people who were appointed by the Swedish Unemployment Committee as constituting the Stockholm School: G. Bagge, D. Hammarskjöld, A. Johannson, G. Myrdal, E. Lindahl, E. Lundberg and B. Ohlin himself. In his textbook, K. G. Landgren has proven that Ohlin must be distinguished from the rest of the people and that the so-called Stockholm School consists only of Ohlin. This contention has been accepted by the Swedish economists who took part in the symposium in the Ekonomisk Tidskrift, 1960. (cf. the Preface of this study.)

The importance of Keynes and the post-Keynesians must be slightly modified, if Ohlin's Swedish original becomes available in English. According to Professor Ohlin himself, his most important contribution was to be translated into English by Professor Brinly Thomas in 1935 which was, somehow, not realized (a letter from Ohlin dated the 18th of October, 1970). The complete summary of Ohlin's argument is beyond our scope. As a consequence, "A more comprehensive comparison between the two bodies of doctrines (Keynesian and the Stockholm School) will have to wait until the Stockholm theory has been made available in English." (Ohlin, "Some Notes," p. 53.)

employment. Ohlin clearly approaches this problem from the point of view of the interaction of savings and investment.[10] More importantly, Ohlin clearly denies the validity of Say's Law by rejecting the rate of interest as the factor which equates savings and investment.

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B. Ohlin, Ibid., "Inledning" (Introduction, ss. 3-4). It is also interesting to note that Ohlin starts his argument with the following contention: "The purpose of monetary theory is to explain the various factors which determine the value of money. However, the Walras-Casselian static price system left the problem unsolved, therefore it requires some special monetary theory as the supplement." (s.5) Furthermore, he argues that the changes in the individual relative price are not important, but the changes in the general price level are essential. (s.5) In other words, Ohlin pointed out that in the Walras-Casselian system the absolute price level is indeterminate, while the relative prices are determinate. According to Ohlin, the value of money is determined by the aggregate demand and supply. 'Olikheten i investeringsbeslutens och sparbeslutens tidsföljd leder til olika prisrorelser." (Ohlin, Ibid., s. 37) (The discrepancy between the time process of the investment decision and that of the saving decision leads to the different price movements. Also cf. Ibid., ss. 45-48.)

The last point is noted by Professor Lange, (O. Lange, "Say's Law; A Restatement and Criticism," Studies in Mathematical Economics and Econometrics, Lange, McIntyre and Yntema ed. pp. 49-68.) The Lange argument was carried out by Professor D. Patinkin and caused heated debate among monetary theorists, and is known as the classical dichotomy (cf. J. R. Hicks, Value and Capital, Ch. 12. D. Patinkin, "Liquidity Preference and Loanable Funds; Stock and Flow Analysis," Econometrica, Nov. 1958. S. Valvanis, "A Denial of Patinkin's Contribution," Kyklos, vol. 8, 1955. Becker and Baumol, "The Classical Monetary Theory; The Outcome of the Discussion," Economica, 1952. G. C. Archibald and R. G. Lipsy, "Monetary and Value Theory; A Critique of Lange and Patinkin," Review of Economic Studies, Oct. 1958. S. C. Tsiang, "Walras' Law, Say's Law and Liquidity Preference in General Equilibrium Analysis," International Economic Review, Sept. 1966. A. Lindbeck, "Den Klassiska Dikotomien," (The Classical Dichotomy) Ekonomisk Tidskrift, 1961.

Although the classical dichotomy problem presents an interesting topic in monetary theory, we will not go further here. (cf. S. Minabe, "The Logical Inconsistency of the Clower-Leijonhufvud Position of the Keynesian Revolution," which is under revision due to changes suggested by Professor John F. Wright, editor of Oxford Economic Papers. In any case, it was Ohlin who, for the first time, noted the classical dichotomy.

"Jämvikten mellan sparande och nyinvestering forelegger med här använda definitionsätt exdefinitione och alltso ej beroende av någon viss räntenivå existerar."

(The equilibrium of saving and new investment lies in the definition here applied, namely, ex definition, and therefore does not depend on a certain level of the rate of interest that does exist. s.37)[11]

Furthermore, Ohlin observes:

"Det fins en gräns, under vilken det är mycket svårt att sänka räntenivån förmedellånga och långa lån i landet."

(There is a limit, under which it is very difficult to reduce the rate of interest on medium-term loans and long-term loans in this country. s. 96)[12]

Moreover, Ohlin recognizes the downward stickiness of the wage rate due to the existence of labor unions:

".....någon större allmäna lönereduksion brukat förkomma." (somewhat large scale general wage reducation has not been allowed to happen.)

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11 Then what is the rate of interest to Ohlin? "Räntan är priset på disposition av en penningsumma under viss tid eller, kortare üttryckt, priset på kredit," (The rate of interest is the price for disposing of a certain amount of money at a given time, or in short, the price of credit. Ibid., s. 41)

12 Ohlin's "liquidity trap" argument can be clearly seen in the following phrase: Hellre än att köpa eller agu obligationer, som stigt till ett som orimligt betrakat pris, vildet vantas ater skola fälla, insätta f. o. kapitalistesna sina pengar t. o. m. på icke rantegivande girorakningar, varifrån pengarna stromma tillbaka till centralbanden, d. v. s. bort fran kredetmarknaden. Det är så atpraglad depression, att ovriga två begränsnengsfaktorer satts ur funktion, hindra att rantan for lägna lån --- även de myket sakra --- pressas ned efter behag. (Rather than buying or possessing bonds which have risen to an unreasonable price, and furthermore, are expected to fall again, capitalists put their money in non-interest bearing checking accounts, keeping away from the credit market. It is this kind of situation and not the shortage of savings that, during a deep depression,hinders the rate of interest on long-term loans -- even though they are very solid -- from falling after it reaches a certain level. Ibid., s. 42.)

Ohlin generally starts from the middle stage of the business cycle (Låt us utgå från medelmåttigt konjunkturläge ---, Ibid., s. 51). This short-run equilibrium point is, by no means, a stable one. At one point, he assumes the following: Antag t. ex. att nyinvesteringskvoten överstiger sparviljan i samhället ---. (Assume that the rate of investment exceeds the willingness to save in the economy ---. s. 54) This assumption is, as has been seen, nothing but the instability condition of a "simple" Keynesian system.

More important, Ohlin argues:

> "The business cycle is in this study regarded as the changes in the scale of economic activities, particularly the production and the distribution of industrial products. Under these circumstances, the scale of investment is inclined to change more than the changes in consumption."[13]

Furthermore,

> "A similar rule applies to the relation between the production of consumption goods and durable investment in consumption production. As soon as the former ceases to expand, ceteris paribus, there would be no new investment, in other words, no increase in the production apparatus. The demand for durable investment from the consumption-products side depends on how new investment is related to the growth of that product: besides, there exists much less variable reinvestment demand."[14]

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13 Konjunkturväxlingarna betraktas i denna undersökning, som redan påpekats, sasom variationer i omfattningen av den ekonomiska verksamheten, närmast framställningen och distributionen av industriprodukter. Inom detta område plägar investeringens omfattning variera väsentligt mera än konsumtionens.

14 På analogt sätt förhaller det sig med relationed mellan framställningen av konsumtionsvaror och den varaktiga investeringen i konsumtionsvaruproduktionen. Så snart den förra upphör att växa, tarvas ju under i övrigt like förhallanden alls ingen nyinvestering, d. v. s. ökning av produktionsapparaten. Efterfragan på varaktigt realkapital från komsumtionsvaruproduktionens sida står alltså vad nyinvesteringen beträffar narmast i proportion till denna produktions tillväxthastighet; dessutom finns det en långt mindre variabel reinvesteringsefterfrågan.

In another part, he argues:

> "Labor's ability to create the demand indirectly and the opportunity of working are different. These indirect reactions, as was pointed out before, consist (a) partly in the fact that the increase in demand goes further, the new proceeds giving rise to the demand for reinvestment and new income and thus to increased consumption demand with diminishing scale in each stroke, (b) partly in the tendency to the future expectations, especially improvements in the profitability."[15]

All these quotations indicate that Ohlin has the concept of what Harrod called the "relation" in his Trade Cycle, 1936 and what later became known as the acceleration principle.

It is interesting to follow Ohlin's reasoning process:

> "Assume either that at the initial-situation as has been given in the previous section ---- the middle stage of a business cycle or moderate depression ---- the expectation of the future, for example, on the ground of political incidence, becomes more pessimistic, or that an increase in the discount rate creates a 'let's wait and see' business mood. The expectation of profitability will be deteriorated and the subjective capital value and the demand for new capital goods will drop.
>
> The diminished production and the decreased price of capital goods including raw materials and semi-finished products diminish net income. As a consequence, the consumer demand will fall and there will be a reduced output of consumer goods and a general tendency toward price deflation. Under these circumstances, the profitability of real investment falls further. After price falls and output cutbacks, the real pressure on the bond-holder will be felt, which partly strengthens the bearish tendency, and partly worsens the credit-position of entrepreneurs, thus diminishing their investment demand."

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15 Arbetenas förmåga att indirekt skapa efterfrågan och arbetstillfallen är olika. Dessa indirekta reaktioner bestå som ovan påpekata (a) dels i att 'efterfrågeökningen vandrar vidare'; de nya intäkterna ge upphov till ny reinvesteringsefterfrågan och nya inkomster och därigenom ökad konsumtions efterfrågan med avtagande omfattning varje gång; (b) dels i den av ändrade framtidsföreställningar, spec. räntabilitets sutsikternas förbättrande, framkallade tendensen till ökad privat investering.

Immediately after this sentence, Ohlin makes a crucially important analysis which distinguishes his theory from Keynes. This point escaped Landren's attention because of his static criteria, and it was not discussed in the Ekonomisk Tidskrift symposium.

Ohlin argues:

> "Since each contraction of demand either decreases or changes the quantity of goods or both so as to reduce gross income and hence to bring out the tendency toward a further curtailment of demand, one may wonder why that deflation-spiral which may steadily progress, does not continue to the point where everything breaks down. The answer probably would be that the demand for consumption goods falls slowly after a certain standard of living, even though net income may fall much faster. Some people eat up their savings and others obtain loans from the government for unemployment relief."[16]

Furthermore, in "Some Notes" he states:

> "On what does this sum total of planned consumption depend? First of all, on a consumer's income expectation. Not on his expected income during the first coming period only, but on what he expects to earn over a long period in the future. If a man holds a temporary well-paid job which gives him a much higher salary than he is used to and more than he can expect to earn later on, his standard of consumption will obviously be greatly affected by consideration of many future periods. This is the principal reason why people during depressions often consume much more than the income they expect to earn actually at the bottom of depression."[17]

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16 We did not quote the Swedish original to save space. Ohlin, Penningpolitik, ss. 32-33.

17 Ohlin, "Some Notes," pp. 62-63. Also, E. Lundberg argues: "Since the business cycles are mainly characterized by variations in this relation, (independent of an individual's distribution of his income between savings and consumption) the theory must explain the changes in the multiplier instead of assuming that the latter is given. And the required theory must explain the size both of investment and the consumption expenditure as independent variables; the latter cannot derive from the former, as in Keynes' system." (E. Lundberg, Ibid., pp. 36-38) Also cf. Ibid., Ch. 6, pp. 136-143.

Certainly these Ohlinian observations have been incorporated into the post-Keynesian consumption function arguments (Chapter IV). On the other hand, it is interesting to note how Landgren investigates this point in the light of the static Keynesian Revolution and why he may have erred. Landgren says:

> "It was at this point that Ohlin carried out a 'Keynesian' revolution in Swedish economics. In an elegant fashion he shows that it is possible, paradoxically, to get 'increased saving' by 'diminished savings' (increased consumption). His meaning can easily be interpreted with the help of the Keynesian savings function, which principally depends on national income. It is assumed, as Ohlin does, that investment grows with national income, and that if a downward shift of the savings function occurs, there results an increased volume of savings, as appears from Figure 7[18] above; the reason is primarily that the national income in this case increase. Through this idea Ohlin, like Keynes, becomes an opponent of wage reductions in an unemployment situation."[19]

As we have quoted Landgren's Figure 7 in the next page, his contention above is correct so long as we take the Keynesian static position. Then how can we interpret the following contention of Ohlin?:

> "As a matter of fact however, people do not decide to save the same percentage of an increase in income at the beginning in recovery as they do during a boom. The necessity to pay off debts or doubts as to whether the increase in income is going to be lasting may make them decide to save 50 percent of the expected increase in income during the first year of a recovery, whereas they would want to save only 10 percent at a later stage of recovery."[20]

In terms of Landgren's figure involving a linear and horizontal shifting savings function along the real income axis, we cannot explain Ohlin's arguments above. However, if we take our own Figures 5-1 and 5-2, then,

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[18] Next page.

[19] Landgren, Ibid., es. 299-300.

[20] Ohlin, "Some Notes," pp. 239-240.

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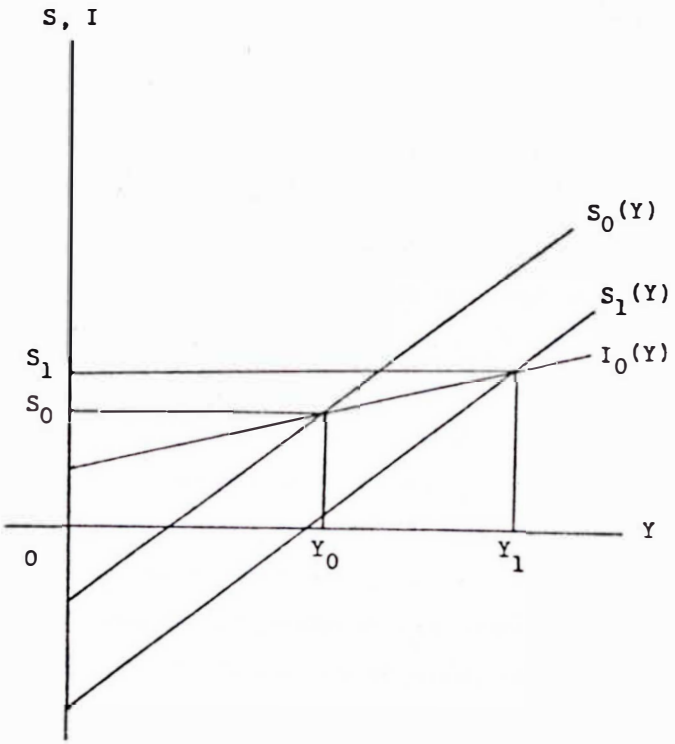
Figure 6-n-1



Landgren, Ibid., p. 177.

it is easy to understand Ohlin at this point. Coming back to those figures (Figure 5-1 is Matthews' device to explain the ratchet effect while Figure 5-2 is a modified version of the former one. In Figure 5-2, we excluded capacity output from the savings function for the reason explained in Chapter IV and V.), they clearly indicate the changes in the marginal propensity to save. According to Figure 5-2, the slope of Os_aY_a indicates the long-run 'normal' marginal propensity to save, while the slopes of BA_a, DC_a, FE_a, etc. are the short-run marginal propensities to save. The latter is assumed to be greater than the former (cf. Ohlin's contention above). Ohlin is not discussing the parallel shifts of the savings function with a given propensity to save; what he is aiming at is a dynamic relationship between the changes in the shape of the savings function and business fluctuations. Therefore, Ohlin's contributions must be compared with Keynes' in the light of post-Keynesian cyclical growth. Ohlin is not arguing about discrete and parallel shifts of the savings function with a given marginal propensity to save as indicated by the comparative static analysis expounded by Landgren (cf. his figure in the previous page). What Ohlin is aiming at is a dynamic relationship between the continuous changes in the marginal propensity to save and business fluctuations. Namely, he is arguing not only about the shifts of the savings function but also about changes in the shapes of that function. From this very point of view, in "Some Notes" he severely attacked Keynes' static multiplier theory. To Ohlin the value of the multiplier is persistently changing, as we have seen. This point has never been illuminated, so far as we know.

If we accepted the static Keynesian Revolution criteria, it would be also difficult to understand the following statement in Ohlin's "Some Notes":

> "Even if planned savings and planned investment should happen to be equal, a process of expansion is possible. Then the only thing required is that expected incomes grow to entail increased consumer expenditures. This fact has often been overlooked by writers who, under the influence of Wicksell or Keynes, start from the saving-investment analysis."

We must wait for the Harrod-Domar dynamics to extend Ohlin's idea of balanced growth fully.

It is rather surprising that we can find in Ohlin's 1934 Penningpolitik most of the essential tools of post-Keynesian cyclical growth analysis. However, we refrained from setting up a cyclical growth model named after Ohlin, because we cannot trace rightward shifts of the non-linear investment function which is the assumption initiated by Morishima. This may be the reason why Ohlin himself admits that the Stockholm School has not gone far enough to produce a complete business cycle theory.

CHAPTER VII

SUMMARY AND CONCLUSIONS

By way of summarizing the present inquiry, the writer wishes to divide this concluding chapter into three sections, namely: (a) the general purpose of the study, (b) the similarities and the differences between the post-Keynesian and the Swedish theory of economic fluctuations, and (c) the contributions and limitations of the respective theories.

(a) The General Purpose of the Study

As the title of the study indicates, its general purpose is to make a comparative analysis of the Keynesian and the Swedish theories of economic fluctuations. In his famous Economic Journal article (1937), Professor B. Ohlin[1] compared the Stockholm theory of savings and investment with Keynes' General Theory. Ohlin writes: "Owing to a coincidence of circumstances, already at an early stage of the depression Swedish economists came to deal with the problem of variations in employment, output and prices by means of a theoretical apparatus rather different from the price theory in economic text books. There are surprising similarities as well as striking differences between that apparatus and the conclusions reached in Sweden on the one hand and Mr. Keynes' General Theory on the other hand."[2] The last part emphasized represents our general purpose here as well. Furthermore, Ohlin himself enumerates the characteristics of the "Stockholm Theory of Process of Contraction and Expansion"

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[1] cf. footnote 1 in the preface.

[2] Ibid., p. 53. The emphasis is mine.

in the following way. First, attention is concentrated on the behavior of the economic system as a whole by analyzing various influences that affect total output, total employment, and general prices. However, the analysis has not yet been pushed far enough to include a theory of business cycles.[3] Secondly, care is taken to state clearly whether income and savings refer to future plans or expectations or to past events. Thirdly, with the exception of Myrdal (whose position is not quite clear), all employ period analysis. Fourthly, as in the theories of Hawtrey and Keynes, attention is focused on the behavior of entrepreneurs and consumers with little regard to its implications for the movements of the general price level. Finally, it has been found that the reasoning to be precise enough must be casuistic. Wide use is, therefore, made of the "type model," like Wicksell's cumulative process.[4]

As indicated by the above quotation, the so-called Stockholm School theories (for that matter, also post-Keynesian theories) encompass a wide range of economic topics. Therefore, we must concentrate our attention on the specific points of the theories involved. Here we pay special attention to Ohlin's first and second points. Although Ohlin himself admits that the Stockholm School theories were not elaborated enough to develop a business cycle theory, the Swedish contributions include some significant implications for the contemporary theories of economic fluctuations.

We compare the Swedish and Keynesian theories from the vantage point of the latest cyclical growth theory. We have chosen this method

[3] Ibid., p. 59. The emphasis is mine.

[4] Ibid., pp. 57-58.

of comparison, because cyclical growth theory is, in itself, of far-reaching importance in the contemporary market economies, moreover, as will be amplified presently in the next section (b), Ohlin's argument involves a very significant departure from Keynes' General Theory at one point. That departure provides us with a useful tool of analysis to explain cyclical growth, along with those contributions made by Harrod, Goodwin, Duesenberry, Matthews, Morishima and others. Thus, the present study may be regarded as a resurgence of the Stockholm School theories as a cyclical growth theory in the light of post-Keynesian developments.

The approach adopted here is mostly theoretical and partly doctrinal. In Chapter I, we set up our basic model along with the traditional IS, LM curves in order to illustrate the difference between the classical economics and Keynesian dynamics. In Chapter II, we briefly discussed the Scandinavian School or the classical economics in Sweden by applying the instruments developed in the previous chapter. Chapter II provides a basis for comparing the Swedish classical school and the "new economics" in Sweden (cf. Chapter VI). In Chapter III, starting from our basic model, or the IS, LM curves, we examined the relationship between a linear cyclical model and Kaldor's non-linear model. In Chapter IV, we analyzed the so-called "Duesenberry effect," (including both the demonstration effect and the ratchet effect). We must emphasize the argument of this chapter, because the dynamic shifts of the consumption function and the changing shape of that function constitute the most important difference between Keynes and the Stockholm School. Also, the Duesenberry effect is crucially important in building a cyclical growth model along the lines of the post-Keynesian and the Stockholm School. This last point was

economic policy" in the early 1930's under the leadership of the Social-Democratic party of that country. However, this economic policy was, by no means, successful due to the strong opposition of the middle class people in Sweden. Some 10 to 12 percent unemployment existed in Sweden during the interwar period. Furthermore, Landgren, in a surprising effort, traced the fact that the so-called Stockholm School economists were not the first to recognize the importance of a public loan-financed employment policy. The new economis policy was carried out by E. Wigforss, the finance minister at that time, and many academic scholars were enlightened by him on the new economic policy which was later developed as a practical application of Keynes' General Theory. Landgren also pointed out that even Swedes came to recognize the formation of the Stockholm School through Ohlin's article in Economic Journal (1937). According to Landgren, Ohlin was then quite unique among the Swedish economists who were classified as belonging to the Stockholm School by Ohlin himself. Rather paradoxically, the Stockholm School consists of Ohlin himself, and the Keynesian Revolution in Sweden initiated by Ohlin alone. These historical analyses expounded by Landgren were highly esteemed by the participants of the Landgren symposium which appeared in Ekonomisk Tidskrift, (1960). However, when we come to the second part of his book dealing with the similarities and differences between the Keynesian and the Stockholm School, namely, our common theme (Ohlin's "Some Notes," Landgren's book and ours), we must expect quite different features. In the Ekonomisk Tidskrift symposium, Landgren was strongly criticized by the participants for his discourteous attitude toward the Swedish authorities, Cassel, Hecksher, Davidson, Myrdal, etc. Furthermore, he was accused of rendering a great disservice to the late

elaborated in Chapter V. In this chapter, we first examined the economic implications of the Duesenberry effect for cyclical growth theory. We reflect a somewhat widely accepted notion of taking the same effect as a link between capacity output and actual output (à la Duesenberry, Goodwin, Matthews and Cornwall). We argue that the Duesenberry effect is useful in explaining the bottom level of income (Ohlin), but not as automatic equilibrating mechanism to achieve an equality between G_n and G_w. Also, we constructed a cyclical growth model in an effort to appraise the post-Keynesian and the Swedish approach. In Chapter VI, we quoted some of the discussions expounded by Ohlin in order to support our argument in the previous chapter. We believe that our attempt to compare the post-Keynesian and the Swedish theory of economic fluctuations has some important implications for the present-day market economies. Especially, our cyclical growth model based on post-Keynesian and Stockholm theories may hopefully be considered an important improvement upon those theories.

(b) The Similarities and the Differences between the Post-Keynesian and the Swedish Theories of Economic Fluctuations

"The surprising similarities as well as striking differences between Keynes' General Theory and the Stockholm School" pointed out by Ohlin, which in turn constitutes our general purpose, were also investigated by Professor K.G. Landgren in 1960.[5] Although his book is only available in Swedish, it has a good English summary. In the first half of the book, Landgren proved that Sweden was the first country to accept the "new

[5] cf. our preface.

Professor Lindahl, by presenting an extremely poor model named after Lindahl. Despite the fact that the managing editor of Ekonomik Tidskrift (then Professor B. Hansen) promised Ohlin's comments on the same book, Ohlin did not write anything on Landgren's book. Upon closer examination of Ohlin's contribution, we can find some serious mistakes in Landgren's theoretical arguments. Although Landgren's misunderstanding of the Stockholm School could escape the severe comments made by the contemporary Swedish economists in the symposium, his error is so serious that we can hardly accept his comparative study as a convincing analysis. Let us turn to this topic here, since it is closely related to the similarities and the differences between the Swedish and Keynesian theories.

If we compare the Swedish theory and the Keynesian theory in the light of the Keynesian Revolution, it is widely believed that K. Wicksell was the first to reject Say's Law.[6] Then, why cannot Wicksell extend his rejection of Say's Law to the general theory of unemployment along with Keynes? The obvious reason for this is that Wicksell did not elaborate the downward inflexibility of either the wage rate or the rate of interest (cf. Chapter II of this study). However, in general, the neo-Wicksellian economists, (especially Myrdal and Lindahl) did not trust the automatic price mechanism of a market economy. Furthermore, if we examine Ohlin's contributions, we can see that he clearly rejects Say's Law by denying the rate of interest as a variable that equates savings and investment (cf. Chapter VI). Moreover, he has a notion of "the liquidity trap" (cf. also Chapter VI). He noted the downward stickiness of wage rates. He observes: "--- somewhat a larger scale general wage-

[6] K. Wicksell, Forelasningar i nationalekonomi, Stockholm, 1906.

reduction is not allowed to happen ---" (Penningpolitik, s. 61).[7] Furthermore, if we take up various analytical instruments like the multiplier and the marginal efficiency of capital, then we can clearly discern a dynamic multiplier process in Ohlin's previous work in Ekonomisk Tidskrift, (1933) and the concept of the marginal efficiency of capital (which is almost the same idea as Wicksell's natural rate of interest --- cf. Chapter II) in both Penningpolitik and "Some Notes." Also, Ohlin has an idea similar to Harrod's "relation" in particular and the acceleration principle in general. He even suggests a non-linear investment function à la Kaldor. From these, it seems correct to maintain that Ohlin initiated the Keynesian Revolution in Sweden, and surprisingly even before Keynes himself.

If we focus our attention on the similarities between the General Theory and the Stockholm theory, they are strikingly similar, confronted as they were with the common problem of general unemployment in the early 1930's. However, we can arrive at this retrospective conclusion, because we looked at the two systems of thought from the standpoint of the static Keynesian model of the General Theory. If we take a dynamic view, then we shall come up with a signficantly different conclusion. On an important point, Ohlin's arguments cannot be evaluated by reference to the static Keynesian theory (This is why we undertook the present dynamic study). Landgren's comparative study led him to some serious mistakes. The Stockholm School contributions must be investigated in the light of post-Keynesian cyclical growth theory.

In "Some Notes," Ohlin criticized the General Theory from several

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[7] cf. Also "Some Notes."

angles. Among others, he maintained that Keynes' multiplier formula was an ex-post relationship (cf. Chapter VI). More importantly, he attacked the General Theory in the respect that Keynes' equilibrium system is too static and too stable and hence too unrealistic. By observing the short-run dynamics of the savings function or the relationship between business fluctuations and the shift of the savings function, he concludes that the multiplier cannot be constant over time. Thus, Ohlin seems to believe himself to have given a fatal blow to the Keynesian multiplier theory.

If we stick to the static Keynesian Revolution-criteria, then we may lose sight of the most important difference between Keynes and the Stockholm School. Furthermore, with the static Keynesian Revolution-criteria, it will be difficult to understand Ohlin's position that an economy can grow secularly even if the I=S static equilibrium condition prevails cyclically.

(c) A Concluding Appraisal of the Contributions and Limitations of the Respective Theories

As discussed previously, in 1934, Ohlin investigated a part of post-Keynesian cyclical growth theory, especially the relation between the cycle and the dynamics of the savings function and subsequently criticized Keynes from the standpoint of post-Keynesian dynamics in Economic Journal (1937). Furthermore, according to Ohlin the expansion process of an economy will be interrupted by the limit set by the available factors of production and the rate of technical progress (Penningpolitik, s. 53). Judging from the basic instruments of post-Keynesian dynamics, (the dynamic interaction of savings and investment) the dynamic theory of the savings function, the non-linear investment function, (even the non-

linear savings function) the warranted rate of growth, the natural rate of growth (à la Harrod), the multiplier and the acceleration principle, etc., one is tempted to conclude that most of the post-Keynesian dynamics was accomplished by Ohlin. Also, it may be possible to build a post-Keynesian cyclical growth model based on these analytical instruments expounded by Ohlin. However, that would be too much. As Ohlin himself admits, his theory may not be good enough to be accepted as a complete theory of business cycle. We must wait until further developments in the post-Keynesian theory of cyclical growth. Meanwhile we are pleased to note that the post-Keynesians and the Stockholm School have been mutually complementary.

One of the most significant differences between Keynes and Ohlin or the relation between short-run changes in the savings function and the business cycle, was investigated by Duesenberry (Friedman and many others). Duesenberry's analysis or the Duesenbarry effect, was brought into business cycle theory by Goodwin and later Matthews. In so doing, these post-Keynesian economists make a serious mistake in substituting peak income for capacity output (cf. Chapter V).

In the latter half of Chapter V, we attempted to construct a cyclical growth model in order to show the economic implications of our study for a contemporary market economy. We tried to set up a cyclical growth model by developing the post-Keynesian line of thought, especially these expounded by Harrod, Domar, Kaldor, Hicks, Goodwin, Matthews and Morishima as well as by the Stockholm School. We used Ohlin's idea about the short-run shift of the savings function in order to explain the bottom level of national income. As pointed out before, this con-

cept was fully investigated by Duesenberry (cf. Chapter IV).

It seems that the best and widely acknowledged contribution made by post-Keynesians is their cyclical growth theories. Several representative models come to our mind, when we discuss about post-Keynesian cyclical growth models. Almost all post-Keynesians start from Harrod's model. However, Harrod's dichotomized growth model is not elaborated into a complete cyclical growth theory (cf. Chapter III). The importance of Hicks' linear model of the trade cycle is beyond any dispute until now. On the other hand, at one point his model is not convincing. He uses autonomous investment in order to explain the bottom level of income. It would be better, if we could avoid as long as possible "autonomous" forces in explaining cyclical growth. Duesenberry's analysis of the savings function cannot by itself by a cyclical growth theory, since his ratchet effect essentially presupposes a business cycle apart from secular growth. On the other hand, Duesenberry's own cycle model involves some serious contradictions and should not be accepted as a cyclical growth theory. Recently Rose presented an interesting model in this field. His model would not be widely accepted in the future, since at one important point his analysis lacks an economic meaning. If we follow his non-linear Phillips curve relation, sooner or later wage rates must be negative infinite at the bottom of a cycle. From these considerations, we are left at present with the aforementioned Harrod, Duesenberry, Goodwin, Matthews and Morishima line of development as the most convincing cyclical growth theory. Their individual models have, as pointed out before, one common defect. They all (except of course, Harrod) took the ratchet effect as the link between the natural

rate of growth and the actual rate of growth. Contrary to their assumption, we have shown how the peak incomes ex-post come into the savings function (cf. Chapter IV and V) and furthermore how the peak incomes may or may not be the capacity income of an economy. It is too debatable to impute an automatic equilibrating force to the ratchet effect so as to provide the link between potential output and actual output.

In our own model (Chapter V), we accepted Ohlin's idea and used the ratchet effect as the floor level of income instead of Hicks' autonomous investment. In order to reinforce our argument, we also incorporated Duesenberry's demonstration effect into the savings function in as much as we believe that the demonstration effect and the ratchet effect work together at the same time in the real world.

It would appear that both post-Keynesian economics and Swedish economics are presently in the process of developing a more complete theory of economic fluctuations. It is hoped that the present study has made some contribution toward the complemental development of such a theory.

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