6. Micro and macro

One of the striking aspects of present economic theory is its disjointed nature. The two major bodies of theory, micro and macro, have only a slight relationship to one another; and it is possible, as the current practice in introductory economics courses demonstrates, to learn the one with but a passing reference to the other — or to master both, equally as well, in either of the two possible sequences. Price and quantity relationships, the heart of the micro theory, can be incorporated into macro analysis only by adding additional equations to the basic Keynesian model, and then the equations are likely to have an *ad hoc* empirical flavor detached from the ordinarily solid theoretical underpinnings of micro theory. The consumption and investment aggregates, on the other hand, the core of the macro theory, can be approached from a micro starting point only by derogating or ignoring the importance of many of the usual variables, and in that case the aesthetic balance of the general equilibrium system is likely to be lost. From a partial equilibrium model, the consumption and investment aggregates cannot even be derived. Micro and macro theory, then, stand as two separate bodies of analysis, with little in the way of a common perspective or a common set of variables to bind them together.

The reason for this dichotomous state of economic theory can be traced to the original Keynesian formulation. In *The General Theory*, Keynes (1936, especially ch. 2) was concerned primarily with destroying a belief in the efficacy of Say’s Law, the intellectual foundations of what then passed for a theory of aggregate income and employment. But Say’s Law was not fundamental to the work of Marshall, Keynes’ mentor. Indeed, it is conspicuously absent from Marshall’s published writings, particularly the *Principles* (1920; see also 1923). More generally, there was little in the Marshallian system to stand in the way of the propositions which Keynes wished to demonstrate. And so, in propounding his macro analysis, Keynes could remain a loyal disciple, taking over unchanged whatever elements of Marshall’s synthesis of neo-classical theory he required for his own purposes. If this led to an uncritical acceptance of competitively determined prices and marginal productivity-related income shares, the lapse can be excused on the grounds that Keynes already had battle enough to wage.

Still, it must be conceded that the updating of economic theory as a belated response to the evolution of economic institutions was incomplete. If the emergence of organized capital markets to supply corporations
with investment funds raised the possibility that *ex ante* savings and investment might diverge, the rise of the oligopolistic megacorp itself called into question the very elements of the Marshallian system which Keynes uncritically incorporated into his own analysis. In truth, as will soon be pointed out, it even called into question the savings-investment adjustment process upon which Keynes based his arguments. The result was a job only half done, with Keynesian theory resting on a micro foundation which had not itself been revised to take into account the same structural changes which necessitated the writing of *The General Theory*.

That this grafting of the new upon the old - despite the many points of incongruity between them - remains the fundamental weakness of macroeconomic theory should not prove a startling thesis to economists who have witnessed, for all their success in controlling excessive unemployment, the persistence over the last several decades of stubborn cost-push inflation. Indeed, if this attempt to develop a determinate model of oligopolistic pricing has been intended to serve any useful purpose, it is to provide the basis for a reconstruction of micro theory which will at the same time be more congenial to the Keynesian aggregate analysis and better able to explain the post World War II inflation. The major elements required for that reconstruction of micro theory have already been introduced in the preceding chapters. All that remains to be done is to fit them into a Keynesian - or more accurately, a post-Keynesian macrodynamic - framework.

A common bond between the micro model set forth above and post-Keynesian macroeconomic theory should already be apparent. This is the emphasis which they both place on *ex ante* investment as the critical factor. In the Keynesian system it is this variable which, holding monetary conditions constant and ignoring both the government and rest-of-the-world sectors, determines aggregate demand and, hence, the level of national income. In the micro model developed above it is the same variable which, holding costs constant and ignoring changes in the supply conditions of investment funds, determines the industry price level and, hence, the price level in the oligopolistic sector of the economy. Yet merely to establish this common bond is not enough. The two bodies of theory must be made truly compatible so that the implications to be derived from the one are not inconsistent with the deductions made from the other. As we shall see, this will require certain modifications or refinements in the conventional macroeconomic analysis.

Nor is it sufficient merely to adjust micro theory to the comparative statics of *The General Theory*. If the long-run consequences of public policies are to be fully traced out, it is necessary to conduct the aggregate analysis within a macrodynamic framework. Thus it is a dynamic version
of the Keynesian model, such as that worked out by Joan Robinson, Nicholas Kaldor and certain other Cambridge, England, economists, with which the reconstruction of microeconomic theory must be made compatible.²

The agenda for this chapter is, then, as follows: first the rate of growth of investment, then the rate of growth of savings are to be discussed from the perspective of the oligopolistic sector alone. Investment demand and savings functions, with the rate of growth of aggregate output as the independent variable, will then be developed, first for that one sector alone and then for the remaining portion of the business sector as well as for the household, government and rest-of-the-world sectors. Finally, with the aid of these various investment demand and savings functions, derived from the microeconomic base developed in the earlier chapters, it will be possible to explain the macrodynamic properties of an economy like that of the United States with a significant oligopolistic sector.

The rate of growth of investment

An investment demand function for the oligopolistic sector has already been specified as an integral part of the pricing model developed in chapters 3 and 4. This investment demand function is based on two independent variables: (1) the marginal efficiency of investment and (2) the expected growth rate of industry sales. Which of the two variables is the more significant depends both on the type of investment being undertaken and on the context in which the investment demand function is being viewed.

The various categories of investment previously considered can be broken down into two broad groupings. The first of these groupings is limited to investment outlays which have as their object an incremental increase in the corporate levy over the long run. They consist of expenditures on advertising, research and development, or any other activity which will enable the megacorp to differentiate its product more sharply, erect higher barriers to entry and/or create a more favorable public image. This first broad grouping even encompasses the purchase of cost-reducing equipment and the initial expansion into a new industry. For all these types of investment, the key determinant is the estimated marginal efficiency or, as a more readily determined approximation, the inverse of the pay-off period.

What is significant about this first broad category is that it gives rise to the downward-sloping investment demand schedule which lies at the heart of both the original Keynesian analysis and the pricing model set forth in chapter 3 above. By ranking each of the possible
investment projects in the descending order of their expected return-over-cost, whether measured in terms of the increment in net revenue or the increment in the realized corporate levy, it is possible to indicate how the total amount of investment that can profitably be undertaken will vary as the marginal efficiency itself varies. An explicit treatment of this relationship is essential if the amount of investment being undertaken is to be explained in terms of some other variable, such as the permanent interest rate or the price level, and that other variable in turn is to be explained by the amount of investment being undertaken. It is for this reason that it has been necessary to incorporate a negatively sloped investment demand schedule into both the original Keynesian analysis and the pricing model developed above - even though the amount of investment involved in this first broad grouping is only a small portion of the total investment likely to be undertaken at any given point in time.

Most investment, then, falls within the second broad grouping, limited to investment outlays which have as their object the maintenance of the existing market share within each of the industries to which the megacorp belongs. These investment outlays consist entirely of expenditures on new plant and equipment, and are intended to provide the megacorp with sufficient capacity to meet whatever demand for its various products is likely to manifest itself. Only if the megacorp is assured on this point can it expect to hold on its historical share of whatever markets it serves. For this type of investment, the key determinant is the expected growth rate of industry sales.

This expected growth rate is based on the past trend of industry sales, not because the past is necessarily thought to repeat itself but because it is the only guide to the future. What the megacorp must assume is that there exists a strong secular trend in the growth of industry sales, reflecting the influence of population, income and similar long-run factors. The megacorp's problem is to determine what that secular trend is so it can increase its productive capacity accordingly. The past pattern of industry sales is perhaps the best indication of what that secular growth path may be. At the same time, however, in extrapolating forward the past trend of industry sales, the megacorp must be careful not to preclude the possibility that the industry's secular growth path has changed. It will allow for this contingency by giving considerably greater weight to its more recent sales experience. What this means is that as long as the past trend of industry sales continues to be maintained, the individual firm's rate of growth of investment will hold steady; but if industry sales should begin to follow an erratic path, the rate growth of investment will vary as a lagged response to changes in that underlying factor. Since most of the investment undertaken in the oligopolistic
sector — if not throughout the rest of the economy — falls into this
second broad category, it is the expected growth rate of individual
industries, estimated in the above manner, which is the more significant
explanatory variable underlying investment. This conclusion is reinforced
by the fact that, over the long run, the marginal efficiency of investment
can be expected to fluctuate only within certain narrow limits.

It should be emphasized that the variable under discussion here is
the rate of growth of investment, \( I \), and not just the level of investment,
\( I \). To focus on the latter, as is usually done, is to restrict the analysis
to a static mold. The fact is that the purchase of new plant and equipment
by a megacorp is not a discrete act taking place intermittently but rather
a continuous process occurring over time, one which involves an increasing
level of expenditures as the size of the firm itself increases. It is therefore
necessary to speak of the rate of growth of investment, not only with
respect to the individual megacorp but with the respect to the industry
as well and, indeed, with respect to the entire oligopolistic sector. This,
in turn, converts the static analysis of Keynes into the dynamic analysis
of the post-Keynesians. The last-mentioned rate of growth of investment,
that for the oligopolistic sector as a whole, will depend primarily on
the rate of growth of sales in each of the industries comprising the
олигополистический сектор. In other words, the determinants of the aggregate
investment function are the same as those for the individual firm and
industry functions.

Thus, while the marginal efficiency of investment must be brought
into the analysis if adequate links to the capital funds market and to
the price level are to be established, the expected growth rate of industry
sales is, for the most part, sufficient by itself to explain the rate of
growth of investment, \( I_0 \), within the oligopolistic sector. An investment
demand function formulated in this manner has several important macro-
dynamic implications. First of all, since the rate of growth of industry
sales is likely to reflect the rate of growth of aggregate investment
— a significant part of which will derive from the growth of investment
within the oligopolistic sector as a result of the secular rise in industry
sales — the basis has been established for the continuous expansion
of the economy as a whole, once growth has been initiated. Second,
because of the lag in adjusting investment expenditures to the change
in industry sales, investment in the oligopolistic sector can be expected
to exert an overall stabilizing influence. No matter how much industry
sales may vary in any given year due to exogenous forces, the change
in investment in the oligopolistic sector will be considerably more
moderate. There will thus be a powerful endogenous force at work,
at least within the oligopolistic sector from the investment demand side,
to dampen any fluctuations in aggregate demand and national income.
It should be noted that an investment demand function of this type is consistent with the current econometric emphasis on accelerator models of investment. In fact, this investment demand function and recent empirical research reinforce one another – the latter helping to provide quantitative verification of the micro theory⁴ and the former making it possible to choose not only between the accelerator model and alternative formulations but also among different versions of the accelerator model itself.

For many years the accelerator model – regardless of how formulated – fared less well under empirical testing than an investment model based on other variables.⁵ But then Eisner (1960), building on earlier work by others, began to develop an accelerator model that was different from previous formulations in two important respects. First he argued – with empirical data to support his contention – that an investment demand function properly specified would depend on changes in aggregate demand not in any one previous year but rather distributed over several years previously.⁶ Second he asserted – again with empirical data to support his contention – that changes in investment were related less to changes in aggregate demand than to changes in the demand experienced by individual industries, these changes being reflected in past sales figures (Eisner, 1963). As finally set forth, then, the Eisner version of the accelerator model related changes in the demand for investment by individual industries to changes in sales over the previous seven-year period, the aggregate investment demand function being simply the sum of these individual industry demand schedules.

An investment demand function of this form not only better fits the empirical data Eisner examined but, by that very fact, also tends to confirm the validity of the investment demand function which is so integral a part of the oligopolistic pricing model developed in chapter 3. The difference between that investment demand function and the estimating equation used by Eisner is relatively insignificant.⁷ At the same time, the earlier analysis of oligopolistic pricing behavior provides a strong theoretical argument in support of Eisner’s empirical findings. As that analysis sought to make clear, the demand for investment based on past sales experience derives from the megacorp’s fundamental goal of maintaining, and perhaps even increasing, its share of whatever market it supplies. In the light of that underlying motivation, it is hardly surprising that investment by firms in the aggregate should be geared to what Eisner has termed the ‘permanent’ sales of various industries.

The oligopolistic pricing model also helps to explain why a capacity utilization variable, which in some ways is much closer than the past sales variables to the original spirit of the acceleration principle, performs less satisfactorily in some of the econometric models. As has already
been emphasized, the megacorp's management will always seek to have a certain amount of excess capacity available to meet any unexpected increase in demand. To do otherwise would be to jeopardize the company's relative market position. Typically, therefore, the megacorp's management will act to increase the company's plant and equipment before the limits of capacity have been reached. Variations in capacity utilization, then, are merely a reflection of the cyclical volatility of demand, a phenomenon which is most likely to have already been taken into account in the past planning of investment expenditures. They will not, except under unusual circumstances, be the direct signal for further outlays on new plant and equipment.

The oligoplistic pricing model developed in chapter 3 helps to explain, moreover, why an interest rate variable, if included in the accelerator model, accounts for such a small part of the total variation in investment expenditures. The fact that only certain marginal projects, representing but a minor portion of all investment expenditures, depend on the marginal efficiency of investment, and hence on changes in the cost of external funds, has already been pointed out. What must also be kept in mind is the relationship between this cost of external funds, the 'permanent' interest rate as it has been termed, and the market rate of interest observed at any given moment in time. That permanent interest rate reflects only the expected minimum rate of interest expected to prevail over the business cycle, so that a change in the actual market rate of interest observed at any given point in time is likely to have an effect on investment only insofar as it is taken as evidence of what the minimum rate of interest will be in the future. Even then, as already pointed out, the cost of fixed debt obligations is merely one of two elements that must be taken into account in determining the permanent interest rate on external funds. In light of these theoretical arguments it is hardly surprising that for many years econometric studies failed to disclose any significant relationship between short-run changes in interest rates and changes in the level of investment in new plant and equipment, such as a highly simplified model based on The General Theory would suggest exists. Nor is it surprising that, in order to reveal at last the relatively minor influence on investment exerted by conditions in the capital funds market, more recent econometric studies have found it necessary to employ a lagged, long-term interest rate variable. As is implicit in the oligopolistic pricing model, a change on the monetary side of the economy can be expected to affect investment decisions on the real side only slightly, and even then only over the long run.

Finally, the oligopolistic pricing model provides strong theoretical support for rejecting an investment demand function based on the past profits variable. For a long time, after the initial empirical studies failed
to reveal any significant relationship between interest rates and investment, econometricians were content simply to base their investment demand function on the amount of profits previously earned (cf. Tinbergen, 1968, Klein and Goldberger, 1955; Suits, 1962). It was difficult to justify this expedient on theoretical grounds - unless one assumed that businessmen were so irrational as to confuse past profits with future anticipated gains, or that past profits were a measure of liquidity and hence an indication of the ability to finance subsequent capital outlays. In the latter case, of course, one had a theory not of investment demand but rather of investment funds supply. Still, econometricians continued to fall back on the past profits variable because, until Eisner and others began to refine the accelerator model, it was the only variable that could be used with any success to predict investment.

The oligopolistic pricing model helps to explain why, when a lagged accelerator model is employed, the past profits variable loses virtually all of its explanatory power (Eisner, 1963, pp. 241, 243, 246; see also Jorgenson, 1971, p. 1133). It will be recalled that, rather than the level of investment being determined by the amount of net revenue, or corporate levy, available to finance investment, the price level in an oligopolistic industry is under ordinary circumstances set so as to yield sufficient net revenue, or corporate levy, over the planning period to finance the level of desired investment. In other words, assuming that the restraints on pricing discretion are not so great as to preclude any further increase in prices, the availability of funds, or liquidity, will not set a limit on the amount of investment expenditures undertaken. Even if the restraints on pricing discretion are momentarily prohibitive, investment will depend on the amount of net revenue, or corporate levy, realized not in any single year but rather over the entire planning period. It is only because net revenue is highly sensitive to changes in sales that the past profits variable can be used with such success to predict subsequent investment. However, the past trend of sales is an even better predictor. For while the past profits variable, as will soon be brought out more clearly, simply measures ex post savings, the past trend of industry sales is the basis for estimating the expected growth rate of industry sales and hence is the best proxy variable for desired investment.\textsuperscript{12}

From the oligopolistic model it is possible, then, to extract an investment demand function based, to some degree, on the marginal efficiency of investment, \(r\), and, to a far greater extent, on the expected growth rate of industry sales, the latter being approximated in the aggregate by the secular trend of the growth of total output, \(\hat{G}_s\).\textsuperscript{13} That is,

\[ I_o = f(r, \hat{G}_s). \]  

(6.1)
The investment demand function, in this form, is based on the assumption that the actual growth rate is equal to the secular, and thus to the expected, growth rate. When that condition does not hold—which is almost always the case—the rate of growth of investment within the oligopolistic sector, \( I_0 \), must be taken to be a function, more generally, of the difference between the actual and the secular growth rates, \( \bar{G} - \bar{G}_s \).

With expectations thus being disappointed, that additional factor—along with every other carry-over from the past into the present—needs to be taken explicitly into account. This can be done through the inclusion of a shift variable, \( I_0 \), in the investment demand function, indicating the rate of growth of investment which will occur independently of any current conditions. Both lag effects from the past as well as expectations about the future are encompassed by this shift variable, which serves as a separate parameter of the oligopolistic sector's investment demand function. That is,

\[
I_o = I_{0*} + f(r, \bar{G} - \bar{G}_s).
\]  

(6.2)

An investment demand function of this type is not only consistent with recent econometric investigations of expenditures on new plant and equipment, it also lends strong theoretical support to those very same empirical studies.

The rate of growth of savings

Just as an investment demand function was implicit in the oligopolistic pricing model developed in chapters 3 and 4, so a savings function was implicit in the income distribution model sketched out in chapter 5. Unlike the savings function found in The General Theory and employed in virtually all the macroeconomic textbooks, this function emphasizes the savings generated in the business sector through the corporate levy. Indeed, the corporate levy is what is meant by savings in the oligopolistic sector, and to the extent that other industries approximate the oligopolistic model as discussed in chapter 4, throughout the rest of the business sector as well. This savings function is based on the following variables: (1) the industry price level; (2) the national incremental wage pattern; (3) corporate and/or ad valorem tax rates; and (4) the rate of growth of aggregate output. Each of these variables will be discussed in turn.

As has frequently been emphasized in this treatise, the price level in an oligopolistic industry will ordinarily be set so as to yield a margin above costs, or average corporate levy, sufficient to finance the anticipated level of investment over the current planning period. The revenues thereby obtained, over and above the sums set aside for payment to
the various constituencies, constitute the residual income, or savings, of the megacorps in that industry. The higher the price level, holding wages and tax rates constant, the greater will be the rate of growth of savings.

Again here, as in the earlier discussion of investment, it is not enough to speak merely in terms of levels. If the investment financed from internal savings brings the increments in the realized corporate levy that were projected at the time the capital funds were committed—largely because the added capacity has enabled the megacorps in the industry to increase their sales—the savings being generated within the industry should also increase over time. For this reason it is better to speak of the rate of growth, and not just the level, of savings. An increase in the price level will lead to an increase in the rate of growth of savings within the industry, and what is true of one oligopolistic industry will be true of the oligopolistic sector as a whole. One can therefore specify a rate of growth of savings for the oligopolistic sector, \( S_0 \), this rate of growth of savings being a function, among other things, of the average price level within the sector, \( P_0 \).

The rate of growth of savings will also be a function of the national incremental wage pattern, \( W_p \), and, in particular, of any difference between that rate of growth of wages and the secular rate of growth of output per worker in the oligopolistic sector, \( \dot{Z}_s \). An increase in the national incremental wage pattern relative to the growth of output per worker will, as described in the preceding chapter, lead to an increase in average variable and fixed costs within the oligopolistic sector; and this increase in costs, holding the price level and tax rates constant, will in turn lead to a decrease in the rate of growth of the corporate levy, or savings, within that sector. There is thus a negative relationship between \( W_p \), \( \dot{Z}_s \), on the one hand and \( S_0 \) on the other, just as there is between \( W_p \) alone and \( S_0 \). The rate of growth of output per worker, reflecting as it does the marginal social surplus created in the oligopolistic sector, will, of course, vary positively with the rate of growth of savings.

There is a similar negative relationship between the rate of growth of savings within the oligopolistic sector and the various tax rates to which the megacorp is subject. This is because, so far as the megacorp is concerned, the taxes paid the government are no less of a drain on its discretionary income than the wages paid the laboring manpower force. At present the megacorp is subject to two major types of taxes: (a) ad valorem taxes, either specific excise taxes or general sales taxes, levied as a percentage of the industry price, and (b) the corporate income tax levied as a percentage of reported net earnings. The imposition of, or an increase in, the first type of tax has the effect, with the
price level remaining unchanged, of reducing the megacorp's average revenue by an amount equal to the price multiplied by the difference between the old and new tax rates, that is, by an amount equal to \( P(\Delta t_o) \), where \( \Delta t_o \) is the change in the \textit{ad valorem} tax rate. The imposition of an increase in the corporate income tax has the effect, with the price level remaining unchanged, of also reducing the megacorp's average revenue. In this case, however, since the tax is levied only on the firm's reported net earnings, the effect is somewhat muted. Average revenue will decline by an amount equal, not to the price multiplied by the difference between the old and new tax rates but rather, by the proportion of that amount represented by the ratio of net income to total income. That is, it will decline by an amount equal to \( \text{Net} \cdot P(\Delta t_o) \), where \( \Delta t_o \) is the change in the corporate income tax rate and Net is the ratio of net income to total income.\(^{14}\) In either case, with the price level remaining unchanged, the imposition of an increase in the tax will lead to a decline in the amount of savings being generated within the oligopolistic sector. Thus there is a negative relationship between the various tax rates which apply to the megacorp and the rate of growth of savings, \( \delta_o \).

What is interesting about the three determinants of the rate of growth of savings in the oligopolistic sector considered so far is that each involves a certain degree of discretion by a different group in society. The national incremental wage pattern, \( W_p \), depends largely on the will of the trade union setting the key bargain in the bellwether industry. The corporate income tax rate, \( t_y \), and the \textit{ad valorem} tax rate, \( t_o \), depend entirely on the fiscal policies of the Federal government. Finally, the average price level in the oligopolistic sector, \( P_o \), holding \( W_p \), \( t_y \), and \( t_o \) constant, depends on the pricing decisions of megacorps. The autonomous nature of at least the first two of these variables contrasts sharply with the purely endogenous nature of the variables determining the rate of growth of investment in the oligopolistic sector, \( I_o \).

Of course, the various determinants of the rate of growth of savings in the oligopolistic sector are not necessarily independent of one another. As pointed out in the preceding chapter, an increase in the national incremental wage pattern, \( W_p \), may well be followed by an increase in the price level for the oligopolistic sector, \( P_o \). As will be argued later in this chapter, an increase in either of the two tax rates, \( t_y \) or \( t_o \), is also likely to have the same effect. On the other hand, an increase in \( P_o \) will, under some circumstances, lead to an increase in \( W_p \). Thus, a change of a certain sort in one or more of these independent variables may initiate the dynamic sequence of events known as the wage-price spiral, with a subsequent decline in the aggregate growth rate, engineered by the government itself, the most probable outcome. Still, it is only
certain changes in these variables which are likely to have such an effect. As long as the new wage pattern and/or tax rates do nothing to impair the ability of megacorps to generate sufficient investment funds from internal sources to finance their desired rate of growth of investment, a wage-price spiral is not likely to be initiated. The condition which must therefore be satisfied if there is to be macrodynamic stability is that, following the change in the wage pattern and/or tax rates, the rate of growth of savings in the oligopolistic sector, $S_O$, must be equal to the rate of growth of investment, $I_O$, without the price level in the oligopolistic sector, $P_O$, having first had to be adjusted. It is clear, then, that a delicate balance is required for macrodynamic stability.\textsuperscript{15}

The argument so far has been predicated on the assumption that prices in the oligopolistic sector are set so as to enable the megacorps in that sector to finance during the current planning period all of their desired investment by means of the corporate levy - or, in other words, that the amount of planned savings likely to result from the prices that have been set is equal to the amount of planned investment over the intermediate run. To the extent that the demand for investment funds is so great relative to the cost of obtaining them internally that megacorps are forced to resort to external financing, this assumption is no longer entirely valid. The gap between planned savings and planned investment in the oligopolistic sector must, under the circumstances, be filled by tapping the savings of the household sector. Still, since megacorps rely primarily on internal financing, this is not a serious qualification (see note 17 to chapter 1). There is thus good reason for assuming, as the argument which follows starts out by doing, that planned savings within the oligopolistic sector will be equal to planned investment.\textsuperscript{16} And this assumption, in turn, insofar as it holds true, requires an important modification of the savings-investment adjustment process formulated by Keynes in \textit{The General Theory}.

The critical difference between Keynes and those whom he referred to as the classical economists was Keynes' gradual awareness that since the decisions of how much to save and how much to invest were made by different groups in society - the one by households and the other by business firms - savings and investment were unlikely to be equal to each other, at least before the decisions were acted on, that is, \textit{ex ante}. In erecting his theory on this insight, the author of \textit{The General Theory} was merely giving belated recognition to a significant change that had occurred in the institutional character of the economy. The increased use of the corporate form of business organization, enabling firms to obtain their investment funds through well-organized capital markets, meant that the decision to save could no longer be assumed to be the equivalent of the decision to invest as it had been when an
entrepreneurial class was forced to finance plant, equipment and inventory expansion largely out of its own pockets. The existence of a monetary system capable both of expanding the money supply in response to business firms' credit needs and of sterilizing any increase in personal savings by households now made it possible for the one type of decision to be undertaken independently of the other - at least initially. Yet the further evolution of the economic system has led to a situation which, in some ways, is closer to that implicit in the pre-Keynesian understanding of the savings-investment process. This newer reality reflects the megacorp's ability to finance most of its desired level of investment internally by means of the corporate levy. In other words, the decisions to save and invest - at least in the oligopolistic sector of the economy - are once again joined in a single entity, even if that entity is a social organization rather than any single person (see above, pp. 21-7).

Despite this fact, it is still possible for savings and investment to diverge - though not in the usually stated ex ante sense. To understand how this can be the case, it is necessary to introduce into the analysis the fourth and final factor determining the rate of growth of savings in the oligopolistic sector. This variable is the rate of growth of aggregate output, \( \dot{G} \). What is of particular significance here, in discussing the rate of growth of savings over the intermediate run, that is, during the planning period of the typical megacorp, is the difference between this growth rate and the secular growth rate, \( \dot{G}_s \), upon which the standard operating ratio is based, for this difference is a measure of the cyclical level of aggregate demand. This same factor, \( \dot{G} - \dot{G}_s \), has already been encountered in the preceding chapter where the Keynesian theory of income distribution was discussed. As was then pointed out, the distribution of income between the megacorp's two principal constituencies on the one hand and the megacorp itself on the other depends on aggregate economic conditions - that is, on the difference between the standard operating ratio and the actual operating ratio which, in a dynamic context, is the same as the difference between the secular growth rate, \( \dot{G}_s \), and the current aggregate growth rate, \( \dot{G} \). Now, in a slightly different context, it will be argued that the divergence between ex ante savings (and investment) on the one hand and ex post savings on the other can be explained in precisely the same terms.

As planned by the megacorp, savings will almost certainly be equal to investment, for it can be assumed that, ignoring any need for external financing, the price level will be set so as to provide sufficient funds for whatever investment expenditures are contemplated during the current planning period. The amount of funds actually obtained at any given point in time will depend, however, on the level of aggregate demand.
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For as noted in the earlier discussion of pricing and income distribution, the greater the current operating ratio, the larger will be the amount of corporate levy accruing to the firm (see above, p. 180). Thus, while the amount of savings and investment planned may be equal to one another, the amount of savings and investment actually realized will, to the extent that the current aggregate growth rate differs from the secular growth rate, necessarily diverge. As a measure of this discrepancy, one can look, not only at the gap between actual operating ratios and the standard operating ratio but also, at the change in the liquid asset position of megacorps, holding outlays constant.19

During that portion of the planning period which falls within an expansionary phase of the cycle, the actual rate of capacity utilization is likely to be greater than the standard operating ratio, and the savings realized by the megacorp will exceed those originally planned. This means that the megacorp's holdings of short-term liquid assets will tend to increase.20 During that portion of the planning period which falls within a contractionary phase of the cycle, the opposite will be true and the megacorp's holdings of short-term liquid assets will tend to decrease. Moreover, since the marginal corporate levy is greater than the average corporate levy, the gap between planned and realized savings will be an increasing function of the difference between the current aggregate growth rate and the secular growth rate for the economy as a whole.

Of course, the secular growth rate itself may change. To the extent that this is recognized by megacorps, they will simply adjust their price levels, causing a shift in the price level for the oligopolistic sector as a whole. But to the extent that the change in the secular growth rate goes unrecognized — and, as was pointed out above, in chapter 5, this type of change is extremely difficult to distinguish from the normal cyclical pattern of fluctuations in aggregate demand — it will lead to an even greater difference between the current aggregate growth rate and the secular growth rate as presently perceived.

It should be added that the rate of growth of output per worker in the oligopolistic sector, because of its close correspondence to the rate of growth of savings within the sector, will be subject to the same cyclical fluctuations. Thus to avoid encompassing that intermediate-run effect more than once in the savings function for the oligopolistic sector, it is necessary to take as the base against which to compare the national incremental wage pattern, not $\bar{z}_0$, the current growth rate of output per worker in the oligopolistic sector but rather $\bar{z}'$, the secular growth rate of output per worker, that is, the growth rate of output per worker when the economy is expanding at its secular rate and megacorps are therefore producing at their standard operating ratio.

In summary, then, the rate of growth of savings within the oligopolistic.
sector, \( S_0 \), will be a function of the price level within the oligopolistic sector, the difference between the secular growth rate of output per worker and the national incremental wage pattern, the several tax rates to which the megacorp is subject, and the divergence between the secular growth rate and the current growth rate. Moreover, it will be affected by any change in the shift variable, \( S_{0s} \), which, like the similar shift variable for the rate of growth of investment, is a parameter of the overall function. In this case, \( S_{0s} \) indicates the rate of growth of savings within the oligopolistic sector which will occur independently of current conditions. It reflects primarily the lag effect of past decisions about the desired level of savings. That is,

\[
S_0 = S_{0s} + f(P, W, Z, t, t, G - C).
\]  

(6.3)

A savings function of this type is quite different from that usually specified in macroeconomic analysis. In the conventional treatment, the savings function pertains only to the household sector. To the extent that the sole interest is in explaining short-run changes in consumption expenditures – these consumption expenditures being the largest component of national income – this exclusive focus on the household sector may be justified. But it should be recognized that, by implicitly ignoring the savings being generated in the business sector, the conventional treatment fails to explain the larger part of aggregate private savings. This is not an argument for abandoning the Keynesian savings function but rather an argument for making it more comprehensive and more fully specified. Instead of being viewed as simply a linear function of aggregate income, and as the inverse of consumption within the household sector, savings must be seen as both an increasing function of the rate of growth of national income – reflecting the disproportionate influence which a higher aggregate growth rate has on the realized corporate levy – and as a linear function of the price level within the oligopolistic sector, with the national incremental wage pattern, the secular growth of output per worker and the several tax rates which apply directly to the megacorp as additional parameters. While a savings function of this sort has not yet been specifically tested empirically, it is nonetheless consistent with the evidence from studies of the cyclical distribution of income.

A savings function based on the rate of growth of aggregate output, among other variables, has a number of important dynamic implications, especially when considered in conjunction with an investment demand function based on the expected growth rate of industry sales. It is these dynamic implications, centering on the investment-savings adjustment process appropriate to the oligopolistic sector, that will presently be examined. First, however, it is necessary to take up a minor point,
the extent to which the savings and investment functions just defined exist independently of one another.

The rate of growth of aggregate output, $G$, is, to be sure, a key determinant of both functions. A change in this variable, to the extent that it is taken as evidence of a change in the secular growth of sales within the oligopolistic sector, will lead to a change in the rate of growth of investment within the sector, $I_O$. The same change in $G$, to the extent that it marks a change in the differential between the current aggregate growth rate and the secular growth rate, will at the same time lead to a change in the rate of growth of savings, $S_O$. However, the fact that both functions are based, at least in part, on the same variable no more precludes them from behaving independently of one another than the joint dependence of conventional supply and demand curves on the price variable precludes them from behaving independently.

It can, of course, be argued that a change in the price level within the oligopolistic sector, since the sector includes many capital goods industries, will affect the marginal efficiency of investment. In that case, since the price level is also a determinant of the rate of growth of savings within the oligopolistic sector, the savings and investment functions would have another independent variable which they share in common. But since most purchases of new plant and equipment depend, not on the marginal efficiency of investment but rather, on the expected growth rate of industry sales, this possible complication can all but be ignored. The effect of a change in the price level of capital goods on the rate of growth of investment will, if anything, be slight. Much the same can be said about the likely effect on capital expenditures of a change either in the wage pattern or in tax rates. With this point covered, it is possible to move on and consider the dynamic adjustment of investment and savings.

The dynamic adjustment of investment and savings

What is of concern here is the process by which investment and savings in the oligopolistic sector, though apt to diverge from one another in the short run, nonetheless give rise to economic forces which tend to bring the two flows back into balance over the intermediate run. Why investment and savings are apt to diverge from one another in the short run should now be clear. While investment expenditures, based as they are on the expected growth rate of industry sales, are likely to remain relatively stable, the amount of savings actually realized will vary considerably depending on the current operating ratio. This is not to suggest that investment expenditures are likely to remain absolutely fixed no matter what the current level of sales may be. It is rather to point
out that the expected growth rate of industry sales, which is derived by extrapolating forward the past trend of industry sales, will be only slightly affected by the sales experience at any single point in time. To the extent that the fluctuations in industry sales are consistent with the anticipated cyclical pattern, they may even occasion no substantial revision of the megacorp's investment plans. This is in contrast to the considerable variation in the realized corporate levy, and hence in the amount of savings generated by the megacorp, as a result of those same fluctuations in industry sales.

The fact that investment and savings are apt to diverge in the short run is not the end of the matter, however. The divergence itself will set in motion self-correcting economic forces. To the extent that the amount of savings being generated exceeds the level of investment expenditures, the megacorp will be withdrawing a larger amount of claims from the income stream than it is returning through its purchase of new plant and equipment, as well as through its purchase of other types of investment goods and services. The dampening effect that this will have on aggregate income flows will then tend to reduce the level of sales which has given rise to the excess of savings over investment. Conversely, to the extent that the amount of savings being generated falls short of the level of investment expenditures, the megacorp will be withdrawing a smaller amount of claims from the income stream than it is returning. The stimulative effect that this will have on aggregate income flows will tend to expand the level of sales so as to eliminate the deficiency of savings.

Since aggregate economic conditions are the operative factor here, what is true of one megacorp is likely to be true of all megacorps; and thus the oligopolistic sector of the economy can be expected to exert a contracyclical influence similar to that of the Federal government itself through its tax and transfer programs. In other words, because of the way it is exacted, the corporate levy acts as an automatic stabilizer over the intermediate run. In an expansionary phase of the cycle, the savings realized by the megacorp through the corporate levy are likely to be greater than the current level of investment and thus will have a restrictive effect on the economy in general. In the contractionary phase of the cycle, the reverse will be the case, the excess of investment over savings giving rise to a stimulative effect. Over the intermediate run, however, to the extent that the fluctuations in industry sales are consistent with the anticipated cyclical pattern, the two effects should offset one another, with the result that investment can be expected to equal savings over the business cycle, both ex post and ex ante, even though they will not necessarily be equal to each other at any particular point in time.
The savings-investment adjustment process just described differs significantly from that found in The General Theory and in most of the subsequent elaborations of that static macroeconomic model. In the usual Keynesian formulation, it is the ability of business firms to undertake investment expenditures independently of the savings decisions reached by households that permits savings and investment to diverge, at least *ex ante*; and it is the resulting effect of these investment expenditures on household income which then brings the two flows back into equilibrium. The burden of the preceding argument is not to deny that an adjustment process of this type exists. It is rather to point out that only a minor portion of business investment is financed from external sources and that therefore the more significant adjustment process is that which takes place within the business sector itself, and, in particular, within the oligopolistic component of that sector (see note 17 to chapter 1). As brought out above, it is the sensitivity of the realized corporate levy to aggregate economic conditions that permits savings and investment to diverge, not *ex ante* but rather, *ex post* in the short run; and it is the contracyclical effect of the fluctuations in the realized corporate levy which then tends to bring the two flows back into equilibrium over the intermediate run. Despite these differences, both adjustment processes are alike in emphasizing the role of the monetary system in enabling savings and investment to diverge in the first place; and alike in emphasizing the preponderant influence of investment in determining a new macrodynamic balance.

What has just been said about savings and investment being equal to one another, *ex post*, over the planning period is predicated, however, on the assumption that the past secular growth rate of individual oligopolistic industries and of the economy as a whole will continue to be maintained. Otherwise, the standard operating ratio, upon which is based the average corporate levy and, *pari passu*, the industry price level, will be incorrectly estimated. If there has been an increase in the secular growth rate so that the actual rate of capacity utilization within the oligopolistic sector consistently exceeds the standard operating ratio, the rate of growth of savings will be greater than planned when the price level was set. Similarly, if there has been a decrease in the secular growth rate so that the oligopolistic sector continually finds itself producing below its standard operating ratio, the rate of growth of savings will be lower than anticipated.

Of course, the rate of growth of investment is likely to be adjusted accordingly. If, for example, the secular growth of aggregate demand has been greater than previously anticipated, the megacorp will need to expand its plant and equipment at a more rapid rate. Similarly, if the secular growth has been smaller than anticipated, the megacorp will
be likely to expand its plant and equipment more slowly. Still, because of the long lead time required to bring a new plant into operation, or even to modernize the equipment in an old one, any change in investment is likely to lag behind, and be smaller than, the change in savings due to a difference between the average rate of capacity utilization over the current planning period and the standard operating ratio. This gives rise to a somewhat different investment–savings adjustment process over the long run, one that is inherent in combining an investment demand function based on the trend of past sales - as a proxy for the expected future growth of the industry - with a savings function highly sensitive to current sales alone. How this adjustment process works is perhaps best explained with the aid of figure 19.

The diagram, by measuring both the rate of growth of investment - or, to use Joan Robinson's phrase, the rate of accumulation - and the rate of growth of savings along the vertical axis, shows each of these two variables as a function of the aggregate growth rate, $G$, measured along the horizontal axis (cf. J. Robinson, 1962a, pp. 34-48). For the moment it will simplify the exposition to assume that the aggregate growth rate is the same as the growth rate within the oligopolistic sector. Later, when the non-oligopolistic subsector and the household, foreign

![Figure 19](image)
and government sectors are brought into the analysis, this assumption will be dropped. In the diagram, curve \( I_o \) is the investment demand curve, indicating the effect that an increase in the aggregate growth rate will have on the rate of growth of investment, holding the marginal efficiency of investment, \( r \), constant. It is a straight line with a slope of less than one, reflecting the fact that an increase in the aggregate growth rate will, within a single time period or even over the entire planning period, lead to only a partial increase in the rate of growth of investment. If an increase in the aggregate growth rate were to lead immediately to a proportionate increase in the capital stock, the slope would be equal to one; if it had no effect whatsoever on investment expenditures, the slope would be equal to zero and curve \( I_o \) would be horizontal.\(^{25}\) Curve \( S_o \) is the savings curve, indicating the effect that an increase in the aggregate growth rate will have on the rate of growth of savings. It bows upward, reflecting the fact that an increase in the aggregate growth rate, both in the short run and over the intermediate, or planning, period, will lead to a disproportionate increase in the rate of growth of savings.

Point \( D \) is the one point at which, under the conditions presumed in figure 19, the rate of growth of investment, \( I_o \), is equal to the rate of growth of savings, \( S_o \). Ignoring for the moment the possibility of a divergence between investment and savings in some other part of the economic system, it is thus the one point at which the corresponding growth rate, \( \bar{G} \), can be maintained indefinitely. If the oligopolistic sector should find itself at a point above \( D \) – as it will if the secular growth rate, due to exogenous factors, has been greater than anticipated – the rate of growth of investment over the planning period, that is, the intermediate run, will fall short of the rate of growth of savings. With savings and investment previously equal to one another, the resulting excess of savings over investment will then act as a drag on the growth rate until it has been slowed down to the rate associated with point \( D \). Alternatively, if the oligopolistic sector should find itself at a point below \( D \) – as it will if the secular growth rate has been less than anticipated – the rate of growth of investment will exceed the rate of growth of savings. In this case, the excess of investment over savings will act as a stimulant on the aggregate growth rate until it has been increased to the rate associated with point \( D \). It is in this sense that \( \bar{G}_w \), the rate of growth associated with point \( D \), is the only warranted growth rate, that is, the only growth rate for the oligopolistic sector (and, since all the other sectors are for the moment being ignored, for the overall economy as well) that can be maintained indefinitely, given the investment and savings functions represented by curves \( I_o \) and \( S_o \).\(^{26}\)

Of course, since the variables employed in this analysis are rates
of growth, and not levels, once the growth path defined by the warranted growth rate has been deviated from, differing rates of growth both of savings and of investment will be required to bring the economic system back on to that track. These interceding values for \( I_o \) and \( S_o \) respectively can be ignored, however, and the analysis focused solely on the value of \( I_o \) and \( S_o \) at point \( D \) as the limit toward which both the rate of growth of investment and the rate of growth of savings will approach, whether monotonically or not, as the economic system returns to the growth path defined by the warranted growth rate. It should be noted that this warranted growth rate is not the same as the secular growth rate. The former is simply a theoretical construct. It refers to a rate of expansion which can be maintained indefinitely once certain conditions have been met – in this case \( I_o \) being equal to \( S_o \). Such a warranted growth rate is unlikely ever to be actually observed, however, since various factors will continually make their influence felt, causing the economy to deviate from the steady-state rate of expansion defined by the warranted growth rate. The secular growth rate, obtained by averaging out these deviations over time, is in fact the closest that it is possible to come to measuring the warranted growth rate, and it is thus the secular growth rate upon which expectations about the future are based. The distinction between the warranted growth rate and the secular growth rate is a crucial one. Indeed, it is essential for understanding how a macrodynamic disequilibrium can occur. Before taking up that point, however, it is necessary to make more explicit the interaction between the oligopolistic sector and the other parts of the economic system.

**Intersectoral effects**

The growth rate of the oligopolistic sector cannot be understood simply in terms of the forces operating within that one part of the economic system alone. The very fact that the secular growth rate can change points to this conclusion, for the inherent tendency of the oligopolistic sector, as just explained, is to maintain a single warranted growth rate. What must then be examined is the extent to which other parts of the economic system are capable of generating on their own a change in the rate of growth either of savings or of investment, thereby offsetting any divergence between those two flows within the oligopolistic sector. The other parts of the economic system which need to be examined in this connection are: (1) the non-oligopolistic subsector of the business sector, consisting of both polypolistic and monopolistically competitive industries; (2) the household sector in its entirety; (3) the foreign sector, and (4) the government sector. For each of these sectors or subsectors,
a savings and investment demand curve similar to that already derived for the oligopolistic subsector will have to be developed and two questions then posed. (a) Which curve, the savings or the investment demand curve, is more sensitive to the aggregate growth rate, $\bar{G}$, that is, which curve has the greater slope? (b) Is either curve capable of shifting autonomously, thereby initiating a change in the aggregate growth rate?

The non-oligopolistic subsector. It is the absence of a corporate levy which, as explained above in chapter 4, characterizes the non-oligopolistic subsector of the economy. This condition does not preclude, however, an increase in the amount of savings being generated within that subsector as aggregate demand rises. Quite the opposite. As aggregate demand rises, shifting industry demand curves outward, the price level within the non-oligopolistic sector will also rise, reflecting, if not the increasing marginal costs of production as the theoretical models would suggest, then at least the greater willingness of customers to surrender their monetary claims. Since in any case the average total costs of production can be expected to rise less rapidly than the marginal costs, the neo-classical proprietorship which is the representative firm within the non-oligopolistic subsector will experience a disproportionate gain in net revenue. These higher profits when the economy is expanding are, of course, matched by the disproportionate losses suffered when the economy is contracting. Thus, over the normal business cycle, the gains and losses in net revenue can be expected to offset one another for the most part, just as they do in the oligopolistic subsector. The distinction, as will soon be brought out more clearly, is that in the non-oligopolistic subsector the fluctuations in net revenue are accompanied by fluctuations in the price level while in the oligopolistic subsector they are not.

Again, perhaps the more interesting question is what happens when the cyclical pattern of demand changes, that is, when the secular growth rate varies. If the expansion of the economy has been greater than one would have anticipated on the basis of past trends, the owner-entrepreneurs who control the neo-classical proprietorships in the non-oligopolistic subsector will be encouraged to treat the increased net revenue as a windfall, withdrawing an ever greater proportion of the profits to enhance their own personal income, confident that they will still have an adequate reserve for whatever less prosperous times may follow. In other words, as the secular growth rate rises, the savings being generated within the non-oligopolistic subsector are likely to be transferred at an increasing rate to the household sector. Alternatively, when the expansion of the economy has been less than one would have anticipated on the basis of the past trends, the owner-entrepreneurs
will be forced to slow down the rate at which they are withdrawing income from their businesses, and indeed may even be forced, beyond a certain point, to reverse the flow (Feber, 1962, pp. 126–8 and the sources cited there). In view of these several factors - the tendency of average total costs to rise and fall with the level of output and the tendency of the savings being generated in the form of profits to be siphoned off, above a certain reserve, into personal income with these savings to be returned to the firm if needed - it seems only reasonable to conclude that the savings curve for the non-oligopolistic subsector will rise less sharply than that for the oligopolistic and regulated industries, and may, in fact, even be linear.27

Single-plant operation, though not so basic as the absence of a corporate levy, is nonetheless another important distinguishing feature of the non-oligopolistic subsector. It has particular significance insofar as the investment demand function is concerned. To the extent that the neoclassical proprietorship is limited by managerial resources to the operation of but a single plant or some other finite number of facilities, it cannot be expected, like the megacorp., to expand its own capacity smoothly and continuously as the economy itself grows (see above, p. 142). Instead, as pointed out in chapter 4 above, a secular rise in industry demand will lead to an even greater gap between the price level and average total costs. The growing profit margin will, in turn, encourage the entry into the industry of new firms, each with its own separate plant and equipment.

This process by which new capacity is added in the polypolistic and monopolistically competitive industries is muted, however, by two offsetting factors. The first is the likelihood that such industries will be growing at a less rapid rate than the oligopolistic subsector. Were this not the case, they would soon be invaded by conglomerate megacorps on the alert for investment opportunities promising above average rates of return. The non-oligopolistic sector thus represents, in the main, the less rapidly expanding parts of the economic system. The exception consists of those industries which are still relatively new and which offer the prospect of greater than average growth in the future. Over the long run, however, these more dynamic industries can be expected to shift over into the oligopolistic subsector, either through the emergence of megacorps from within or through the invasion of megacorps from without.

The second offsetting factor, limiting the expansion of capacity through new entry, is the effect of technological change in permitting a greater rate of output for the individual production facility at its least cost point (see Scherer, 1970, pp. 88–90). This means that the size of the neo-classical proprietorship can be expected to increase somewhat over
time even if the firm is limited by managerial resources to the operation of but a single plant. All the same, if the industry’s secular growth has been sufficiently great so that the increased demand cannot be met through the output of the larger plants coming into use as the worn-out capacity is replaced, the profit margin will rise. And even if the existing firms should somehow find a means of overcoming the limitation of managerial resources and are thus able to increase the number of their plants, outside firms can still be expected to enter the industry in growing numbers as it becomes clear that the rise in demand is not simply temporary. In fact, with no way to coordinate or even limit this type of expansion it may well be that, beyond a certain point, the growth of capacity will exceed the growth of industry demand as more and more entrepreneurs rush to take advantage of the seemingly attractive investment opportunity. Alternatively, if the industry’s secular growth should begin to slow down, the growth of investment can be expected to come to a halt – especially if the industry is already showing signs of excess capacity.

What the above line of argument suggests is that the rate of growth of investment in the non-oligopolistic subsector will be largely a function of the profit level over the intermediate run, the latter in turn reflecting the secular growth rate of the polypolistic and monopolistically competitive industries which comprise that subsector. Initially, the rate of growth of investment will increase less rapidly than the secular growth rate as owner-entrepreneurs wait to make sure that the rise in demand is more than cyclical. In the meantime, of course, the increased demand will be met, partly through the larger size plants which the improved technology has made possible and partly by using the existing capacity more intensively. As profit margins continue to rise, however, new firms will be encouraged to enter the subsector in increasing numbers, thereby giving rise to a disproportionate increase in the rate of growth of investment. This implies an investment demand curve for the non-oligopolistic subsector which, though less sensitive at low levels to the growth rate than is the investment demand function for the oligopolistic and regulated industries, nonetheless bows upward as the growth rate increases until it has a slope which is even greater than that of the savings function previously postulated for the non-oligopolistic subsector.28

Figure 20 shows an investment demand function of this type, together with a savings function appropriate to the polypolistic and monopolistically competitive industries. The two functions, when considered together, suggest a savings-investment adjustment process which is the opposite of that already indicated as applying to the rest of the business sector. To the extent that the rate of growth of investment,
\( I_N \) is more sensitive to the aggregate growth rate, \( \bar{G} \), than is the rate of growth of savings, \( S_N \). The subsector will be dynamically unstable. Any displacement from the warranted growth rate, \( \bar{G}_w \), will lead to an even greater displacement.

For example, if the secular growth rate were to increase to \( \bar{G}_1 \), the rate of growth of investment would rise to \( I_{N1} \), thereby exceeding the rate of growth of savings, \( S_{N1} \). This excess of investment over savings (assuming investment and savings were initially equal to one another at the warranted growth rate, \( \bar{G}_w \)) would in turn lead to a further increase in the aggregate growth rate, this producing an even greater gap between the rate of growth of investment and the rate of growth of savings. The resulting explosive growth would come to a halt only when supply constraints in the capital goods industry finally placed a ceiling on the amount of new plant and equipment which could be added or what is the more probable alternative - when an excess of capacity relative to demand finally led to a collapse of the investment boom.

On the other hand, if the secular growth rate were to fall to \( \bar{G}_2 \), the rate of growth of investment would be less than the rate of growth of savings, and the aggregate growth rate would decline, this leading to a further drop in the rate of growth of investment. The resulting
downward spiral in economic activity would come to a halt only when the rate of growth of investment finally reached zero. This process of cumulative decline may, of course, be a sequel to the period of explosive growth. What emerges from the analysis is the picture of a sector subject to alternating boom and busts. This is in sharp contrast to the stabilizing effect which the oligopolistic subsector can be expected to have.29

The potentially destabilizing influence of the non-oligopolistic subsector tends to be mitigated in practice, however, by two factors. The first follows from the point already stressed, that many of the industries which comprise the subsector are either stagnant or in secular decline. This means that only a certain segment of the non-oligopolistic sector, that consisting of the newer, rapidly growing industries, is likely to go through the boom-and-bust cycle.30 The second factor which serves to mitigate the non-oligopolistic sector's destabilizing influence is the small percentage of total investment accounted for by polypolistic and monopolistically competitive industries.31 This means that, whatever the disproportionate change in the rate of growth of investment within the non-oligopolistic sector resulting from a change in the aggregate growth rate, it will be more than offset by the less than proportional change in the rate of growth of investment within the oligopolistic sector. The crucial question, then, insofar as aggregate stability is concerned, is whether the other sectors - household, foreign and government - more closely approximate the oligopolistic portion of the business sector, where the rate of investment is less responsive to a change in the aggregate growth rate than is the rate of growth of savings, or whether they more closely approximate the non-oligopolistic subsector, where the opposite is true.

The other sectors. Traditionally, the term savings has been restricted in economics to that portion of household income not used to command consumption goods, while the term investment has been limited to physical capital formulation in the business sector. Already, in order to describe the pricing behavior of oligopolistic industries in more realistic terms it has been necessary to broaden the meaning of both terms, to extend the concept to the business sector in the case of savings and to encompass expenditures on items that subsequently bring non-material benefits, even if those benefits accrue only to private parties, in the case of investment. Now, in order to carry through this analysis of the macro-dynamics of a modern, technologically progressive economy such as that of the United States, it is necessary to extend the concepts even further.

What is about to be argued is that savings and investment demand
functions can be derived for the household, foreign and government sectors no less readily than for the two parts of the business sector itself. If the terms savings and investment seem inapplicable to some of these other sectors, one need only recall the most general definition of the two words - income not otherwise required to meet ongoing needs in the case of savings and the present commitment of physical resources in order to derive benefits beyond the current period in the case of investment. If the terms savings and investment still seem inapplicable, then one can substitute the phrases discretionary income and discretionary expenditures while keeping the definitions themselves the same (see Eichner and Kregel, 1974; Eichner, 1975).

Insofar as the household sector alone is concerned, the term savings presents no problem, of course. It is only with respect to investment, or discretionary expenditures, by the household sector that a demurrer is likely to be heard. It seems not at all unreasonable, however, to equate the latter with the purchase of consumer durables as well as of those services, such as education, whose benefits lie primarily in the future. In any case, the separation of durable goods from other consumer purchases has been found to be essential in econometric investigations. Residential construction presents a more difficult problem. The convention, at least in the United States national income and products accounts, is to treat this type of expenditure as part of business investment, with home owners, both new and old, viewed as being in the business of renting their properties to themselves. Yet it seems clear that residential construction reflects the derived demand for additional shelter by households in the same way that business fixed investment reflects, not simply the output of the capital goods sector but, more basically, the derived demand for additional plant and equipment by the business sector as a whole. For this reason it would appear best to include new housing as part of the discretionary expenditures by the household sector. While there is no problem, theoretically, in treating residential construction along with consumer durables and certain services as part of household investment, empirically it has been shown to have quite different determinants and to behave quite unlike what are usually classified as consumer durable expenditures. The practice followed here will be to include residential construction as part of the household sector’s discretionary expenditures but then to note its distinctive behavioral characteristics. With the definitional problem thus resolved, the question becomes how do the rates of growth both of savings and of investment within the household sector vary as the aggregate growth rate itself varies.

The rate of growth of savings within the household sector and the rate of growth of expenditures on consumer durables depend, of course,
on the rate of growth of disposable income, $\dot{Y}_D$. Were this to be a full exposition of the macrodynamic model in its entirety, it would be necessary to dwell at some length on the short-run relationship between $G$ and $\dot{Y}_D$. But since what concerns us here is simply the relative slopes of the savings and investment curves for the household sector and whether they suggest a destabilizing influence similar to that of the non-oligopolistic sector, the argument can be abridged somewhat.

In order for the household sector to be destabilizing, the individual family units within the sector would have to vary their own rate of growth of investment, that is, their purchase of consumer durables and certain services, more rapidly than their rate of growth of savings. This would, in turn, imply an increasing marginal propensity to consume (actually to invest in) household durables and discretionary services as the secular growth rate rises. Yet such a relationship is contrary to the observed evidence. The overall marginal propensity to consume is likely, if anything, to decline as income levels increase - especially if, as is more appropriate to the situation under consideration, it is the growth of transitory income rather than of permanent income which is being measured. In other words, savings are the more volatile part of household income. Since this proportionately greater change in the rate of growth of savings within the household sector is, in part, but the obverse of the proportionately smaller change in the rate of growth of savings occurring within the non-oligopolistic subsector - it being owner-entrepreneurs whose incomes within the household sector are likely to fluctuate most widely - this result is hardly a surprising one. Nonetheless, it suggests that the household sector, rather than being destabilizing, serves to reinforce the short-run dynamic impact of the oligopolistic subsector. Adding residential construction to consumer durable purchases merely makes the household sector even more of a stabilizing factor, for while the countercyclical pattern of new housing starts may be more supply than demand related, it nonetheless gives further evidence of an investment demand curve for the household sector with a slope which is less than that of the sector's savings curve (see Evans, 1965, ch. 7, especially section 5).

In the foreign or rest-of-the-world sector, not even the concept of savings is usually applied. Yet it should be clear, if one views the situation from the perspective of other nations, that the dollar credits (or whatever else may serve as a local or international currency) which must be surrendered to pay for imports represent, for those other countries, discretionary income. The larger the volume of their goods imported into this country or dollar credits otherwise earned, the greater will be the income of the United States' trading partners available for meeting other than their ongoing needs in international markets. Similarly,
the larger the volume of American exports, including the transfer overseas of managerial skills, the greater will be the amount of capital formation abroad. Thus the rate of growth of savings and the rate of growth of investment within the foreign sector can be identified approximately with the rate of growth of imports and the rate of growth of exports respectively.

Again, the main question that is of concern here is whether the slope of the investment demand curve relative to the slope of the savings curve makes the foreign sector destabilizing insofar as the domestic American economy is concerned, holding all factors except the aggregate growth rate constant. For the foreign sector to be destabilizing in this sense, its rate of growth of investment, that is, the purchase of goods and services in this country by other nations, would have to vary more sharply in response to a change in the level of aggregate demand than the rate of growth of dollar flows overseas. This would, in turn, imply a rate of growth of exports which is more sensitive to the aggregate growth rate in this country than is the rate of growth of imports. Once more, the conditions necessary for the sector to be destabilizing are contrary to what has been observed. It is the rate of growth of imports and, more broadly, the rate of growth of dollar outflows, which depends more directly on the level of domestic economic activity. In fact, the rate of growth of exports is likely to be somewhat insensitive to the domestic growth rate (cf. Rhomberg and Boissonneault, 1965; Evans and Klein, 1967; Evans, 1969, ch. 9, section 7; Suits, 1962).

Important as the household and foreign sectors may be in determining whether the savings-investment adjustment process associated with the oligopolistic subsector will prevail in the aggregate, the government sector, because of the large amount of discretionary income which it generates, is even more important. By now, one should have little trouble in identifying the rate of growth of savings in the government sector with the rate of growth of tax revenue, and the rate of growth of investment with the rate of growth of government outlays. Clearly, taxes represent the discretionary income of government, and the outlays by the various sovereign entities, the public sector's discretionary expenditures. By now, too, it should be understood that the critical question is whether the slope of the investment demand curve relative to the slope of the savings curve makes the government sector destabilizing.

On this point, one cannot help but conclude that, rather than counteracting the stabilizing effect which the oligopolistic subsector is likely to have, the government sector will reinforce that tendency. On the one hand, the rate of growth of savings, in the form of taxes, will be highly sensitive to the aggregate growth rate. Given a progressive income tax and, even more important, a corporate income tax geared
to the rate of growth of savings in the oligopolistic sector, government revenues can be expected to rise, and fall, at an increasing rate as the aggregate growth rate itself varies. The savings curve for the government sector is thus similar to that for the oligopolistic subsector. On the other hand, the rate of growth of investment, in the form of expenditures, will be only partially sensitive to the aggregate growth rate. Some government outlays will, of course, be entirely independent of economic considerations. More will be said of them soon. The rest, representing in varying proportions public goods and quasi-public goods, can be expected to increase over time as population and income grow. Still, over the intermediate run, any change in the secular growth rate is likely to have only a muted impact on these expenditures. The investment demand function for the government sector is thus similar to the lagged accelerator model already postulated for the oligopolistic subsector (cf. Ando, Brown and Adams, 1965; Evans and Klein, 1967; Suits, 1962).

In summary, then, it can be presumed that the savings-investment adjustment process applicable to the economy as a whole is not significantly different from that analyzed in the case of the oligopolistic subsector alone. While the non-oligopolistic subsector may well have an offsetting influence, this impact is more than outweighed by that of the household, foreign and government sectors. The latter, in particular, can be expected to experience a disproportionate change in the rate of growth of savings as the aggregate growth rate itself varies. This means that one can postulate aggregate savings and aggregate investment demand functions such as those shown in figure 21. $S_o$ is the savings curve for the oligopolistic subsector and $S$, the savings curve for the economy as a whole; while $I_o$ and $I$ are the corresponding investment demand curves. These aggregate savings and investment curves make it possible to analyze the larger dynamic of which the interrelationship between the oligopolistic subsector and the economy as a whole is but a part.

The larger dynamic

As shown in figure 21, $I$, the investment demand curve for the economy as a whole, lies below $I_o$, the investment demand curve for the oligopolistic subsector, and has a lesser slope. The lower rate of growth of aggregate investment which this presumes for a given value of $G$ reflects the inability of the government sector and, even more, of the non-oligopolistic subsector to match the rate of capital formation occurring within the oligopolistic subsector. At the same time, the lesser sensitivity of aggregate investment which this positioning also implies derives from
the dampening effect exerted by the lack of responsiveness of government expenditures to changing income levels in the short run. Both factors, as reflected by the position of $I$ relative to $I_0$ in the diagram, assure that the warranted growth rate for the economy as a whole, $\bar{G}_w$, will be less than the warranted growth rate for the oligopolistic subsector alone, whether $S$ lies slightly to the right of $S_0$ or - as is more likely to be the case, given the high marginal tax rates that presently prevail in the United States - somewhere to the left of $S_0$.

From the diagram it can be seen that, once the other sectors besides the oligopolistic one have been taken into account, a change in the warranted growth rate for the economy as a whole is possible even without a shift in either the oligopolistic sector's savings curve or its investment demand curve. If, for example, the investment demand curve for one of the other sectors should shift upward, the investment demand curve for the economy as a whole will shift upward as well. This, as can be seen from figure 21, will lead to a new warranted growth rate, $\bar{G}_w$, for the economy as a whole, even though the savings and investment demand curves for the oligopolistic sector remain unchanged.

The significant point here is that the new warranted growth rate will
be consistent with a rate of growth of savings for the oligopolistic sector that is no longer equal to the rate of growth of investment - or, to put it another way, the intersection of the $S_o$ and $I_o$ curves will no longer define the warranted growth rate for the oligopolistic sector. The upward shift in the investment demand function for one of the other sectors will necessarily push the oligopolistic sector up further along on its own savings curve so that its rate of growth of savings exceeds its rate of growth of investment.\textsuperscript{35} This simply means that, within the oligopolistic sector, the increased levels of demand will lead to a higher than expected operating ratio over the planning period and that consequently the realized corporate levy will be greater than the planned investment outlays. This excess of savings over investment within the oligopolistic sector, and possibly within one or more of the other sectors, will be balanced by the excess of investment over savings in the sector in which the autonomous shift in the investment demand curve initially occurred. In all, it will be the same as though the oligopolistic sector's own investment demand curve had shifted upward.

What has just been said about an upward shift in the investment demand curve for one of the other sectors applies, of course, in reverse if instead there should be either a downward shift in that other sector's investment demand curve or an upward shift in its savings curve. No matter what the direction of the shift or the curve involved, the result will be a divergence between savings and investment within the oligopolistic sector. As will soon be explained more fully, any such divergence is apt to set off a wage-price spiral throughout the economy. At this point, however, we are concerned only with the possible initiating cause of the divergence. This means turning our attention, at least briefly, to the second of the two questions posed at the beginning of this section, whether it is possible for either the savings or investment demand curves for one of the other sectors of the economy to shift autonomously, that is, for some reason other than a change in the secular growth rate.

While it is possible to stipulate conditions under which the savings curve in one of the sectors might shift autonomously, it is questionable whether the change in the rate of growth of savings - holding the growth rate for the economy as a whole constant - will be more than a temporary one. For example, the savings curve for the non-oligopolistic sector will shift autonomously if, because of a sudden change in economic prospects arising from non-economic events, owner-entrepreneurs decide to alter the rate at which they have been withdrawing income from their businesses. The savings function for the household sector will shift autonomously if, following a similar sequence of events, family units decide to alter the rate at which they have been purchasing consumer
goods. But at some point expectations will necessarily have to be brought back into line with reality so that the rate of growth of savings will once more depend on the secular growth rate for the economy as a whole. The savings curve for the government sector, while capable of shifting autonomously in a way that is not simply temporary, nonetheless poses a special problem to be brought out later.

It is thus the investment demand function and, even more specifically, the investment demand curve in three of the four other sectors which is most likely to shift in such a way as to initiate on its own, independently of other factors, a permanent change in the secular growth rate. Such a shift can occur in the investment demand curve for the foreign sector through autonomous developments abroad. It can occur in the investment demand curve for the non-oligopolistic sector through the impact of a Schumpeterian grand invention or even some lesser technological breakthrough. Finally, such a shift can occur in the investment demand curve for the government sector through the addition of new programs or through the liberalization of existing programs. Of these several possible shifts, only the latter two warrant a more extended discussion.

A Schumpeterian grand invention, like, for example, the automobile in the early decades of the twentieth century, can be expected to generate a major expansion of aggregate demand. As the new technology becomes commercially exploitable, significantly altering consumption patterns, the secular growth rate for the business sector as a whole will increase even without any stimulus from the government and foreign sectors. While the oligopolistic subsector will experience some increase in its own growth rate, the more dramatic result will be the birth of entirely new industries within the non-oligopolistic subsector. Over time, of course, these industries will tend to become oligopolistic as a result of the evolutionary process already described. Concurrently, as the portion of total income which the new product can command approaches some asymptotic limit, the growth rate of these industries will tend to slow down until it approaches that for the oligopolistic subsector as a whole; this slowing down of the growth rate corresponding to the contractionary phase of that particular Kondratieff cycle (Schumpeter, 1939, vol. 1).

Still, in the meantime, the overall economy will have experienced a period of vigorous expansion as a result of the investment demand curve for the non-oligopolistic subsector having shifted outward. Lesser technological breakthroughs will simply have a lesser stimulative effect. The key point to be noted here is that this continued birth of new industries within the non-oligopolistic subsector through the impact of Schumpeterian grand inventions and even somewhat paler imitations is the primary source of autonomous growth within the business sector as a whole.

A Schumpeterian grand invention, like autonomous developments
abroad, reflects forces over which the society itself has little control. It is precisely the opposite characteristic of government expenditures which makes them of such critical importance. Whatever the existing growth rate for the economy as a whole may be, the society can consciously choose to raise or lower it by varying the rate of growth of government expenditures, thereby autonomously shifting the investment demand curve for the government sector. It might seem that the same result could be achieved by manipulating the various tax rates, thereby autonomously shifting the saving curve for the government sector as well. But as the next chapter will bring out, this alternative approach, since each tax rate is also a parameter of some other sector's savings function, may not have the full effect intended. For this reason, the most certain means of controlling the aggregate growth rate is by shifting the investment demand curve for the government sector.  

What is being suggested here is that the society, through its political system, can choose the secular growth rate it wishes — as long as that growth rate does not exceed what is defined in the next chapter as the potential growth rate. If the current growth rate is \( \bar{G}_w \), as depicted in figure 21, but the society prefers a higher growth rate, say one closer to \( \bar{G}_w \), the government need only increase its rate of growth of expenditures relative to the rate of growth of tax revenue. Should this excess of investment over savings in the government sector be maintained on the average over the interval which encompasses the normal cyclical pattern of fluctuating aggregate output, the investment demand curve for the economy as a whole will shift secularly from \( I \) toward \( I' \). Whether all the intersectoral effects can be fully spelled out in advance is not the issue.  

The fact is that the government, by maintaining a rate of growth of expenditures, or investment, that on balance exceeds the rate of growth of tax revenue, or savings, over the intermediate run, will assure that a higher secular growth rate for the economy as a whole, one approximating \( \bar{G}_w \), is achieved. Similarly, the government, by allowing the rate of growth of expenditures to fall below the rate of growth of tax revenue, can see to it that a lower secular growth rate is realized.  

While the society can, through the intermediary device of its political system, choose the secular growth rate it prefers within certain limits, what must be understood is that the growth rate so selected is unlikely to be a sustainable one — given the economic institutions which presently exist in a country like the United States. The reason is not, as is often supposed, that the growth rate chosen is apt to be different from the so-called natural growth rate. It is rather that the very process by which the secular growth rate is manipulated — in the main, by an autonomous shift in the investment demand curve for the government sector but
also, to a lesser extent, by a shift in the savings curve as well - will
necessarily lead to a discrepancy between the rate of growth of savings
and the rate of growth of investment within the oligopolistic sector.
This divergence between the two growth rates, the obverse of the
divergence within the government sector, will give rise to a redistributive
effect which, together with the nature of the supply curve in the
non-oligopolistic sector, is almost certain to touch off a wage-price
inflationary spiral. Indeed, this is likely to be the result whether the
shift in the government's investment demand and/or savings curve is
intentional or not. Why any such change in the secular growth rate
will tend to be destabilizing is the subject matter of the chapter which
follows.