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FINANCE IN A DEVELOPMENT CONTEXT: LESSONS FROM WEST GERMANY

A DISSERTATION

SUBMITTED TO THE DEPARTMENT OF ECONOMICS

AND THE COMMITTEE ON THE GRADUATE DIVISION

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

By

Edward John Ray

May, 1971

I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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CHAPTER I

GENERAL INTRODUCTION

Two branches of theoretical literature relating to the allocation and accumulation of capital in developing countries will be presented and analyzed in the dissertation. One branch of the literature, optimal intervention analysis, can be used to derive a ranking of policies aimed at offsetting product and factor market distortions through the use of taxes, subsidies and tariffs. In Chapter II, we will argue that the problems of wage distortions and the presence of externalities, which were focused upon by early works on optimal intervention analysis, can be traced to an absence of integrated financial services. Consequently, the various forms of direct market intervention considered are evaluated according to their effectiveness in offsetting capital market distortions.

The second branch of the literature, classical and neo-classical development theory, is concerned with deriving policies to increase the rate of capital accumulation and thereby the potential growth rate of developing countries. Using classical savings assumptions, one can derive a simple income distribution model to explain aggregate saving behavior. By varying assumptions about workers' savings habits and the degree of financial development, we develop four variants of the simple income distribution model. These models are used to explain the development experience of West Germany during the period 1948-1968.

A serious flaw in both approaches is that neither assigns importance to financial development as a means of changing private savings and investment behavior in the short-run or in the long-run. Oversimplifying

the task of centrally allocating capital, "optimal intervention analysis" fails to include financial development as a viable policy alternative to direct government intervention by tariffs and subsidies to improve specific industries. Moreover, classical and neoclassical development theory is used to derive policies to effect a more rapid rate of capital accumulation, assuming constant savings rates in an underdeveloped world where savings rates are highly variable.

Specifically, the purpose of the dissertation is four-fold. First, by presenting a summary of the development literature dealing with the problems of allocating and accumulating capital, we will clarify traditional assumptions about savings behavior, the speed with which financial change can occur, and the certainty and effectiveness of government intervention as a substitute for development of the financial sector. The implications of a simple relationship between the aggregate savings rate and the profit share of income, assumed to exist in traditional development theory, are examined. Secondly, we will clarify the relationships that exist between financial development and individual savings behavior--with particular emphasis on allocative efficiency, the relative supply of external finance, and the term structure of lending.

Thirdly, we will present evidence from the post-war West German experience which contradicts the traditional assumption of constant savings rates out of the shares of income accruing to labor and capital. Hence, there need not be a simple relationship between the aggregate savings rate and the profit share of income. The German study provides rather striking evidence that rapid financial change can occur over the relatively short historical period of 20 years, and this should be considered as a relevant policy objective for less developed economies.

Finally, policy prescriptions arising out of accepted theory are examined; and new policy recommendations are put forward. Our primary conclusion is that financial markets can play an integral part in determining the growth possibilities of a developing country and that financial development is a realistic alternative to direct government intervention.

CHAPTER II

THE ALLOCATION OF CAPITAL IN A DEVELOPING ECONOMY

Section I: The Causes of Factor Market Distortions

Optimal intervention theory has developed into a simple and promising tool for diagnosing and suggesting solutions for economic problems in developing economies. [4], [8], [9], [11], [12], [14], [15] Most of the literature has centered on an analysis of a labor surplus economy (an economy in which the marginal product of some workers is zero). While maintaining the assumption of full employment, various authors have suggested policies to offset the presence of a wage differential between the industrial and agricultural sectors of developing economies (wages being higher in the industrial sector than in the agricultural sector). Stephen Magee, [15], has applied this analysis to the case in which the return to capital is higher in the industrial sector than in the agricultural sector. None of these papers presents a satisfactory explanation for different rates of return to a factor in different sectors of the economy. Alternatively, we will argue that all factor market distortions--labor, capital and land--can be traced to the absence of integrated financial markets. The fact that financial integration is ignored in the received theory suggests that the "optimal" policy intervention prescribed is unlikely to be optimal.

The remainder of this section will be devoted to enumerating the causes of factor market distortions and framing our problem within the context of optimal intervention techniques of analysis. In Section II, we briefly review and clarify the techniques of optimal intervention analysis

relevant to our discussion of factor market distortions. In Section III, we discuss the appropriateness of policies derived from such models to the problem of resource misallocation in developing countries and suggest an alternative framework.

Although we will have a great deal to say about intrasectoral market imperfections, the use of optimal intervention analysis requires us to define the economy as consisting of two sectors: The particular dichotomy we use is between a modern sector, (M), and a traditional sector, (T). Throughout we assume that there are two factors of production, labor (L) and capital (K), which are used in the production of M and T. The two-good, two-factor model is the usual structure to which techniques of optimal intervention analysis have been applied. We further assume that the economy is relatively labor abundant. The traditional sector is relatively labor intensive; the modern sector is relatively capital intensive. Free trade would result in exports from the traditional sector and imports of the produce of the modern sector.

For the most part, the literature on optimal policy intervention is a static analysis focusing on the allocation of a fixed endowment of resources among alternative uses and proposing "optimal" policy prescriptions for given market distortions. Johnson [10] and Bhagwati [2] have introduced the idea of a two period horizon into this analysis in order to investigate the possibility of perverse welfare effects of growth in a distorted economy. More recently, Bhagwati has attempted a ranking of policy interventions, given market distortions in a two period model. [3]

As one probes into the causes of a misallocation of resources in the context of a static model, he becomes uncomfortably aware that the determinants of the static allocation of resources are also important in

determining the allocation and accumulation of resources over time (see Section III). Because of its limited nature, optimal intervention theory cannot help us to determine if the intervention will be temporary or permanent or if a policy that is optimal in the short-run will also be optimal in the long-run. This strongly suggests that the interesting problems and implications of market distortions are dynamic in nature and beyond the scope of a static model. There is more than a lack of robustness involved here. The ease with which static analysis leads one to accept initial conditions as given has resulted in a failure in the received theory to perceive linkages that may exist between the causes of market distortions and the viability of market interventions. No thought is given to the possibility that the factors which contribute to the original distortion may also impair the efficiency of policy intervention. Consequently, policy intervention by a central authority is made to seem too easy to apply and too certain in its effects and, perhaps what is worse, too palatable an alternative to attacking the source of a distortion.

These points will become clearer as we proceed. The dichotomy between the traditional and the modern sector has been made for several reasons; for the moment, we will offer one reason for such a dichotomy. (As already mentioned such a dichotomy is necessary if we are to frame our problem in the context of optimal intervention analysis.) Often, both in the development literature and in policy-making bodies, developing countries have been viewed as consisting of an agricultural sector and a manufacturing sector. Policy makers have sought to speed up economic development in their countries by mimicking relative product mixes in advanced economies. This approach leads to the simple-minded notion that agricultural production is bad and manufacturing production is good, which has

sometimes expressed itself in the form of taxes on agricultural products and subsidies on factor inputs into manufacturing. As the effects of this strategy become more pervasive, the agricultural sector declines and the industrial sector expands in an atmosphere of distorted factor and output prices with little hope of surviving in a competitive international market.

In contrast, the modern sector, as defined in this paper, will include production of agricultural goods by new techniques, as well as commercially viable manufacturing, which is not heavily subsidized. The modern sector--traditional sector dichotomy permits us to view the growth process in terms of a transition to improved methods of production at all levels rather than as a transition from agriculture to manufacturing.

We assume that prior to any policy intervention, the average cost of capital is higher in the modern sector than in the traditional sector. (The fact that capital is often cheaper to the modern sector than to the traditional sector is largely the result of explicit policy intervention of the sort recommended by optimal intervention analysis.) The primary cause of the differential is the fact that information about investment opportunities is imperfect and the best source of such information, a highly developed financial sector, either does not exist or exists in only a crude form.

We can explain the differential in the context of a simple mean-variance analysis. Individuals base their investment decisions on the mean-variance combinations of the assets available to them by maximizing the expected utility of their portfolios subject to their budget constraints (generally assuming decreasing absolute risk aversion). The lack of perfect information in the system means that the subjective probability functions of the individual investors will diverge from the objective

probabilities associated with the available menu of assets. These subjective probability functions will depend upon a number of parameters which, for the sake of brevity, we will classify as technical know-how and market know-how. In a highly developed capital market, one can get estimates of the potential profitability of an investment by consulting market prices or even reading profit statements which companies may be required to issue periodically. One uses such information to help him formulate his subjective probability function for returns on an investment. The more accurate and extensive the information, the closer one's subjective probability estimates will accord with the objective probability function. Given a decision rule, the investor would revise his subjective probability function until he achieves an optimal allocation of his investment funds. The costs of information can be measured in terms of misallocated resources and the consequence that the dynamic path of "profits received" will be below the optimal full information path. In addition, in developing countries where there is no ready market to buy and sell securities, the reallocation process itself is not costless.

A simple example may help to clarify what we have been saying. Offered two portfolios, A and B, which have the same objective probability distributions, with perfect information about the assets in portfolio A and imperfect information about the assets in portfolio B, an investor would prefer to hold portfolio A. This stems from the fact that the investor is aware of the potential cost of a suboptimal allocation of funds and that this cost will be positive when he is faced with imperfect information. The premium will be higher as the cost of information and the cost of reallocating funds rises, i.e., the more imperfect the capital market is.

What do these considerations suggest regarding the costs of capital to the modern and traditional sectors of the economy? Our discussion suggests that the cost of external finance will be high to both sectors of the economy. Lacking information about potential borrowers and the soundness of their investment plans, individuals in both sectors will content themselves with lower, "safer" rates of return on investment by plowing funds back into their own enterprises. Capital tends to be locked-in, immobile, and is inhibited from flowing in the direction of greatest profitability.

This inertia in the flow of capital and the resultant high cost of external finance will have a differential effect on the cost of capital and equilibrium rate of return on investment in the two sectors. The absence of integrated financial markets means that the opportunity costs of plowing-back funds will be low in the economy. Therefore, the cost of capital for investors in the traditional sector who have funds to invest will be low. Since enterprises in the modern sector will, by their nature, be limited in their endowments of owned capital, they will be heavily dependent upon external financing and for this reason will face relatively high capital costs than investors in the traditional sector. Investments which promise higher rates of return than rates obtained on investments in the traditional sector (with comparable objective risks) will not be undertaken because of an inability to obtain external financing. Notice, there is nothing that implies that the cost of capital is higher for every investor in the modern sector relative to every investor in the traditional sector. We require only that the cost of capital would on average be higher in the modern sector than in the traditional sector because on average we would

expect investment in the modern sector to be more heavily dependent upon external financing than investment in the traditional sector.

With this background, we can obtain some insight into the argument by governments that they should subsidize infant industries. An infant industry is generally defined as an industry which is unprofitable in the short-run, but because of economies of scale and/or learning by doing effects one which is profitable in the long-run. The explanation of why such industries cannot obtain external finance through the private sector rests on the locked-in nature of capital in fragmented financial markets. The conclusion that governments should subsidize infant industries rests on the naive belief that government administrators can circumvent the need for financial markets to solve the allocation problem and correctly identify profitable investments on their own. We will return to this point in Section III.

Another argument that has been advanced to justify government subsidies to the modern sector is that because of a lack of external finance the private rate of return on investment will be below the social rate of return on investment in certain areas. This implies that the private sector will underinvest in those areas. Clearly if financial markets operated perfectly, an appropriate amount of external finance would be allocated to each investment project. As in the case of the "infant industry" argument, the need for government intervention can only be justified because financial markets are failing to allocate capital in a socially optimal way. Yet, traditional policy recommendations, as in the case of the infant industry argument, take the form of direct subsidies to industry. Intervention into the financial sector to improve its allocative efficiency is never considered.

The existence of a wage differential with higher wages in the industrial sector than in the agricultural sector is another argument used to justify the subsidization of manufacturing. Governments frequently subsidize the importation of capital goods used in manufacturing activities. Without the technical know-how needed to adapt foreign technology to their domestic economy, native industrialists are encouraged to mimic techniques of production used in developed economies. These techniques will tend to be too capital intensive. But, as long as the government is providing the funds to buy capital goods and providing tariff protection to inefficient producers, the industrial sector will continue to use inappropriate techniques of production. Moreover, these subsidies themselves may aggravate the higher wage-rental ratio in the industrial sector as compared to the traditional sector. Instead of being exogenously given, the industrial wage becomes determined by the policy of industrial subsidization. Where these enterprises are foreign owned, domestic unions and government will use their power to raise wages and increase the labor share of income in the industrial enclave as a means of maximizing the domestic share of total product. This distortion in the wage-rental ratio in the industrial sector will persist as long as government intervention in the form of subsidies and tariffs continues to make inefficient production profitable.* Hence, the use of subsidies to overcome what is basically a "financial" problem is inherently limited.

Although we will be focusing on the intersectoral allocation problem, stemming from imperfect information and the lack of an advanced

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*The absence of a fully developed market in human capital will be reflected by the inertia on the part of workers to apply their human capital to new techniques and types of production in the modern sector. Labor in the traditional sector will be locked in.

financial structure, there are equally important problems of intrasectoral allocation. The information problem and the resultant high cost of external finance which exists in a broad sense across sectors is also present within sectors. Entrepreneurs who wish to expand their operations, whether in the traditional or the modern sector, are restricted primarily to internal finance. The fragmentation of the securities market and the lack of information about existing securities make it difficult for individuals to float new securities and for monetary institutions and individuals to diversify their portfolios; the riskiness and illiquidity costs attached to any investment project are increased by these market imperfections. High illiquidity costs lead investors to adjust the term structure of their portfolios toward the short-end. High risk premiums discourage investments and raise the cost of capital throughout the economy.

It is worth noting that with optimal intervention analysis, we will not be able to handle optimally the problem of intrasectoral distortions or the problem of a generally slow rate of capital accumulation in developing countries. Nevertheless, it seems worthwhile to briefly review optimal intervention theory based on the more appropriate sectoral distinction between "modern" and "traditional."

Section II: Optimal Intervention Analysis

Throughout this section, we will view a particular economy in terms of a two-good, two-sector model. The two sectors are the modern sector, M, and the traditional sector, T. The two factors of production are capital, K, and labor, L. Both production functions are linear homogeneous; and except for the distortion in the capital sector, the economy obeys all of the optimality rules of a perfectly competitive economy. The algebraic model corresponding to the geometrical analytics of this section is presented in Appendix A. As explained in the appendix, the effect of a distortion in the factor markets is to shift the operating production surface (aB'm) inside the Domestic Transformation Surface (aBm) as shown in Figure 1.

Incorporating the assumptions of perfectly mobile, flexibly priced, fully employed factor inputs into our model, we can analyze the efficiency of different policy prescriptions, given a distortion in the allocation of capital. Referring to Figure 2, with no distortions in the economy, production would take place at point B with exports of BE_1 units of T and imports of E_1C_1 units of M. A factor market distortion such that producers in the modern sector face a higher price for capital than producers in the traditional sector results in production at point B' on the shrunken production frontier aB'm with exports of T of $B'E_2$ and imports of M of E_2C_2. Our graphical and algebraic results both indicate that the differential reduces production of M, increases production of T, and increases both exports and imports. From our graphical analysis, we note that the distortion reduces social welfare from U_1 to U_3.

Introduction of a production subsidy on production of M and tax on production of T changes the product prices seen by producers to the

Figure 1.

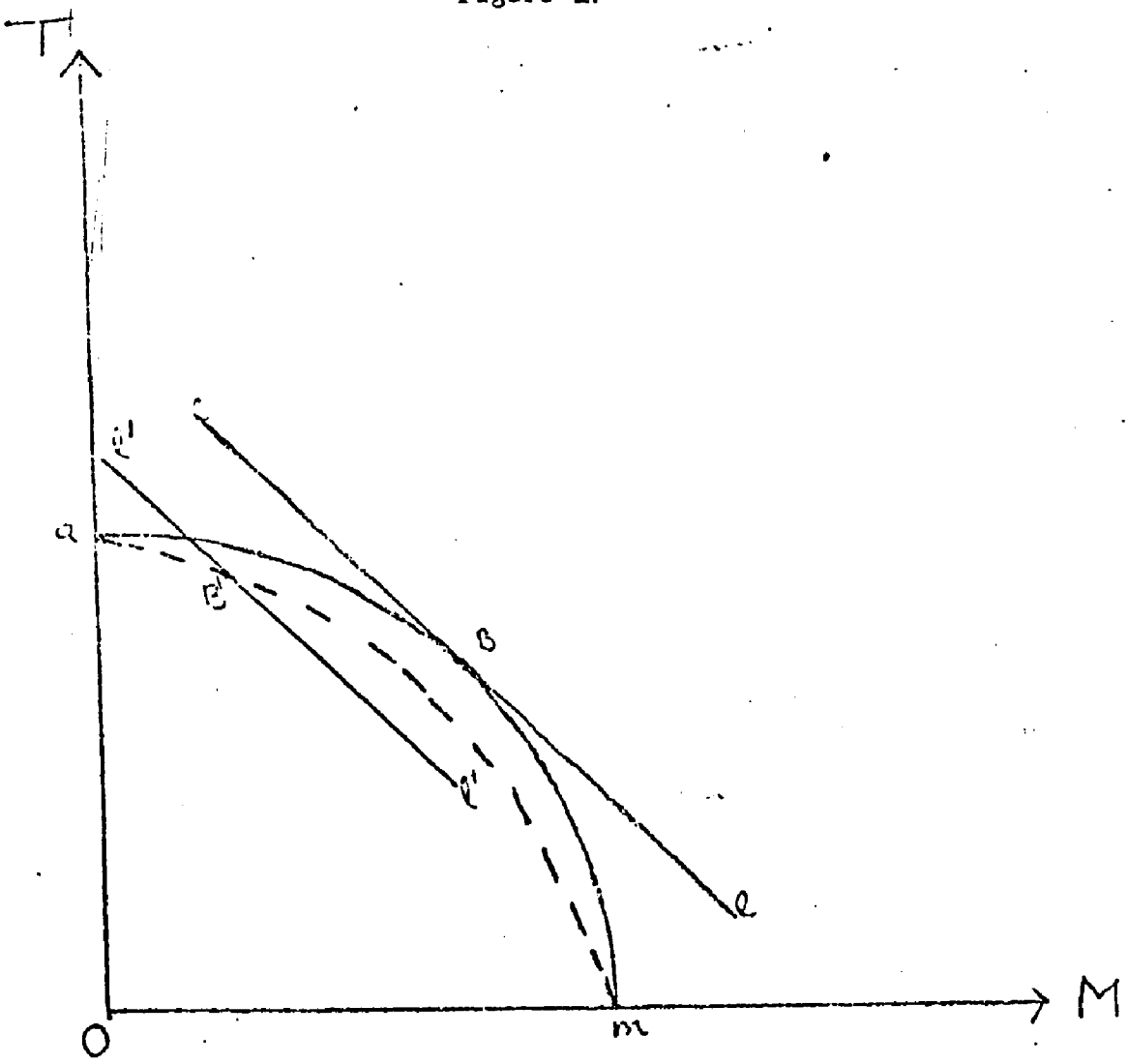
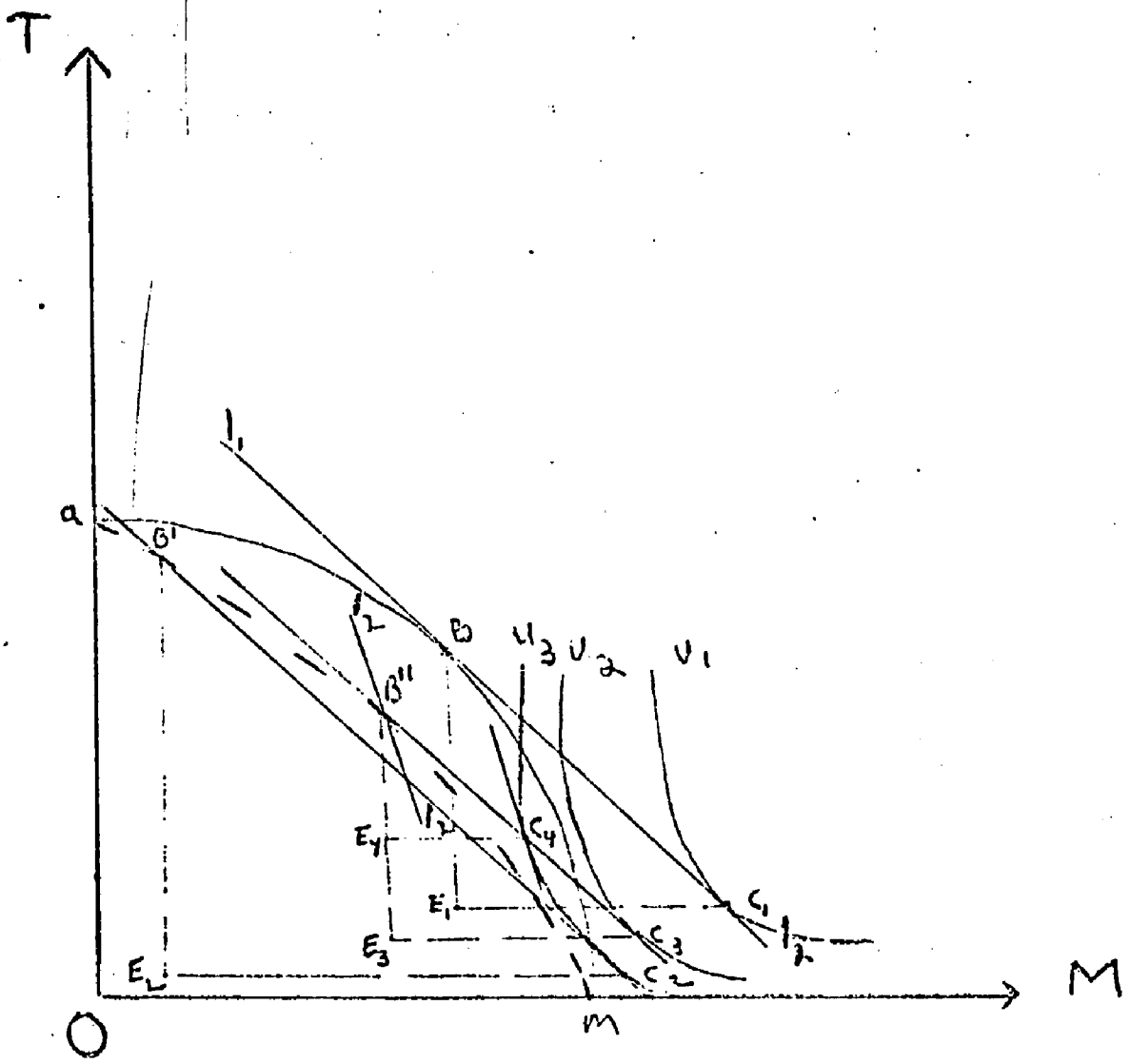


Figure 2.



slope of l_2l_2, (P_M/P_T), representing a relative rise in the price received by producers in the modern sector. Consequently, production shifts to point B" on aB"m while exports of T shrink to $B"E_3$ and imports shrink to E_3C_3. The production tax-cum-subsidy moves the economy back toward the optimal product mix by causing an expansion of the modern sector and a contraction of the traditional sector and, consequently, raises the level of social welfare from U_3 to U_2.

A tariff on imports of M could also move us to point B", decreasing exports to $B"E_4$ and imports to E_4C_4. As shown in Figure 2, a tariff is inferior to a production tax-cum-subsidy; and, in fact, in Figure 2 we find that social welfare has not been increased by the tariff. This possibility arises from the fact that although the tariff moves the economy to a more efficient product mix, consumers now face distorted consumption prices, which discourage consumption of M relative to T. In our example, the consumption loss just offsets the production gain and the level of social welfare remains at U_3. Given a large enough consumption loss, a tariff could prove to be worse from a welfare standpoint than no policy intervention at all.

A factor subsidy-cum-tax on the use of capital in the modern sector could move us from the shrunken transformation curve aB'm to point B on the outer production frontier aBm, as in the case where there is no factor market distortion. This is simply a review of the results obtained in the literature on optimal policy intervention, and our results yield Bhagwati's ranking of policy interventions in the face of factor market distortions:

best: factor tax-cum-subsidy
next best: production tax-cum-subsidy
worst: tariff

A factor tax-cum-subsidy is the most efficient form of direct intervention while a tariff is the least efficient form of intervention.

There is a further difficulty in the use of production subsidies or tariffs. While producers using traditional techniques to produce a product such as rice are in the traditional sector, producers of rice using newer techniques would be in the modern sector. A production subsidy to rice producers of a tariff on imported rice would subsidize both kinds of production. Policies are needed to promote the most efficient producers of rice, not rice production in general.

David and Fishlow [8], Johnson [12], Lewis [14], Magee [15] and others have questioned the underlying assumptions of Bhagwati and Ramaswami regarding factor mobility, full employment and the derivation of the shrunken production frontier. A detailed discussion of the issues that have been raised is presented in Appendix A, pp. A-9 -- A-18. On cannot help but be impressed by the fact that even with modifications in a number of the underlying assumptions of the analysis, the original ranking of policies by Bhagwati and Ramaswami is still valid. In Section III, we will raise some new issues and reassess the relevance of the Bhagwati-Ramaswami formulation.

Section III: Limitations of Optimal Intervention Analysis

In Section I, we suggested that the fragmentation of the capital market implied that the intermediation process was not taking place, i.e., external finance was virtually non-existent and that information was sparse and unreliable, contributing to the subjective estimates of the riskiness of new projects. Yet, we have implicitly assumed in Section II that the central authority somehow knows the optimal product mix for the society. The government is assumed to know both the shape and the location of the outer transformation surface. The kind of omniscience implied is difficult to take seriously.

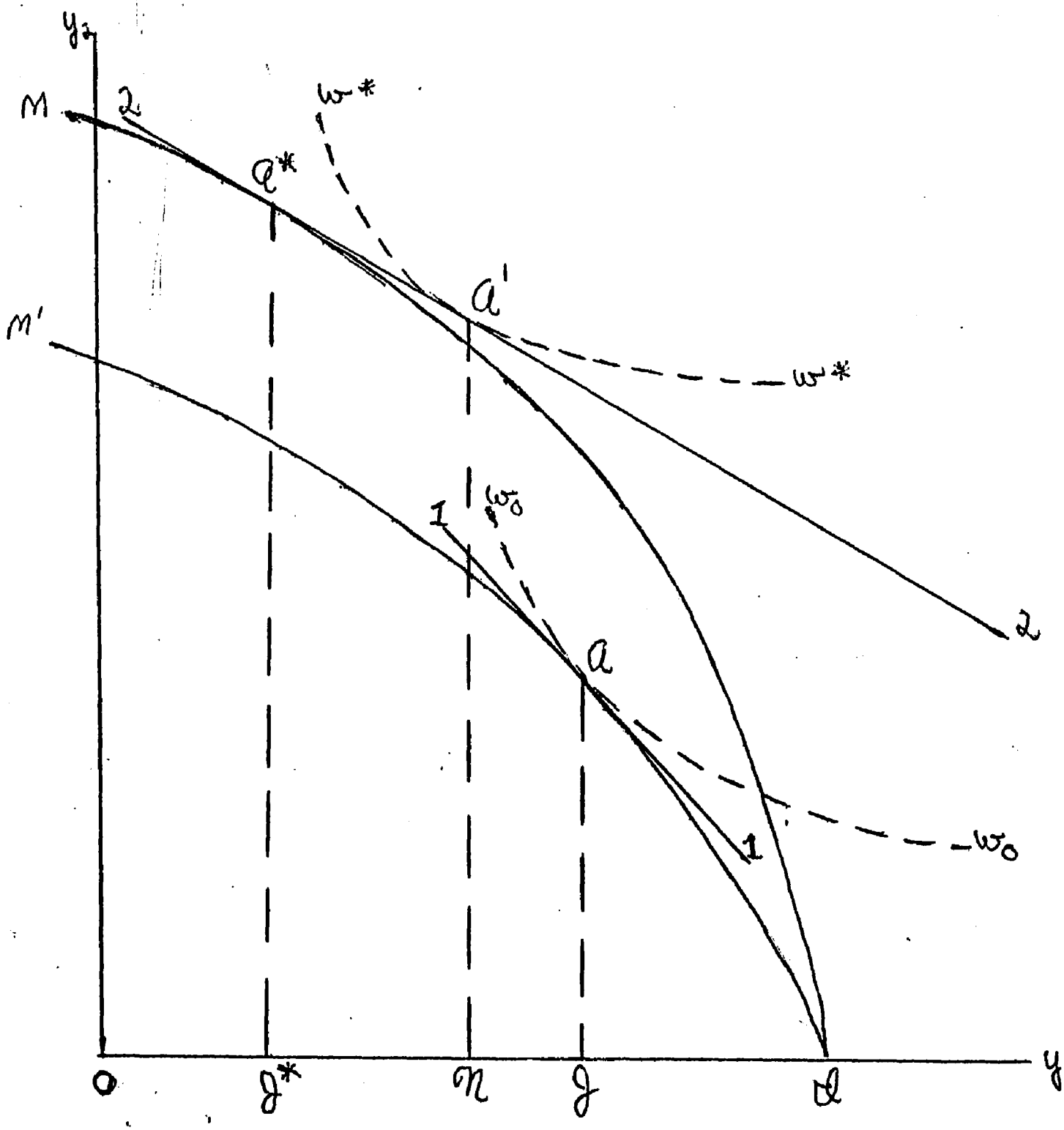
The pervasiveness of the fragmentation problem and the limitations of optimal intervention analysis can be pinpointed by use of a simple two period Fisherian analysis.* Referring to Figure 3, we can analyze the investment decisions of an individual with respect to a given class of assets (all of the projects considered have equal subjective risk). The individual is assumed to have income, y_1, in period I and no guaranteed income in period 2.** Assuming that there is no access to external finance (no borrowing or lending), he will invest current income until the marginal rate of time preference (measured by the slope of his willingness curve $w_o w_o$) is equal to the marginal rate of return above cost on investment (measured as the slope of the investment opportunity curve IAM'). The diagram suggests that this particular individual will consume income OJ today and invest JI of his income.

---

*Irving Fisher, The Theory of Interest, Kelley and Millman, Inc., New York, New York, 1954.

**Allowing the individual to have a certain level of income in both periods would simply shift the origin to 0, y_2^* where y_2^* is the guaranteed income of period 2.

Figure 3



To understand how financial integration affects the individual's investment decisions, we must first realize that without any financial markets the investment opportunities facing any individual are limited to those represented by plowing back funds into his own enterprise and new projects which he might undertake entirely by himself (IAM'). The development of financial markets increases the investment opportunities for the individual by enabling him to lend to or buy shares in other enterprises. The effect of this expansion in his investment opportunities is represented by the outward shift of his investment opportunity locus to IA'M.

A further consequence of financial integration is that assets will be salable and individuals will be able to reduce the locked-in nature of investment. As a result, the subjective risks of investment are reduced, and the individual will be more willing to invest. This increased willingness to invest is reflected by the fact that w*w* is less steeply sloped than $w_o w_o$ for any given level of investment. As Fisher himself suggested,

> When a security because it is well known or for any other reason has a high degree of salability, that is, can be sold on short notice without great risk of sacrifice, its price will be higher than less favored securities and the rate it yields will therefore be low. Salability is a safeguard against contingencies which may make quick selling advisable. In other words in a world of chance and sudden changes, quick salability or liquidity is a great advantage.

Clearly, this applies with equal force to any particular class of asset which becomes more salable because of financial development. The fall in the market rate of interest on the class of assets considered is represented by the fact that the line 2-2 is less steep than 1-1. The slope of 2-2 represents the market trading line.

Faced with a new investment opportunity locus and an increased willingness to invest, we find that the individual now invests NI of his

own income and borrows the sum J*N for investment purposes. His total investment has increased from JI to J*I.

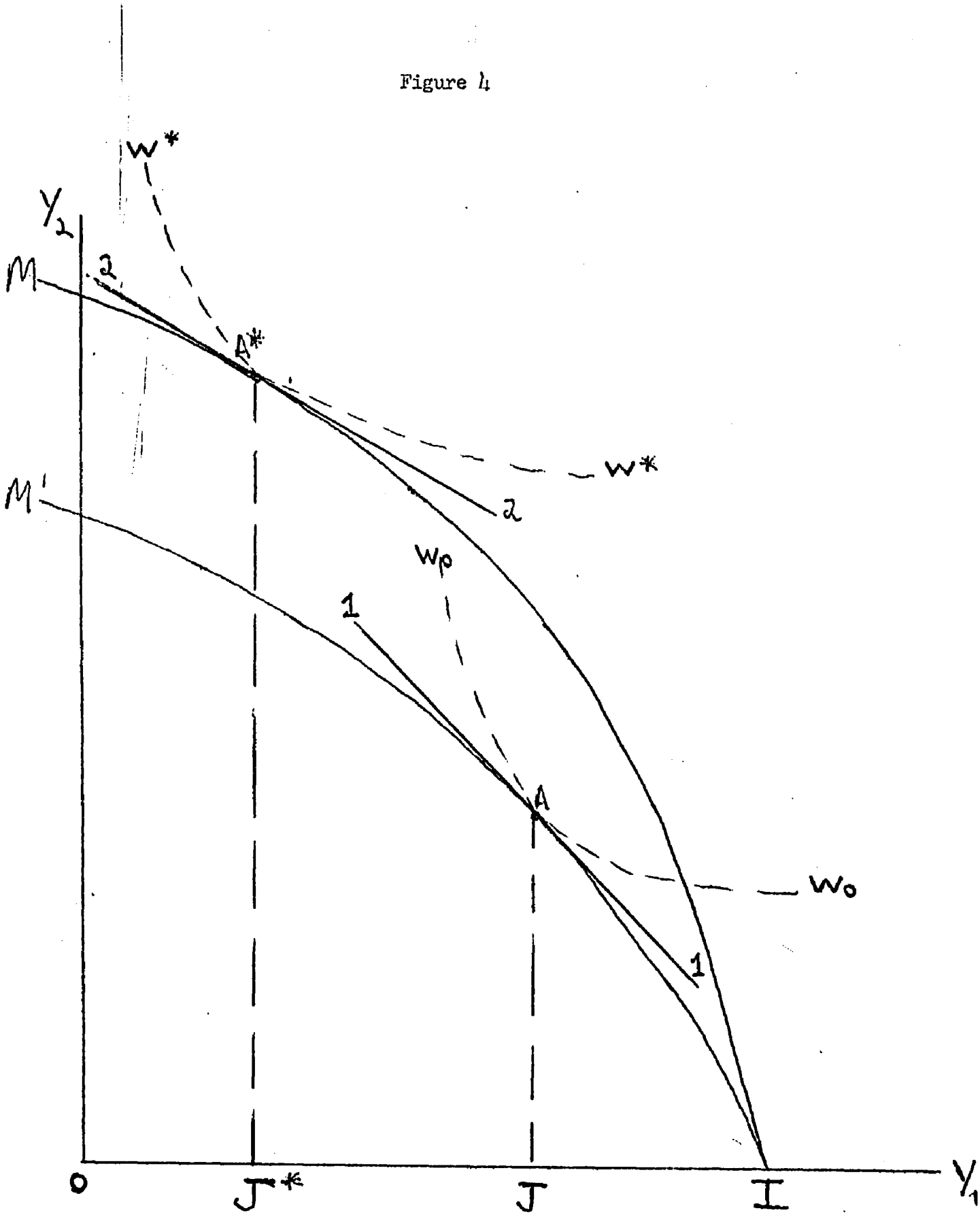
If we refer to Figure 4, we can depict the effects of market integration on the demand for a particular class of asset for the economy as a whole. The effect of financial integration in expanding investment opportunities for society is represented by the shift in the investment opportunity locus from IAM' to IA'M. The increased desirability attached to the particular class of investment because of increased salability is reflected by the fact that the slope of 2-2 is less than the slope of 1-1. Investment is expanded from IJ to IJ*.

The possibility that there are many classes of investment available in the economy makes our analysis much more complex. If there are n types of assets, we would need an n + 1 dimensional space to represent the optimal investment problem; and the solution would involve n different equilibrium rates of interest.

One immediate fact discerned from our simple Fisherian analysis is that there is an important and positive relationship between the efficiency of capital allocation and the desired level of aggregate investment. Static optimal intervention analysis does not permit us to investigate this essentially dynamic relationship.

By presenting the problem of capital allocation in terms of a two-good, two-factor model, optimal intervention analysis simplifies both the problem and its solution. By ignoring the fact that many goods are produced in each sector, we completely miss the point that the allocation problem is as real and important within sectors as it is between sectors. Capital is not only locked in each sector, but also within subsectors of each sector. Without financing or access to relevant information, a

Figure 4



producer in the traditional sector will not be able to initiate new projects in the traditional sector any more than he will be able to initiate projects in the modern sector. The problem of misallocating resources concomitant with a fragmented capital market is pervasive. As our Fisherian analysis suggests, there are n market rates of interest to be solved for, not simply one as suggested by the analysis of Section II. Viewing our "optimal" policy intervention in this context, we realize that the government is assumed capable of replacing a properly functioning capital market by deciding which firms and industries should expand, which ones should contract, and at what rate these changes should occur.

Inefficiency and fragmentation in the capital market impedes the ability of individuals in the private sector to allocate capital in an optimal way; it seems illogical to assume that this same uncertainty and lack of information will not impair the effectiveness of policy planning. The distortions which make it impossible for the private sector to function optimally will also prevent the central authority from functioning optimally. Yet, the fact that the state of financial development never enters this analysis explicitly guarantees that the most promising policy for an efficient allocation of capital -- the promotion of financial growth and integration -- is never considered.

BIBLIOGRAPHY

1. Arrow, Kenneth J. Aspects of the Theory of Risk Bearing. Yrjo Jahnssen Lectures. Helsinki, 1965.

2. Bhagwati, J. "Distortions and Immiserizing Growth: A Generalization," Review of Economic Studies. 35 (November, 1968).

3. Bhagwati, J. "The Generalized Theory of Distortions and Welfare" (mimeographed, 1969).

4. Bhagwati, J. and V. K. Ramaswami. "Domestic Distortions, Tariffs and the Theory of Optimum Subsidy," Journal of Political Economy, 71 (February, 1963).

5. Bhagwati, J. and T. N. Srinivasan. "Optimal Intervention to Achieve Non-Economic Objectives," Review of Economic Studies, 36 (January, 1969).

6. Eckaus, R. S. "The Factor Proportions Problem in Underdeveloped Areas," American Economic Review (September, 1955).

7. Fisher, Lawrence. "Determinants of Risk Premiums on Corporate Bonds," Journal of Political Economy (June, 1959).

8. Fishlow, A. and P. David. "Optimal Resource Allocation in an Imperfect Market Setting," Journal of Political Economy, 69 (December, 1961).

9. Hagen, E. "An Economic Justification of Protectionism," Quarterly Journal of Economics, 72 (November, 1958).

10. Johnson, H. G. "The Possibility of Income Losses From Increased Efficiency or Factor Accumulation in the Presence of Tariffs," Economic Journal, 77 (March, 1967).

11. Johnson, H. G. "Factor Market Distortions and the Shape of the Transformation Curve," Econometrica, 34 (June, 1966).

12. Johnson, H. G. "Optimal Trade Intervention in the Presence of Domestic Distortion," in Baldwin et al., Trade, Growth and the Balance of Payments. North Holland Pub. Co., 1965.

13. Johnston and Mellor. "Agriculture in Economic Development," American Economic Review, (September, 1961).

14. Lewis, Stephen Jr. Taxation and Growth in the Dual Economy: An Evaluation of Tax Devises in Underdeveloped Countries, Stanford dissertation (1963).

15. Magee, Stephen P. Factor Market Distortions and the Price Theory of International Trade, M.I.T. dissertation (May, 1969).

16. McKinnon, R. I. "On Misunderstanding the Capital Constraint in LDC's: The Consequences for Trade Policy" (mimeograph, 1969).

17. McKinnon, R. I. "On Misunderstanding the Capital Constraint in Underdeveloped Countries," Stanford Research Center in Economic Growth, 75 (July, 1969).

18. Nurkse, Ragnar. Problems of Capital Formation in Underdeveloped Countries, Oxford Economic Press (1962).

CHAPTER III

CAPITAL ACCUMULATION IN DEVELOPING COUNTRIES: INCOME DISTRIBUTION AND THE SOURCES OF FINANCE

In Chapter II, we pointed out the need to treat financial organization and integration explicitly if we are to understand the problem of allocating capital efficiently in a developing economy. The purpose of this chapter will be to explore the conditions under which simple income-saving equations can be derived and to suggest that the stability and relevance of such models is not independent of the level and degree of integration of financial markets. There are a number of important questions that are relevant:

(1) What is the relative importance of external vis a vis internal funds in financing aggregate investment?

(2) What forms of external finance are available in the economy, e.g., bank loans, sale of shares, sale of bonds, etc.?

(3) What factors determine the term structure of finance and aggregate investment?

(4) What are the determinants of the desired investment-output ratio?

(5) What is the role of monetary and fiscal policy and of financial intermediation in the growth process?

(6) How does the distribution of income affect the accumulation process?

The present chapter will focus attention on questions (1), (4) and (6), while discussion of questions (2), (3) and (5) will be deferred to Chapters IV, V and VI.

Section II: Income Distribution Models and Pure Internal Finance

In traditional development theory, one often assumes that there exists a direct one-to-one correspondence between the profit share of income and the aggregate rate of investment out of a given level of income. In a discussion of economic development, Dale Jorgenson expressed and defended the assumption that all investment is financed out of profits by stating:

> It is assumed that all agricultural incomes are consumed, so that investment in the manufacturing sector is financed entirely out of income of property-holders in that sector. The assumption that landlords do not accumulate capital accords with the classical theories of land-rent especially the theory of Smith and the physiocrats. [2, p. 43]

and in a later article he suggested,

> Both classical and neoclassical theories of the development of a dual economy provide an explanation of an increase in the share of saving. In each case the explanation is based on the relationship between saving and industrial profits. [3, p. 47]

Perhaps the clearest statement of the presumed relationship between the profit share of income and the aggregate savings rate was given by W. Arthur Lewis when he suggested that

> . . . it must be recognized that the net contribution of the farmers, the wage earners and the salaried middle classes to the supply of savings will be small--hardly enough to finance agriculture and housing. Everything should be done to increase this contribution. But the main source of private saving is the profits of business enterprises, corporate and unincorporated, distributed and undistributed. Most countries now design their tax laws to encourage reinvestment of profits rather than distribution of dividends. The main reason why the rate of saving is low in underdeveloped countries is that business enterprise accounts for a relatively small part of their national income. The savings ratio will grow automatically as the modern business sector expands relative to the rest of the economy. Since this inevitably takes time, the rate of private saving cannot be increased sharply in a short period. [7, p. 20]

Four simple models will be presented in order to answer the questions we have raised about the stability and relevance of this simple savings-income relationship. Each of the models will incorporate classical savings assumptions.

Model I: Pure Internal Finance and the Widow's Cruse

This model includes the following assumptions:

(1) Capital markets are so fragmented and investment information is so imperfect that there is no access to external finance.

(2) $s_w = 0$, s_p = constant in the short-run, where s_w is the savings rate out of workers' income and s_p is the savings rate out of business income. (These are the standard classical savings assumptions.)

(3) We impose the classical assumption that all savings are invested.

The assumption that workers do not save implies that all savings are generated from business income. Since there is no external finance, the aggregate private savings rate equals s_p; and s_p is equal to the ratio of retained earnings to total profits. The economy is divided into households and firms with firms having access only to internal finance, which implies that no proportion of distributed profits are reinvested. Savings from labor income, which is associated with households, are assumed close to zero. Assumption (3) implies that savings and investment are always in equilibrium and independent of the level of aggregate income.

Let Y represent aggregate income. We can divide Y into wages and salaries, W, and business plus property income, P, which represents profits. Letting S_w and S_p represent savings out of Wages and Profits, we have the following identities:

$$Y \equiv W + P \qquad (1)$$

$$I \equiv S \tag{2}$$

$$S \equiv S_w + S_p \tag{3}$$

Taking the distribution of income as given and assuming simple proportional savings functions, $S_w = s_w W$ and $S_p = s_p P$, we obtain:

$$I = s_p P + s_w W = s_p P + s_w (Y - P) = (s_p - s_w) P + s_w Y$$

or,
$$I/Y = (s_p - s_w) P/Y + s_w \tag{4}$$

Imposing the classical assumption that $s_w = 0$, we obtain:

$$I/Y = s_p P/Y \tag{5}*$$

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*Nicholas Kaldor developed a model similar to those presented in this Chapter 4 . The principle differences are that Kaldor's model was a short-run full employment equilibrium model and that the investment-output ratio rather than the distribution of income was treated as exogenous. Kaldor derived an expression similar to our equation (5) of the form $\frac{P}{Y} = \frac{1}{s_p} \cdot \frac{I}{Y}$ based on the assumption that $s_w = 0$. He suggested that this "special case" corresponded to the "widow's cruse" model hinted at by Keynes in the Treatise. In a later study ("Rate of Profit and Income Distribution in Relation to the Rate of Economic Growth" in The Review of Economic Studies, October, 1962. pp. 267-280), Luigi Pasinetti showed that even if workers saved, i.e., $s_w > 0$, long-run equilibrium considerations suggested that the equation derived as a special case by Kaldor represented the general equilibrium condition. Specifically, Pasinetti derived the following long-run equilibrium relationship:

$\frac{P}{Y} = \frac{1}{s_c} \frac{I}{Y}$, where s_c is the savings rate out of capitalists' income, distributed and undistributed. In Model IV, our equilibrium condition differs from Pasinetti's. We define the equilibrium condition in terms of the retained earnings rate, s_r, and the household savings rate, s_H, rather than the capitalists' savings rate, s_c. The reader should realize that part of what Pasinetti calls capitalists' savings enters our measure of household savings. We chose to focus attention on the dichotomy between retained earnings and household savings rather than on capitalists' and workers' savings for two reasons. First, we will want to discuss the stability and explanatory power of the equilibrium savings functions derived in this chapter for the case of West Germany; but data for capitalists' and workers' savings are not available. Second, the dichotomy between retained earnings and household savings will be valuable to our discussion of changes in the structure of finance (external vs. internal) in West Germany over the period 1948-1968 in Chapter V.

Clearly, given the classical savings-investment structure, the policy objective of increasing the rate of capital accumulation in a developing country requires measures which shift income toward profits and/or increase the business savings rate. Developing countries often use taxes and subsidies to keep profits high, and policy planners accept a highly skewed distribution of income as a necessary evil if their economies are to achieve rapid growth. Tariffs and Quotas are also used to protect and promote the rapid growth of the business sector relative to the rest of the economy. In addition, planners use subsidies and tax reductions to stimulate retained earnings. Restrictive trade policies and low cost government loans encourage investment by reducing private risks. Within the context of Model I, such policies are reasonable.

Model II: The General Pure Internal Finance Model

If we now assume that workers save, i.e., $s_w > 0$, the dichotomy between profits and workers' incomes which seemed useful in Model I loses its relevance from a policy standpoint. Without external financing, both workers and businessmen save and invest in their own enterprises; and the distinction between workers and businessmen is meaningless. In primitive economies composed of household-firms, the two income groups identified in Model I are not distinguishable; and the effects of income redistribution are difficult to assess. Though descriptive of primitive agricultural societies, the general pure internal finance model is not relevant to the study of post-war West Germany to which the models of this chapter will be applied in Chapters IV and V.

Section III: Income Distribution Models and External Finance

In this section, we will discuss two models in which there exists limited access to external finance. The focus of this chapter is on the effects of different modes of finance on the simple income-savings equation. In Chapter V, a model specifically developed for the German case will be used to explain changes in the composition and time structure of investment that occurred in West Germany as the financial sector developed.

Model III: External Finance and the Widow's Cruse Model

This model incorporates the following set of assumptions:

(1) $s_w = 0$

(2) There exists access to external finance in the form of bank loans.

(3) There is a single bank which issues money and lends to businesses.

(4) Retained earnings are reinvested within the firm.

(5) All household savings are channelled to investments through the bank.

Assumption (1) implies that the savings-investment relationship is of the following form:

$$\frac{I}{Y} = s_p \frac{P}{Y} \tag{6}$$

Assumption (2) implies that s_p consists of two parts: retained earnings as a proportion of business income which we will denote by s_r and the household savings rate out of distributed business income which we will denote by s_H.

One can easily verify that:

$$s_p = s_r + s_H (1 - s_r) \tag{7}$$

and equation (6) can be written as:

$$\frac{I}{Y} = \left[s_r + s_H (1 - s_r) \right] \frac{P}{Y} \tag{8}$$

The stability of this simple functional relationship between the aggregate investment-output ratio and the profit share of income will, of course, depend on the short-run stability of the business and household savings rates s_r and s_H. As suggested by the analysis of Chapter II, Section III, and developed more fully in Appendix B, increased financial development and integration could induce higher sectoral savings rates by reducing the subjective risks of saving and investing and by expanding the investment opportunities of individual investors.

In Model I, which was a pure internal finance widow's cruse model, we found that the one-to-one correspondence between the profit share of income and the aggregate investment-output ratio could be broken only by stimulating higher retained earnings through government intervention. In Section I of Chapter IV, we will present a detailed discussion of how the West German government tried to maintain a high investment-output ratio, despite a declining profit share of income in the early post-war period, by subsidizing and providing tax incentives for higher rates of retained earnings.

To the extent that financial integration can increase the household savings rate in equation (8) a high or increasing investment-output ratio can be maintained, without having to subsidize retained earnings. As will be shown in Section II of Chapter IV, the business share of income in West Germany continued to decline after 1956 as did the retained earnings rate, largely due to the removal by that time of tax advantages and subsidies to retained profits. Yet, the investment-output ratio actually increased. The desired investment-output ratio increased in part because of easier credit conditions resulting from the growth of the banking sector. Once we have introduced the possibility of external finance and a changing

household savings rate, the level of investment is no longer bounded by the level of retained earnings; and the one-to-one correspondence between the profit share of income and the aggregate investment-output ratio, which could only be broken by government intervention in the pure internal finance model, need no longer hold.

Along with the transition from internal to external financing, there is a rationale for movement away from the use of taxes and subsidies to promote capital accumulation. Policies geared toward stimulating higher rates of retained earnings which seemed desirable in a model with pure internal finance need not represent a net benefit to the economy. Access to external finance suggests that the locked-in nature of capital investment of the pure internal finance model can be overcome. The financial market can begin to serve as a means of allocating savings to the most profitable investments. In the pure internal finance model, even with government intervention, there is no mechanism, except by assumption, that can allocate savings efficiently.

Referring to equation (8), we find that policies to promote a highly skewed distribution of income away from workers and toward businesses are still consistent with the goal of increasing the rate of capital accumulation in the economy. Therefore, given that workers do not save, the classical distinction between businesses' and workers' income shares is still a useful one to make despite the fact that we have introduced limited access to external finance. Yet, the stability of the savings-income equation (8), over time will depend upon whether changes in the structure and efficiency of financial markets affect the business and household savings rates s_r and s_H.

Model IV: External Finance, the Generalized Model

The principal difference between Model III and Model IV is that we now assume that $s_w > 0$, i.e., workers save. As a result, the savings-income relationship becomes:

$$\frac{I}{Y} = (s_p - s_w)\frac{P}{Y} + s_w \tag{9}$$

The savings rate s_p can be written as the sum of retained earnings divided by business income, s_r, and the savings rate out of business distributed income, s_D, multiplied by $(1 - s_r)$:

$$s_p = s_r + s_D(1 - s_r) \tag{10}$$

so that equation (9) becomes:

$$\frac{I}{Y} = \left[s_r + s_D(1 - s_r) - s_w\right]\frac{P}{Y} + s_w \tag{11}$$

Consequently, the household savings rate s_H will be defined as follows:

$$s_H = s_w + (s_D - s_w)\frac{B'}{Y'} \tag{12}$$

where B' represents business distributed income $(1 - s_r)P$, and Y' equals the sum of wage income plus distributed business income. Equation (12) can be rewritten as:

$$s_H = s_w + (s_D - s_w)(1 - s_r)\frac{P}{Y'} \tag{13}$$

Rewriting equation (11), we get:

$$\frac{I}{Y} = \left[s_r(1 - s_w) + (s_H - s_w)\frac{Y'}{P}\right] \cdot \frac{P}{Y} + s_w \tag{14}$$

Using the fact that $Y' = Y - s_rP$, we can derive the following simple investment-income relationship:

$$\frac{I}{Y} = s_r(1 - s_H)\frac{P}{Y} + s_H \tag{15}$$

As a result of the fact that workers save, the household savings function is no longer independent of the distribution of income. From

equation (12), we know that the household savings rate is a function of the savings rate out of wages and business distributed income and of the ratio of business distributed income to total disposable income. Policies designed to redistribute income toward the business sector and/or raise s_r which would raise the rate of capital accumulation in the widow's cruse models ($s_w = 0$) could be offset by an undesirable decline in the household savings rate. These considerations suggest that once we introduce external financing and positive savings rates for workers, the one-to-one correspondence between the business sector's share of income and the investment-output ratio need not hold. More importantly, development policies which seemed unassailable within the context of Model I are highly questionable within the context of Model IV.

The irrelevance of the dichotomy between businesses' and workers' income shares in development planning within the context of Models II and IV stems from the fact that such a dichotomy is useful only if it permits us to separate those who save from those who squander. In Models I and III, the redistribution of income toward the business sector was, in effect, a way of transferring income from those who would not save to those who would save. This had the effect of raising the aggregate savings rate which financed a more rapid rate of capital accumulation. In Models II and IV, these same policies have the effect of taking income from one group with a positive savings rate and giving it to another group with a positive savings rate. The impact of such an income transfer on aggregate savings and the aggregate investment-output ratio is ambiguous. Government policies which could be rationalized in Models I and III on the basis of their desirable income redistribution effects seem much less defensible within the context of Model IV.

In Chapter IV, the household, business and aggregate private savings functions of this chapter, based on classical savings assumptions, will be fitted to annual data from West Germany for the period 1950-1968. We will be interested in assessing the stability and explanatory power of these rleationships. We will also investigate the explanatory power of alternative savings functions, based on consideration of the linkages that exist between financial development and the incentive to save, fitted to the same data.

BIBLIOGRAPHY

1. Fei and Ranis. "Agrarianism, Dualism and Economic Development." Adelman and Thorbecke, Eds. The Theory and Design of Economic Development. John Hopkins U. Press, Baltimore. 1966. 3-41.

2. Jorgenson, Dale W. "The Development of a Dual Economy." Economic Journal. June, 1961. 309-334.

3. ----------. "Testing Alternative Theories of the Development of a Dual Economy". Adelman and Thorbecke, Eds. The Theory and Design of Economic Development. John Hopkins U. Press, 1966. 45-60.

4. Kaldor, N. "Alternative Theories of Distribution." Review of Economic Studies, XXIII(2) #61, 1955-1956. 83-100.

5. Lewis, W. Arthur. The Theory of Economic Growth. Allen & Unwin Ltd., London, 1955.

6. ----------. "A Review of Economic Development." A.E.A. Papers and Proceedings. May, 1965. 1-17.

7. ----------. Development Planning. Harper and Row Publishers, New York. 1966.

8. Marglin, Stephen. "The Rate of Interest and the Value of Capital with Unlimited Supplies of Labor." Karl Shell, Ed. Essays on the Optimal Theory of Economic Growth. 141-165.

9. Nurkse, Ragnar. Problems of Capital Formation in Underdeveloped Countries. Oxford University Press, New York. 1962.

10. Reder, Melvin W. "Alternative Theories of Labor's Share." The Allocation of Economic Resources. Stanford University Press, Stanford, California. 1959. 180-207.

11. Samuelson and Modigliani. "The Pasinetti Paradox in Neoclassical and More General Models." Review of Economic Studies. October, 1966. 269-301.

12. Sen, Amartya. "Some Notes on the Choice of Capital Intensity in Development Planning." Quarterly Journal of Economics. November, 1957. 561-584.

13. Tinbergen, Jan. The Design of Development. John Hopkins University Press, 1958.

CHAPTER IV

INCOME SHARES AND SOURCES OF FINANCE IN POST-WAR WEST GERMANY

One reason the role of finance in economic development has been largely ignored is that financial data in poor countries is often fragmentary and unreliable. Even after the destruction of World War II, West Germany could not be classified as being comparable to most underdeveloped economies today. (A detailed discussion of German economic conditions prior to 1948 will be deferred to section I of Chapter V.) The West German economy of 1948 shared one important characteristic with most developing economies of today -- an almost complete absence of financial markets to facilitate the allocation and encourage the accumulation of capital. Yet, the availability of financial statistics over the period 1948-1968 affords us the opportunity to examine the inputs and implications of financial integration in West Germany, an opportunity not available in less developed economies.

One rationalization for ignoring finance is to assume that financial development, though desirable, can only occur slowly and that changing savings behavior significantly is only possible in the very long-run. As Lewis suggests, "The slow rate of change of private savings is one reason why more importance is now attached to increasing public savings." [10, p. 3] In the short-run, alternative policies such as tax-cum-subsidy schemes and income redistribution must be used. This is an empirical presumption.

In Chapters IV and V, we will present evidence to the contrary and demonstrate quite clearly that in the case of West Germany, savings patterns shifted dramatically as did the time structure (short-term vs. long-term) and composition (internal finance vs. external finance) of investment in the relatively short historical period of 20 years. After a brief discussion of

overall economic trends in West Germany between 1948 and 1968, we will present evidence that government policies during the period 1948-1954 reflected traditional thinking about the one-to-one correspondence between the profits share of income and the savings share of income. In section II, we document the dramatic shift in savings patterns as a result of financial liberalization begun in the period 1955-1956.

Section I: The Overall Trends and Early Development Policies

Clearly, West Germany represents one of the most spectacular economic success stories of the post-war period. The last column in table I shows that growth has been rapid and continuous in West Germany throughout the period 1950-1968. The average rate of growth in real G.N.P. was 7.3% per annum. Even if we exclude the high rate of growth for 1950, 29.3%, the average rate of growth equaled 6% per annum. Yet, the cost of living index (table 2), which rose 7% during the Korean boom, rose at an average rate of only 1.3% per annum during the interval from 1951 to 1961. The cost of living index rose at a 3% per annum rate during the 1961-1968 period. In part, the upward shift during the 1960's reflected the price affects of removing rent controls which began in 1963.

The high unemployment rates recorded in the early 1950's reflect the difficulties West Germany experienced in relocating and assimilating the 10 million refugees that flowed into the country from the east after the war and the partitioning of Germany. Wages remained stable during the late 1940's, but rose 8% during the 1950-1951 Korean inflation. The fact that general labor shortages began to be felt in 1955-1956 helps to explain why nominal wages rose at an average rate of 10.3% per annum between 1956 and 1968 and only 4.6% per annum between 1951 and 1956.

Gross investment as a percentage of G.N.P. averaged 24.87% per annum between 1955 and 1959 and 26.58% between 1960 and 1964. Comparable averages for a number of developed economies during the period 1958-1965 were as follows: United States, 17%; France, 20%; Italy, 22%; Japan, 32%; United Kingdom, 16%; and Sweden, 23%.* While residential construction has constituted an important use for investment funds in West Germany since W.W.II, its importance may have

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*O.E.C.D. Capital Market Study, Statistical Appendix, p. 14.

Table 1

Gross National Product and its Breakdown

	G.N.P.	G.N.P. 1954 prices	Depreciation	Private consumption	Gov't consumption	Gross Investment in Fixed Assets	Inventory Investment	Net exports	Growth Rate -%-
	Billions of D.M.								
1949		87.5 *							
1950	97.2	113.1	10.1	62.5	14.0	18.3	3.7	-1.2	29.3
1951	118.6	125.0	11.9	72.5	17.4	22.5	3.9	2.3	10.5
1952	135.6	135.4	13.3	79.9	20.8	25.9	5.6	3.4	8.3
1953	145.5	145.6	13.4	87.6	21.1	29.3	2.1	5.5	7.5
1954	156.4	156.4	13.6	92.8	22.0	32.9	3.4	5.3	6.9
1955	178.3	174.4	14.8	103.4	23.8	41.0	6.0	4.2	11.5
1956	196.4	186.4	16.6	115.1	25.4	45.0	4.3	6.6	6.8
1957	213.6	196.5	18.3	125.6	27.3	46.7	5.3	8.7	5.4
1958	228.5	202.9	19.9	134.9	30.6	50.3	3.8	8.8	3.3
1959	247.9	216.5	21.2	144.2	33.6	57.1	4.6	8.5	6.7
/ 1960	296.8	254.9	26.2	170.0	40.4	70.6	8.6	7.2	----
1961	326.2	268.6	29.7	186.8	46.1	80.6	5.9	6.8	5.4
1962	354.5	279.6	33.8	204.0	53.1	90.2	3.5	3.7	4.1
1963	377.6	289.3	37.8	215.9	59.2	95.3	2.1	5.0	3.5
1964	413.8	308.5	42.0	232.9	61.7	109.2	4.7	5.3	6.6
1965	452.7	325.7	47.1	255.7	69.7	118.9	9.0	- .6	5.6
1966	480.8	333.3	52.2	274.9	75.4	121.9	2.0	6.5	2.3
1967	485.1	334.1	55.0	281.4	80.6	110.4	3.5	16.2	0.2
1968	528.8	357.5	59.3	297.3	82.9	121.9	8.2	18.5	7.0
								Avg.	7.3

*Roskamp's estimate.

/Figures for 1960-1968 include West Berlin and the Saarland.

Table 2

Price and Employment Indexes

	Cost of living index 1958 = 100 (IFS)	Wage rate 1958 = 100 (IFS)	Call Money Rate (IFS)	Unemployment Rate end of III quarter (DBMR)
1950	85	55	4.20	8.2
1951	92	63	6.02	7.7
1952	94	68	5.17	6.4
1953	92	71	3.58	5.5
1954	92	73	2.94	4.6
1955	94	78	3.13	2.7
1956	96	86	4.70	2.1
1957	96	94	4.10	1.9
1958	100	100	3.08	1.7
1959	101	105	2.69	0.9
1960	102	115	4.55	0.5
1961	105	127	2.94	0.5
1962	108	142	2.66	0.4
1963	111	153	2.97	0.5
1964	114	165	3.29	0.4
1965	118	182	4.11	0.4
1966	122	194	5.34	0.5
1967	124	198	3.35	1.7
1968	126	209	2.58	0.9

been overemphasized. As shown in table 3, the ratio of investment in housing to G.N.P. of 6% in West Germany for the period 1958-1965 is not high relative to other developed economies. In fact, the share of housing investment in gross fixed asset formation of 22% for West Germany is not very different from the average ratio for the fifteen countries listed (22.33%).

The after tax distribution of income has shifted over time in West Germany. Referring to table 4, the labor share of N.N.P. rose from an average of 51.44% for the period 1950-1954 to 56.10% during the 1965-1968 period.

Table 3

Share of Investment in Housing in G.N.P. and in Gross Fixed Asset Formation
(As percentages)

	Ratio of Investment in Housing					
	To G.N.P. (excludes land)			To Gross Fixed Asset Formation		
	1958	1965	Average 1958 - 1965	1958	1965	Average 1958 - 1965
Germany	5	6	6	22	21	22
Austria	4	5	4	20	18	18
Belgium	4	6	5	26	28	26
Denmark	3	5	4	16	21	18
Spain	5	4	5	26	17	23
United States . .	5	4	5	29	24	28
France	5	7	5	26	31	27
Greece	6	7	6	29	29	26
Italy	6	7	7	30	36	31
Japan	3	6	5	13	18	15
Norway	4	4	4	14	14	14
Netherlands . . .	5	5	4	22	20	18
United Kingdom .	3	4	3	17	21	19
Sweden	5	6	6	26	25	24
Switzerland . . .	4	7	7	20	26	26

Source -- O.E.C.D. Capital Market Study: Statistical Annex, Paris, 1968 p. 16.

At the same time, while the government share of after tax income oscillated around 24% of N.N.P., business after tax income fell from 24.95% during the 1950-1954 period to 19.90% for the 1965-1968 period. This shift in income distribution is extremely relevant to our discussion of the sources of savings in section II.

The call money rate is a market determined short-term lending rate. Movements in the call money rate, as shown in table 2, reflect the tight money policy of the Bank Deutscher Länder during the early 1950's. Credit conditions

Table 4

The Distribution of Net National Product (Bill. D.M.)

	Net National Product	Employee Compen-sation plus wel-fare tran-sfers after taxes	Business Dispos-able Income after taxes	Gov't Income after taxes		Employee Income as a % of NNP	Business Income as a % of NNP	Gov't Income as a % of NNP
1950	87.1	46.4	22.7	18.0		53.27	26.06	20.67
1951	106.7	54.6	27.7	24.3		51.17	25.96	22.77
1952	122.3	61.3	31.3	29.7		50.12	25.59	24.28
1953	132.1	67.7	31.1	33.3		51.25	23.54	25.21
1954	142.8	73.7	33.7	35.4		51.40	23.60	24.79
1955	163.5	83.6	40.3	39.6		51.13	24.65	24.22
1956	179.9	93.4	43.5	42.9		51.92	24.18	23.85
1957	195.3	104.8	46.0	44.5		53.66	23.55	22.79
1958	208.6	113.4	49.1	46.1		54.36	23.54	22.10
1959	226.7	120.5	53.2	53.0		53.15	23.47	23.38
1960	270.6	141.3	64.2	65.3		52.14	23.73	24.13
1961	296.6	157.3	64.5	75.0		52.93	21.75	25.29
1962	320.7	172.0	65.3	82.8		53.82	20.36	25.82
1963	339.8	184.6	68.0	87.6		54.24	20.01	25.78
1964	371.8	202.5	75.7	94.1		54.36	20.36	25.31
1965	405.6	225.8	81.8	98.4		55.54	20.17	24.26
1966	428.6	241.4	82.3	105.3		56.23	19.20	24.57
1967	430.1	246.9	81.7	101.9		57.34	19.00	23.69
1968	471.5	259.8	99.6	110.2		55.10	21.12	23.37
				Avg.	1950-54	51.44	24.95	23.54
					1955-59	52.84	23.88	23.27
					1960-64	53.50	21.24	25.27
					1965-68	56.10	19.90	24.00

Source: Deutsche Bundesbank Annual Reports

were generally easier during the late 1950's and early 1960's (except for a brief attempt at autonomous monetary policy in an open economy in 1960 which culminated in the currency revaluation of 1961).

The Early Years

The process of rebuilding financial markets took a great step forward with the currency reform of 1948 (see Chapter V, section I). Although the immediate effect of the currency reform and the removal of many price controls was inflationary pressure, the inflationary trend came to a halt around the end of 1948, half a year after the currency reform. As one might expect, changes in relative prices after controls were removed were often dramatic. The price of pots and pans declined .6% while the price of stockings rose 342%. [11] One of the primary reasons cited for the rapid development of price stability was the reluctance of labor unions to push for wage increases. But, as shown in figure 1, the cost of living index actually fell between June, 1948, and April, 1950. This resulted in part from the fact that although wage controls were removed three months after the currency reform, rents, agricultural foodstuffs, iron, steel, coal, oil, utilities, transportation and many services remained under price controls. The price of the average worker's consumption bundle did not reflect the initial post-reform inflationary trend.

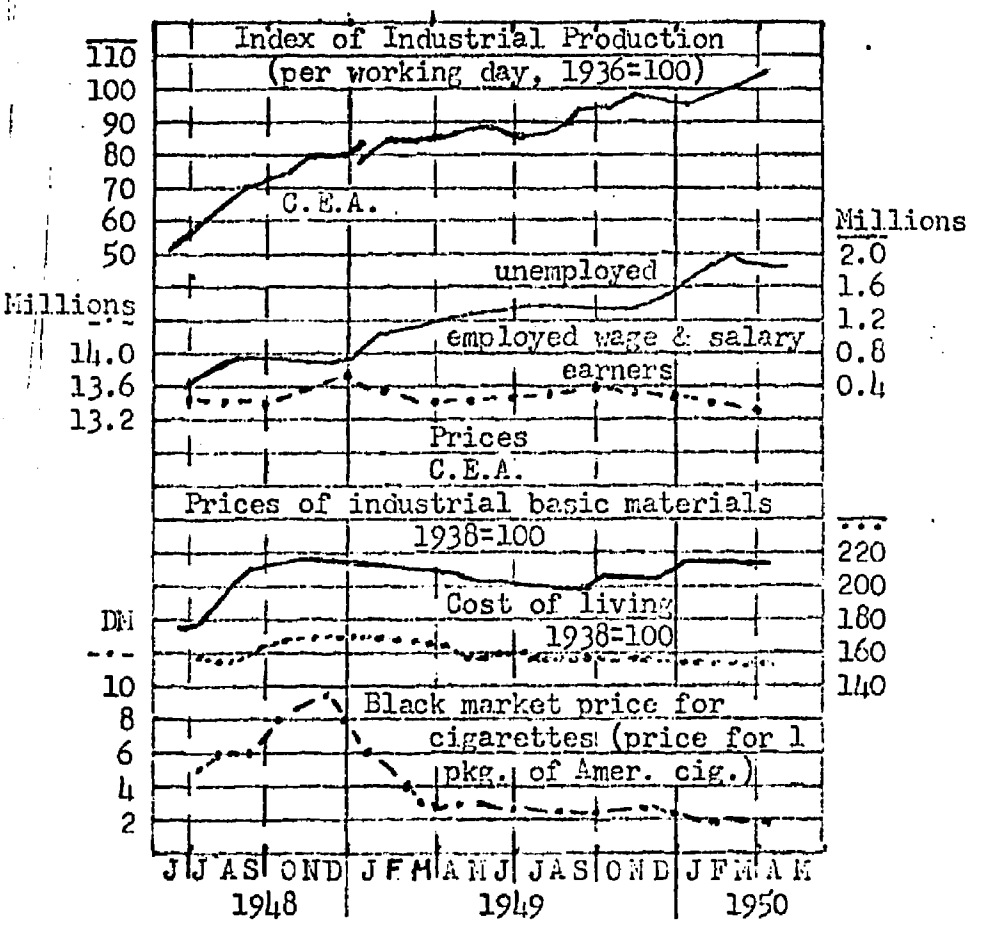
No doubt the influx of 10 million refugees into West Germany from the east after the war, the partitioning of the country and the consequent unemployment rates of 8.3% and 10.2% in 1949 and 1950 help to explain the stability of wages before the Korean crisis. As Sohman suggests, labor unions were not passive during the late 1940's and early 1950's.

> "In 1951, the union movement secured passage of the Law of Codetermination. This law stipulated that half the members of the boards of directors of all companies in the coal and steel industries were to be delegates of the workers and the union movement. The workers in these industries were also given representation in management through the election from their ranks of vice-presidents for industrial relations. The Works Constitution Law of 1952 provided that 1/3 of the boards of directors of all companies in other industries were to be composed of workers delegates." [14, p. 991]

Figure 1

Economic Indices in Western Germany

(Except where otherwise indicated, in the area of the German Federal Republic; otherwise in the Combined Economic Area.)



Source: Bank Deutscher Länder Annual Report, 1949-1950

In September, 1949, Great Britain devalued the pound 30.5%. While most European countries devalued to the same extent, West Germany devalued by only 20.6% with the result that balance of payments deficits quickly developed. West Germany borrowed heavily from the E.P.U., but repaid its debts by the end of 1952. The income tax law of 1950, which was retroactive to January 1, 1950, resulted in an average tax cut of 17%. This in conjunction with the outbreak of the Korean conflict in June, 1950, started a wage-price spiral. Monetary policy was tightened through higher reserve requirements, higher discount rates and reduced rediscount quotas. Trade liberalization was also

suspended until 1952. The cost of living index rose at an average rate of only 1.3% per annum between 1951 and 1961.

Policies to Encourage Self-Finance

In the early years following currency reform, government tax policy seemed to reflect the view of traditional development theory that a more rapid rate of aggregate capital formation could be achieved by redistributing after tax income toward profits and/or creating incentives for businesses to increase their gross savings rate. These are the policies we derived under the conditions of model I in Chapter III. Traditional policy prescriptions of development and otpimal intervention theory were applied immediately after the currency reform.

> "With a view to removing the disincentive effects of the very heavy taxes imposed in 1946, by the Allied Control Council in June, 1948, the three western military governments substantially reduced several direct taxes. The reduction in income taxes averaged 33-1/2%, and property taxes were reduced to 0.75% per annum as compared with a previous range of 1-1/2 to 2-1/2%. Corporate taxes were changed from 35-65% to a flat 50%." [9, p. 284]

The first corporate tax law under German partial sovereignty reduced the rate for small person related corporations (June 27, 1951), but increased it to 60% for other corporations. This was still considerably lower than the income tax rate at that time. The Law of June 24, 1953, reduced the rate on distributed profits to 30% unless the distribution exceeded 8% on capital. For all others, the 60% tax rate remained in effect. In 1954, the rate was reduced to 45% for distributed profits and non-distributed profits. [12, p. 118]

> ". . . Under paragraph 10 E St. G., 15% of the total profit or half of the retained profit could be deducted from taxable income. All firms were entitled to use this paragraph until 1950; in later years it was reserved for special groups such as the politically persectued and refugees. Deductions were therefore especially high for the years 1949-1950. They amounted to 332.3 million D.M. in 1949 and 500.3 million D.M. in 1950.

". . . The alternative method for claiming tax exemptions for retained earnings appeared in paragraph 32a of the income tax law, also effective 1949-1950. If yearly income before taxes was larger than 30,000 D.M. the recipient could apply for a flat tax rate of 50%. Applications were granted if not more than 15,000 D.M. was withdrawn from the business." [13, p. 131]

Capital revaluation was allowed after currency reform, and firms generally raised the book value of their assets to take advantage of generous depreciation allowances (with the expectation that future tax rates would be lower). [13]

Housing loans (7c), shipbuilding loans (7d) and loans to the Fund for the Equalization of War Damages (7f) constituted the main instances of specific channeling of investment funds by the government. Under these provisions, firms and individuals could, within generous limits, make interest free loans to third parties for the purposes indicated and deduct them from their taxable income. If and when the loans were recalled, they became fully taxable income. For individuals in the lower income brackets, where tax deductions meant little, the government offered matching grants of 25% of the savings devoted to residential housing. It is estimated that the volume of housing loans ranged as high as 1.2 billion D.M. in 1951. The funds channeled into housing accounted for approximately 15-20% of total investment in that sector. In the shipbuilding field, the proportion must have been much higher. [15] Later these loans could not exceed 50% of business profits. After 1955, the deduction fell to 25% of the loan.

Between 1951 and 1956, exporters were permitted to accumulate tax free reserves. Such accumulations could be liquidated as taxable income over a ten year period in equal installments. They could also take tax free deductions on profits from exports. Preferential discounting of export drafts (at the rate of the importing country) was one of the few instances where monetary policy was used selectively in West Germany. [13]

Estimates of the tax deductions under several of the paragraphs of the tax law are shown in table 5. All of these tax privileges were geared to promote internal financing.

Table 5

Deductions by Business Under Various Paragraphs for Tax-Exempt Loans, Retained Earnings, Export Aids and Interest on Tax Favored Securities (1949-1957, Millions of current D.M.)

Year	7c E.St.G. Credits for Housing	7d E.St.G. Credits for Ship-building	7f E.St.G. Prepay-ment of Equali-zation of Burden Funds	10a E.St.G. Rtaind Profits in Firms	32or E.St.G. Flat-rate 50% for Income Tax	Law to favor Exports		Law to favor Capital Markets Para.3a E.St.G.	Total
						Para.3 Forma-tion of Reser-ves	Para.4 lower Profits		
1949	147.6	10.8	------	332.3	362.9	------	------	------	853.6
1950	270.3	47.9	------	500.3	100.0	------	------	------	918.5
1951	350.0	275.0	------	30.0	------	100.0	150.0	------	905.0
1952	400.0	300.0	------	40.0	------	125.0	200.0	------	1065.0
1953	400.0	325.0	------	50.0	------	150.0	225.0	90.0	1323.4
1954	539.9	319.0	83.4	60.1	------	188.5	274.6	160.0	1607.2
1955	287.0	100.0	65.1	70.0	------	------	200.0	165.0	822.0
1956	190.0	100.0	------	80.0	------	------	------	155.0	525.0
1957	65.0	75.4	------	90.0	------	------	------	150.0	380.4
Total 1949-1957	2649.8	1553.1	148.5	1252.7	462.9	563.5	1049.6	720.0	8400.1

Source: Roskamp, table 23, p. 133

And, as Roskamp suggests,

> "In our opinion, tax exemptions for capital formation in West Germany did little to increase the volume of savings above the level they would otherwise have reached. Exemptions were, in essence, equal to outright government subsidies and, in some cases to interest free loans. As such they were not very effective in inducing additional savings." [13, p. 137]

Wallich supported this view when he wrote that,

> "about 70% or more of total investment funds, in all years before 1953 were derived from exceptionally high profits and amortized charges of business, plus some short-term bank credit. Budget funds from tax revenues accounted for about 15%. The capital market, including long-term funds supplied by banks provided no more than 10% of total funds up to 1953." [15, p. 154]

In the early post-war period, West German policy followed the prescriptions of traditional development theory that we derived under the conditions of model I.

Direct Government Intervention

Industrial production slowed down in 1951 principally because of iron, steel, coal and electricity shortages. Perhaps not merely by coincidence, these industries were still under price controls. In order to overcome these "bottlenecks," top organizations of manufacturing industry agreed to pay a quasi-tax of 3.5% on profits and 4% on transactions to subsidize these basic industries. The program was formalized under the Investment Aid Law of 1952 and resulted in the collection of 1 billion D.M. in 1952, 1953 and 1954. The quotas and distribution of Investment Aid Funds can be found in table 6.

Table 6

Allocation of Investment Assistance
(as of June 30, 1953, in millions of D.M.)

Industry	Industry Quotas	Industry Disbursements
Coal	234	173
Iron & Steel	278	219
Electric Power	252	211
Gas	126	73
Water	60	57
Equip. for Fed. R.R.s	50	50
Total	1,000	783

Source: Wallich, table 20, p. 177

The subsidies ended December 31, 1954. Benefitting industries were also permitted to depreciate new equipment up to 50% and buildings up to 30% in the first three years. The depreciation funds had to be immediately reinvested in the industry concerned. Again, the emphasis was on internal.

finance. These special depreciation rights expired in 1956. [13]

Counterpart Funds represented another channel for direct financing by public authorities. These funds were acquired from the sale of imports received through foreign aid and amounted to 5.535 billion D.M. by the end of 1952. Table 7 shows the distribution of 3.637 billion D.M. by November, 1954. By December, 1954, some 4.927 billion D.M. had been channeled into the economy.

Table 7

Counterpart Investment Program (mill. of D.M.)

Industry	Mill. of D.M.	%
Food & Agri.	451	12.4
Electric Energy	736	20.2
Gas & Water	107	2.9
Coal mining	442	12.2
Iron & Steel	228	6.3
Other Industry	552	15.2
Transportation & Communication	293	8.0
Housing	497	13.7
(miner's housing)	(169)	(4.6)
Expellees & Refugees	181	5.0
Tourism	24	0.6
Research	31	0.9
Pending	95	2.6
	3,637	100

Source: Wallich, table 19, p. 176.

Finally, table 8 shows the distribution of gross investment by the government of West Germany between 1949 and 1955. Residential construction was by far the largest area of investment by the government.

Table 8

Distribution of Gross Investments by Government in West Germany According to Economic Sectors, 1949-1955, Current Prices

Sector	1949	1950	1951	1952	1953	1954	1955	1950-1955
General Gov't	3.8	4.3	3.8	2.6	2.5	2.4	2.4	2.8
Public System	0.3	0.2	2.4	1.3	1.1	0.9	1.2	1.2
Justice	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5
Schools	5.4	5.8	8.2	7.9	8.2	7.9	8.5	7.9
Science & Art	3.0	2.6	2.8	2.7	2.6	2.6	2.8	2.7
Social Institutions	7.6	5.6	6.5	7.3	6.6	6.1	6.0	6.4
Residential Construction	32.3	24.5	36.5	33.3	30.4	28.9	24.5	29.4
Other construction		15.7	6.5	2.6	2.3	2.9	14.5	7.1
Agri. & Forestry	2.6	2.6	5.0	3.7	4.4	5.0	5.2	4.5
Industry, Trade & Arts	5.8	8.6	10.7	6.6	7.8	6.6	12.1	8.7
Municipal Services	10.5	9.4	6.2	12.5	14.2	17.6	11.7	12.6
Roads & Bridges	8.2	7.3	6.4	13.5	14.9	14.3	7.3	11.0
Waterways, Shipping & Harbors	6.7	4.5	4.0	3.6	3.3	2.9	2.6	3.3
Other traffic & transport	0.3	0.4	0.2	0.5	0.4	0.8	0.6	0.5
War burden	12.8	7.8	0.1	1.3	0.7	0.6	0.1	1.3
Total	100	100	100	100	100	100	100	100
Gross Investment accounted for above in Mill. of D.M.	3561.4	4770.5	6066.3	8139.8	9042.5	10470.9	11398.5	49888.5
Total Gross Investment by Government	4444.1	5333.6	6932.1	8413.0	9359.4	11037.9	12131.7	
% accounted for	80.2	89.5	87.5	96.6	96.6	94.9	93.9	

Source: Roskamp, table 59, p. 242

In assessing the self-financing practices promoted during this period, Roskamp wrote,

"The high rate of saving in West Germany during the crucial growth period 1949-1957 was definitely not due to large voluntary savings induced by high interest rates, as is sometimes assumed. The bulk of the savings were involuntarily obtained through taxes or high profits which were not taxed when invested. Without public savings, the rapid West German capital formation would have been very difficult if not impossible." [13, p. 161]

That external finance played a minor role in the total funding of investment in West Germany prior to 1957 is quite clear. But, one could take issue with the notion that heavy control and planning of investment expenditures by the government was the only way that the high rates of growth and capital accumulation experienced in West Germany could have been achieved. In order to understand the relatively minor role played by external financing prior to 1957, we would need to know more about the functioning of the capital market.

The Capital Market

In May, 1949, F. A. Lutz wrote,

"The will as well as the ability to save is naturally weak in Germany at present. Replies to questionnaires sent out to individuals indicated that in June (before the reform) 59% of those questioned intended to save in the future, in July 49% and in October (after cancellation of part of the blocked accounts) 32%. In fact, all through the second half of 1948 out-payments from savings accounts exceeded in-payments. Some attempt has been made by firms to tap savings directly by floating long-term bonds carrying interest rates of between 5 and 6.5%, the issue price usually being 98. Few such bonds have, however, found buyers. In January, for the first time, in-payments on savings accounts exceeded out-payments, probably as a result of the reversal of the price movement. This fact confirms the belief that the crisis of confidence in the D.M. is passed. Never the less, large savings cannot be expected in the near future." [11, p. 139]

Security sales rose quickly in 1951, but these were public placements through private institutions with instructions on the use of the funds. Private security purchases were small. Dividends on shares were subject to the 60% corporate tax. Fixed interest securities were tax exempt, but their yields were fixed too low to attract savings. [1]

The Bank Deutscher Länder pointed out in 1952 that since the currency reform, the interest rate on mortgage bonds had been kept at a fixed rate and that for their sake, so had the interest rates on all other bonds. This was accomplished by means of an almost water-tight government control of new issues through the Capital Issues Commission.

Wallich offered the following assessment of capital market controls.

> "The capital market had to be placed in a straight-jacket in order to make mortgage money available at 5%, the maximum that the fixed rent level could stand. The volume of construction has been so high that it would be unfair to blame rent control for the failure of housing to catch up with demand. Yet, the performance probably would have been better without rent controls.
>
> "The control of the capital market through the fixing of a 5% rate where 8% would have been closer to equilibrium also exacted its toll. It channeled funds away from the market and probably has increased the volume of self-finance. The market's function of selecting investment projects was further curtailed, and financially weak industries were handicapped." [15, p. 124]

He also pointed out that the black market for mortgage bonds offered 10 to 12%. In part, the minor role of external finance in Germany prior to 1957, which approximated the financial conditions discussed in model I, was policy induced.

The First Law for the Encouragement of the Capital Market was passed in December, 1952. This law freed the interest on mortgage and municipal bonds from all taxation, in cases where at least 90% of the proceeds served to finance social housing projects. It also exempted loans and other issues deemed by the federal government to be worthy of encouragement. The yield on other securities was subject to a global capital yield tax of 30% except where for specific reasons the rate was fixed at 60%. This law expired at the end of 1954, and the Capital Issues Commission was dissolved at the end of 1953. The Investment Aid program mentioned earlier expired December 31, 1954, though deliveries were permitted in 1955.

Along with the expiration of many of the capital control laws in the period 1954-1956, labor markets began to tighten up. In fact, 1955 was the first year in which labor scarcity was felt throughout the economy. Tight credit policy to contain a wage-price spiral in 1955 and 1956 helped to keep the capital market narrow and weak despite the removal of capital market controls. The economy cooled off in late 1956 and early 1957. From 1957 on, financial markets have been relatively unconstrained by government policy, except for generally tight monetary policy which has continued to keep the security market small and in a recurring state of crisis. The changes that occurred in the structure of finance in West Germany after 1957 suggest that the minor role played by external financing and intermediation during the period 1949-1957 resulted from policy decisions to favor internal financing.

In summary, development policy in West Germany during the period between 1949 and 1956 followed the traditional formula of (1) redistributing income toward profits, (2) encouraging higher retained earnings rates and (3) using government intervention to allocate capital and increase the rate of capital accumulation. These are the policies derived from model I of Chapter III where changes in patterns of finance are presumed slow and insignificant in the short-run.

Section II: Financial Liberalization and the Response of Private Savings

Perhaps the simplest way to gain an understanding of the significance of the shifts in the structure of finance that occurred in West Germany in the post-war period would be to begin with a discussion of model IV in Chapter III. Letting P represent business income after taxes, Y equal aggregate after tax disposable income, I equal private net investment and s_r and s_H equal the retained earnings rate and the household savings rate respectively, we derived the following identity:

$$\frac{I}{Y} = s_r(1 - s_H)\frac{P}{Y} + s_H \qquad (1)$$

This relationship ceases to be an accounting identity once we assume, as classical and neoclassical theory suggests, that the savings rates are constant in the short-run. In this case, we have a linear relationship between the business share of income and the aggregate investment-output ratio.

The effect of removing tax privileges by the end of 1956 coincident with the development of labor shortages throughout the economy in 1955-1956 meant that business income was being squeezed from both ends: rising unit costs of production and higher effective tax rates on business income. Referring to table 9, we find estimates of labor, business, and government shares of before and after tax income. While the labor share of before tax income rose steadily from an average of 59.17% during the 1950-1954 period to 65.94% during the 1965-1968 period and government income remained fairly stable around an average value of 1.69%, the business share of before tax

Table 9

The Distribution of National Income and Net National Product

Year	Share of National Income			Share of N.N.P			S_p/Y_p	Net Investment as a % of N.N.P.
	Labor %	Entrepre-neurial %	Gov't %	Labor %	Entrepre-neurial %	Gov't %	%	
1950	59.19	39.73	1.21	53.27	26.06	20.67	9.71	13.41
1951	59.14	39.53	1.33	51.17	25.96	22.77	11.98	13.35
1952	57.98	40.37	1.75	50.12	25.59	24.28	13.74	14.86
1953	59.49	37.25	1.72	51.25	23.54	25.21	11.34	13.59
1954	60.07	38.18	1.75	51.40	23.60	24.79	13.46	15.92
1955	59.56	38.40	2.04	51.13	24.65	24.22	16.52	19.69
1956	60.36	37.67	1.91	51.92	24.18	23.85	15.91	18.22
1957	60.62	37.27	2.17	53.66	23.55	22.79	16.62	17.22
1958	61.41	36.51	2.08	54.36	23.54	22.10	16.84	16.43
1959	60.84	37.28	1.88	53.15	23.47	23.38	17.09	18.02
1960	60.84	37.60	1.57	52.14	23.73	24.13	16.86	19.58
1961	62.48	35.81	1.71	52.93	21.75	25.29	15.27	19.20
1962	63.96	34.39	1.69	53.82	20.36	25.82	13.68	18.67
1963	64.53	33.74	1.73	54.24	20.01	25.78	13.75	17.55
1964	64.58	33.74	1.71	54.36	20.36	25.31	15.45	19.34
1965	65.37	32.98	1.65	55.54	20.17	24.26	15.83	19.93
1966	66.61	31.83	1.56	56.23	19.20	24.57	12.65	16.72
1967	66.92	31.62	1.35	57.34	19.00	23.69	12.18	11.99
1968	64.84	33.79	1.34	55.29	21.21	23.47	15.56	15.31
Average								
1950-1954	59.17	39.01	1.55	51.44	24.95	23.54	12.05	14.23
1955-1959	60.56	37.43	2.02	52.84	23.88	23.27	16.60	17.92
1960-1964	63.28	35.06	1.68	53.50	21.24	25.27	15.00	18.87
1965-1968	65.94	32.56	1.48	56.10	19.90	24.00	14.06	15.99

income declined steadily from 39.01% during the 1950-1954 period to 32.56% during the 1965-1968 period. This represents a relative decrease of 16.53% between the initial and final periods. While the labor share of after tax income rose steadily from an average value of 51.44% between 1950 and 1954 to a value of 56.10% during the 1965-1968 period and government after tax income remained fairly stable around an average value of 24.02%, the business share of after tax income (measured as non-employee private after tax income) declined from an average value of 24.95% during the period 1950-1954 to 19.90% for the period 1965-1968. This represents a relative decline of 20.24% and suggests that the changes in the tax structure after 1954 contributed to the relative decline in the business share of after tax income.

Clearly, if savings rates remained constant throughout the post-war period, one would expect that the aggregate investment-output ratio declined over time. The household savings rate for the period 1950-1954 was 4.79%. Let us assume that $s_H = 5\%$. The savings rate for the business sector was 23.26%.* Therefore, let us assume that $s_r = 25\%$, where s_r is the business savings rate and P represents business after tax income. If we net out the government sector and calculate the private net investment-private disposable income ratio -- assuming that s_H and s_r are fixed at 5% and 25% -- with the relevant values of P/Y equal to 32.7%, 31.1%, 28.4% and 26.2% for the 1950-1954, 1955-1959, 1960-1964 and 1965-1968 periods, we obtain the following estimates of I/Y by substituting into equation (1):

1950-1954, estimated I/Y = 12.77%

1955-1959, estimated I/Y = 12.39%

1960-1964, estimated I/Y = 11.75%

1965-1968, estimated I/Y = 11.22%

*The business savings rate is derived as the ratio of retained earnings divided by business after tax income.

This expectation of a decline in the investment-output ratio in the private sector from 12.77% to 11.22% between the initial and final periods is contrasted against the actual rise in the investment-output ratio in the private sector from an average value of 12.05% for the interval 1950-1954 to an average of 14.06% for the period 1965-1968. The rise in the private investment-output ratio despite the decline in the business share of after tax income can best be explained in the context of model IV. As financial markets developed and external finance expanded, the household savings rate increased in response to monetary stability and reduced risks and higher expected returns on investment. The rise in the household savings rate more than offset the negative impact of the declining business share of income on the private investment-output ratio.

The Rate of Return on Capital and the Business Share of Income

The downward trend in the business share of income tends to suggest that the rate of return on capital has been falling in West Germany. First, one ought to recognize that the economy is not on a steady state growth path; growth rates after 1954 vary from a high value of 11.5% in 1955 to a low value of 0.2% in 1967. Second, although the relative share of business after tax income decreased, actual business income increased nearly five-fold from 22.7 billion D.M. in 1950 to 99.6 billion D.M. in 1968. If we allow for the possible effects of technological change over time, the rate of return on capital could have increased over time, while the business share of income declined.

Changes in accounting procedures may also offer a partial explanation of the downward trend in the business share of income. Depreciation laws did change over time. After 1956, accelerated depreciation was permitted for all equipment with a lifetime of more than 10 years. Initially,

28.3% of the remaining book value could be deducted as depreciation in each year. This percentage was considered too high and was reduced to 25% in 1958. After 1958, capital goods with a lifetime of less than 10 years were also allowed accelerated depreciation. [13] The 1960 law permitted accelerated depreciation up to 20% of the assessed value in the first year or double the straight-line depreciation rate, whichever was less. [15] Special accelerated depreciation allowances were introduced in January, 1967, on goods ordered between January 20, 1967, and October 31, 1967, as a countercyclical measure. To some extent, the use of accelerated depreciation after 1956 suggests that the declining business share of income in a non-steady state reflects a shift in accounting procedures to take advantage of accelerated depreciation. As an extreme example of how this might work, we can estimate the ratio of business before tax gross income as a share of private G.N.P. (G.N.P. less government before tax income and depreciation allowances). In this case, the business income share declined from 39.6% for the 1950-1954 period to 35.8% for the 1965-1968 period. This implies a relative decline of 9.60% in the business income share as compared with earlier estimate of a relative decline of 16.53% in the business before tax income share. The actual percentage decline rests somewhere between these two rates. Nonetheless, this does suggest that changes in accounting procedures created a downward bias in our estimates of the business share of income over time.

Although it is the view of the author that capital and labor are both heterogeneous factors and that capital-output ratios are not terribly meaningful, estimates of gross capital stock in West Germany published by F. Grünig for 1950 along with figures for gross capital formation by the Deutsche Bundesbank make it possible for us to calculate a gross

capital-output ratio for West Germany for the period 1950-1968.* The average gross capital-output ratio was 3.768 for the period 1950-1954, 3.094 for the period 1955-1959, 2.738 for the interval 1960-1964 and finally 2.938 during the 1965-1968 period. Using the following relationship:

$$\frac{\partial Q}{\partial K} = \left(\frac{\partial Q}{\partial K} \cdot \frac{K}{Y}\right)\frac{Y}{K} \qquad (2)$$

we can multiply the business share of income by the inverse of the capital-output ratio to get an estimate of the rate of return on capital in West Germany. [2] The estimated rate of return averaged 10.42% for 1950-1954, 11.98% for 1955-1959, 13.17% for 1960-1964 and 11.97% during the period 1965-1968. Throughout Chapter II, we stressed that financial integration could contribute significantly to allocative efficiency. Therefore, it is highly significant that financial liberalization after 1954 was accompanied by a rise in the estimated rate of return on capital. The inverse movement in the estimated rate of return on capital and the profit share of income could be attributed to capital augmenting technological change. In fact, Beckman and Sato found that technological change in Germany was best explained as capital augmenting./

The Capital Market

Before discussing the structural changes in the savings rates and the financial network in West Germany that made a declining business income share compatible with an increased investment-output ratio, we should have some background on financial conditions after 1956.

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*See F. Grunig, Income and Wealth, Series VIII, pp. 154-156. The capital-output ratio calculated for 1960 in this manner is close to an estimate given by Goldsmith in Financial Structure and Development, Yale University Press, New Haven, 1969, p. 294.

/See Beckman and Sato, "Aggregate Production Functions and Types of Technical Progress: A Statistical Analysis," American Economic Review, October, 1969, pp. 88-101.

As suggested in section I, the inflationary pressure in 1955 eased up in late 1956 and early 1957, and monetary policy was relaxed. The discount rate fell from 5% in September, 1956, to 2.75% in January, 1959. An economic upswing began in 1958, and prices remained fairly stable. In early 1959, the Bundesbank described the rapid development of the capital market as follows:

> "In the course of the last year and a half the capital market, which had since the 1948 currency reform always been one of the weakest parts in West German economic developments, showed bounding growth such as few would have thought possible one or two years ago. At the middle of 1957 the long-term interest rate even for first class borrowers had been 6% or more. At the end of 1958 on the other hand securities of the 5-1/2% type already predominated, and in the first months of the current year those bearing 5% interest gained uncontested pre-eminence in the market." [6, 1958, p. 2]

Shortly after this statement was made, the economic picture changed sharply. By the middle of 1959, a building boom combined with an extremely tight labor market and a drought to create inflationary pressure and a return to tight money policy. The discount rate and reserve requirements rose sharply from the middle of 1959 to the middle of 1960. The Minor Company Law Reform, effective December 31, 1959, permitted the tax free issue of shares by companies whose capital stock was too small in relation to their total capital and reserves. This did not create new capital, but did deepen the capital market. Despite this program, the tight money policies of 1959 and 1960 threw the capital market into a state of crisis.

The consequences of pursuing autonomous monetary policy in an open economy became clear in June of 1960. The German effort to maintain high interest rates and tight credit while the Federal Reserve was easing credit conditions in the U.S. resulted in an 8 billion D.M. capital inflow into West Germany. Consequently, credit conditions were eased and a myriad of regulations were developed to encourage capital outflows and discourage capital inflows. And, the D.M. was revalued 5%, effective March 6, 1961. Credit

conditions were easier throughout 1961, and the Volkswagen Works were partially denationalized. Share prices rose briefly in the spring of 1961 and then turned down again. By 1962, the bond market had begun to grow again. Economic activity picked up again around the middle of 1963. The share market began to revive; and the bond market boomed from the beginning of 1964, largely reflecting increased foreign demand for fixed interest securities.

Price rises in 1963 and 1964 inspired tight money policies in the second half of 1964 and early 1965. Passage of a 25% Corporate Yield Tax on foreign owned German bonds in March, 1965, effectively stifled foreign demand for fixed interest securities; and new placements became difficult. The enthusiasm for price stability at any cost by the monetary authority has exacted a heavy toll on the capital market. The following is a statement from the Bundesbank Annual Report for the year 1965 and is representative of bank attitudes throughout the 1950-1968 period:

> ". . . the growth of home demand was becoming a good deal slower, so that gradual cessation of the upward price trend appears possible, at least if in all measures relevant to economic policy the stability of prices is accorded priority over every other aim of such policy." [6, p. 1]

Credit policy remained tight throughout 1965, and bond prices continued to fall. Bond rates peaked at 8.4% in the middle of 1966. Credit conditions eased toward the end of 1966, but the economy had begun to head into a recession earlier in the year. The real rate of growth declined from 5.6% in 1965 to 2.3% in 1966 and 0.2% in 1967. Economic activity picked up again in 1968 with a real growth rate of 7%.

Sectoral Savings Rates

As shown in table 10, sectoral savings rates shifted quite dramatically over the period 1950-1968. Throughout this section, we assume that the nominal and real savings rates are equal; or equivalently, the savings

variable and the income variable have a common price deflator. Referring first to the household sector, one finds that the household savings rate, s_H, rose steadily from an average of 4.79% during the 1950-1954 period to an average rate of 11.48% during the 1965-1968 period. In part, this dramatic shift reflects the fact that the monetary stability of the 1950's and 1960's made savings a less risky undertaking than it was during the late 1940's when, in response to the partial cancellation of blocked savings accounts and the rapid inflation that immediately followed the currency reform, savings actually decreased in absolute terms. The high rates of growth of real G.N.P. in the early 1950's helped to foster a sense of economic well being that was also conducive to an increase in the savings rate. No doubt the de-control of financial markets by 1956 also contributed to the growth in voluntary savings by expanding the investment opportunities available to consumers.

Table 10

Sector Savings Rates

	Household Sector %	Business Sector %	Government Sector %
1950-54	4.79	23.26	21.46
1955-59	7.44	31.39	22.11
1960-64	9.13	22.48	30.19
1965-68	11.48	10.99	22.07

In Chapter III, we discussed four different income distribution models which permitted us to derive a linear relationship between the private aggregate savings rate and the business share of private gross national product. While models I and II were based on the assumption that all investment in the private sector was internally financed, models III and IV were based on the assumption that external finance was available for investment. In models I and III, we assumed that workers did not save while in model II and IV we allowed for positive savings out of workers income. In each of these models,

we assumed along classical lines that household and business savings were simple linear functions of current disposable income in each sector and that these relationships were invariant over any relevant planning period. The objective of this section is three-fold. First, we want to fit these classical savings functions to post-war German data and evaluate their explanatory power. Second, we want to conduct F-tests to investigate the stability of these classical savings functions for the West German case. We have suggested that financial conditions in the periods 1950-1956 and 1957-1968 corresponded to the very different financial conditions assumed in model I and model IV. The stability tests represent an attempt to measure the impact of changes in the financial structure on household, business and aggregate savings behavior. Finally, we will want to examine the extent to which non-classical savings functions which incorporate the financial effects touched on in Chapters III and IV and spelled out in Chapter V, section II, can provide better explanations of aggregate and sectoral savings behavior.

In order to test the explanatory power and stability of the classical household savings function, we fitted the following non-homogeneous savings function for the periods 1950-1968, 1950-1956, 1957-1968:

$$S_H = s_{H_o} + s_{H_1} Y_d$$

where S_H = household savings, Y_d = household disposable income. The adjusted R^2 for the period 1950-1968 gives us a measure of the explanatory power of this simple linear relationship while the regressions from all three periods are used to construct an appropriate F-test of the stability of the savings relationship.

The F-test makes it possible for us to judge if estimating independent savings functions for each of the two sub-periods significantly reduces the unexplained variance resulting from fitting one function for the whole period,

implying that the savings function has undergone a structural shift during the period of analysis. The test statistic is of the following form:

$$\frac{A - (B + C)}{p} \Big/ \frac{B + C}{n + m - 2p} = F(p, n + m - 2p)$$

where A = the sum of squared residuals resulting from the regression for the whole period, B and C are the sum of squared residuals resulting from the regressions for the 1950-1956 and 1957-1968 periods respectively, p is the number of parameters estimated (2 in this case) and n and m are the number of observations in the two subperiods. [4]

The results obtained were as follows:

1950-1968

$$S_{H_t} = \underset{(8.7995)}{-8.033} + \underset{(30.4958)}{0.1362}\ Y_{d_t} \qquad \bar{R}^2 = .9810 \qquad D.W. = 1.06$$

1950-1956

$$S_{H_t} = \underset{(2.9200)}{-4.363} + \underset{(6.3588)}{0.1004}\ Y_{d_t} \qquad \bar{R}^2 = .8679 \qquad D.W. = 1.45$$

1957-1968

$$S_{H_t} = \underset{(4.8492)}{-10.06} + \underset{(17.1203)}{0.1439}\ Y_{d_t} \qquad \bar{R}^2 = .9637 \qquad D.W. = 1.08 \ *$$

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*$\bar{R}^2$ is equal to the value of R^2 adjusted for degrees of freedom. For a one tailed t-test, t values above 1.74 are significant at the 5% level. The values in parenthese are t-values. D.W. is the Durbin-Wetson statistic. For all values of D.W. less than 1.15 the presence of serial correlation had to be considered. In cases where g.l.s. (generalized least squares) led to significantly different coefficients than those obtained by o.l.s. (ordinary least squares), the g.l.s. results are presented. Normally, g.l.s. estimates are obtained by running the o.l.s. regression and regressing the residuals obtained on their lagged values to obtain a consistent estimate of the autocorrelation coefficient ρ (i.e., regress $u_t = u_o + \rho u_{t-1}$ where u_t is the residual from the o.l.s. regression for period t). Each variable x_{i_t} in the regression is then transformed to the form $(x_{i_t} - \rho x_{i_{t-1}})$ and the o.l.s. regression is run. In our case, in order to get a consistent estimate of ρ, each exogenous variable X_{i_t} is first separated into two variables X'_{i_t} and X''_{i_t} where X'_{i_t} is a 19x1 vector the first seven values of which are the values of X_{i_t} for the years 1950-1956 and the last twelve observations

First, we should note that a simple linear household function has a high degree of explanatory power. In order to test the stability of the household savings function, we set up the null hypothesis that no structural shift occurred in the household savings function, maintained at the 5% level of significance, if the relevant F-statistic, F(2, 15), is less than 3.68. The actual value of F was found to be 1.347 which implies that the household savings function was stable.

Referring again to table 10, we find that the government savings rate remained fairly stable around 22% with a value of 21.46% during the 1950-1954 interval and 22.07% for the 1965-1968 period. But, the business savings rate, defined here as the level of retained earnings divided by business after tax income, fell from an average value of 23.26% during the 1950-1954 period to a value of 10.99% for the 1965-1968 period. Except for the period 1965-1968, the business savings rate, s_r, was fairly stable. Again, we estimated simple linear savings functions for the periods 1951-1956 and 1957-1968 of the form:

$$S_r \quad s_{r_o} \quad s_{r_1} P$$

where S_r equals business retained earnings and P equals business disposable income. One observation was lost because of the presence of serial correlation and the g.l.s. results were as follows:

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are set equal to zero. X''_{i_t} is a 19x1 vector with the first seven observations equal to zero and the last twelve observations equal to the values of X_{i_t} for the years 1957-1968. The o.l.s. regression is run and the residuals obtained are regressed on their lagged values to obtain an estimate of ρ which is consistent. This partitioning is necessary so that the coefficients of the exogenous variables and the constant will be unrestricted for the subperiods we will want to analyze. The variables are then transformed as in the normal g.l.s. procedure, and the regression coefficients are estimated. The need for such a procedure was suggested to me by Prof. Mitchell at Stanford University.

1951-1968

$$S_{r_t} = \underset{(1.4874)}{3.377} + \underset{(1.1992)}{0.08709}\ P_t \qquad \bar{R}^2 = 0.0251$$

1951-1956

$$S_{r_t} = \underset{(2.9675)}{8.496} + \underset{(4.9280)}{0.7698}\ P_t \qquad \bar{R}^2 = 0.8232$$

1957-1968

$$S_{r_t} = \underset{(0.6209)}{2.826} + \underset{(0.7616)}{0.09623}\ P_t \qquad \bar{R}^2 + 0.00$$

The fact that the relevant F-statistic for this set of regressions, $F(2, 14) = 2.386$, implies a stable relationship is overshadowed by the fact that the explanatory power of this simple business savings function is close to zero.

Recognizing that depreciation allowances are used in part to finance net investment, a more relevant relationship to investigate would be the one between business gross savings, S_{rg}, which equals retained earnings plus private depreciation allowances, and business gross income, P_g, which equals business disposable income plus depreciation allowances. The regressions were adjusted for serial correlation and the g.l.s. results were:

1951-1968

$$S_{rg_t} = \underset{(1.6185)}{2.025} + \underset{(21.511)}{0.4299}\ P_{g_t} \qquad \bar{R}^2 = 0.9645$$

1951-1956

$$S_{rg_t} = \underset{(2.1348)}{-7.638} + \underset{(6.6352)}{0.7184}\ P_{g_t} \qquad \bar{R}^2 = 0.8959$$

1957-1968

$$S_{rg_t} = \underset{(1.5287)}{0.3611} + \underset{(12.645)}{0.4090}\ P_{g_t} \qquad \bar{R}^2 = 0.9353$$

The relevant F-statistic was $F(2, 14) = 1.85$, implying that the business gross savings function was stable over the period 1950-1968. The explanatory power of our simple classical savings function has been significantly improved by including private depreciation allowances in our measure of business

gross savings.*

An F-test was also applied to a proportional net savings function for the private sector. The results were as follows:

1950-1968

$$S_t = \underset{(0.2019)}{0.4204} + \underset{(14.9148)}{0.1442}\ Y_{p_t} \qquad \bar{R}^2 = 0.9248 \qquad D.W. = 1.26$$

where S equals household plus business net savings and Y_p equals private disposable income.

1950-1956

$$S_t = \underset{(4.1419)}{-9.475} + \underset{(10.4420)}{0.2300}\ Y_{p_t} \qquad \bar{R}^2 = 0.9474 \qquad D.W. = 2.29$$

1957-1968

$$S_t = \underset{(1.8507)}{8.150} + \underset{(6.8310)}{0.1161}\ Y_{p_t} \qquad \bar{R}^2 = 0.8059 \qquad D.W. = 1.93$$

Although the explanatory power of this simple linear aggregate savings function is quite high, the relevant F-statistic was $F(2, 15) = 3.80$, suggesting that there was a structural shift in the savings function between the two periods 1950-1956 and 1957-1968.

To investigate the source of instability in our aggregate net savings function, we estimated a private gross savings function by replacing business retained earnings by business gross savings in our aggregate savings function. The results obtained were as follows:

1950-1968

$$S'_t = \underset{(1.981)}{-3.114} + \underset{(41.19)}{0.2633}\ Y_{pg_t} \qquad \bar{R}^2 = 0.98949 \qquad D.W. = 1.79$$

where S' equals private gross savings ($S_H + S_{rg}$) and Y_{pg} equals private

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*As will be discussed in greater detail in Chapter V, section III, business net investment exceeded business retained earnings and business gross investment exceeded business gross savings for each of the 19 years observed. The business sector has been a net borrower from the financial and household sectors in every year.

gross disposable income (Y_p + private depreciation).

1950-1956

$$S_t^! = \underset{(0.8766)}{-11.19} + \underset{(7.727)}{0.2852}\, Y_{pg_t} \qquad \bar{R}^2 = 0.90728 \qquad D.W. = 1.88$$

1957-1968

$$S_t^! = \underset{(0.2918)}{-1.132} + \underset{(19.63)}{0.2571}\, Y_{pg_t} \qquad \bar{R}^2 = 0.97217 \qquad D.W. = 1.86$$

Again we find that the explanatory power of the simple linear savings function is high. The relevant F-statistic was $F(2, 15) = -3.01$ which implies that the private gross savings function was highly stable.

These results suggest that simple linear savings functions relating current savings with current income variables (reflecting classical savings assumptions) yield in stable regression results with a fairly high degree of explanatory power when applied to the household, business and private sectors, i.e., when used to explain household savings behavior, business gross savings behavior and private gross savings behavior.*

A question that arises is whether or not the financial changes that occurred in West Germany during the interval 1950-1968 had any significant impact on household, business and aggregate private savings behavior. In short, can we derive better explanations of the sources of savings by incorporating financial variables, which we have alluded to in Chapters II and III and discussed more fully in Chapter V, section II, and appendix B, into our savings functions?

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*Strictly speaking, the classical savings assumptions imply strict proportionality between savings and income in each sector of the economy. When the household savings function is computed without the constant term, the relevant F-statistic is 12.9965. This is significant at the 2% level and implies an unstable relationship, i.e., S_H/Y_H was not stable over time. The individual regressions imply that the household savings rate rose from an average value of 5.52% for the period 1950-1956 to an average value of 10.47% for the period 1957-1968.

Determinants of Private Savings Functions

Beginning with household savings, we tried to improve the explanatory power of the household savings function by incorporating financial variables into the savings function. As suggested in Chapter III, we would expect higher real deposit rates and monetary stability to increase household savings. But, an attempt to incorporate real deposit rates (nominal savings deposit rates less the rate of inflation) into the household savings function proved insignificant. We would also expect higher rates of growth in household income to raise expectations and increase private savings, but the explanatory power of changes in disposable income on household savings proved insignificant. Finally, we introduced a dummy variable which took on the value of 0 for the period 1950-1956 and 1 for the period 1957-1968 to test whether or not the expansion of investment opportunities resulting from financial liberalization after 1956 had any positive impact on household savings. Again the results proved insignificant. These results suggest that contrary to our expectations, household savings behavior was not significantly affected by the financial considerations already discussed in Chapters II and III. Finally, the household savings function which we are left with is the simple, linear, classical savings function derived earlier:

$$S_{H_t} = \underset{(8.7995)}{-8.033} + \underset{(30.4958)}{0.1362}\, Y_{d_t} \qquad \bar{R}^2 = 0.9810 \qquad D.W. = 1.06$$

Investigating the business gross savings function, we found that financial and growth factors did enter the function significantly. Attempts to include the dummy variable, representing structural change in financial markets, proved insignificant as did a stock adjustment model. We introduced a short-term call money rate into the equation (which was unregulated by the government) and found, as we would expect, that business savings moved inversely with the opportunity cost of capital to the business sector. We also found that business gross savings were positively related to changes in private gross income. Increases in the pace at which private income grew raised business expectations and encouraged business

savings. The final form of the busines gross savings function was as follows:

$$S_{rg_t} = \underset{(3.466)}{6.260} + \underset{(29.34)}{0.3832}\, P_{g_t} + \underset{(4.700)}{0.2275}\,(Y_{pg_t} - Y_{pg_{t-1}}) - \underset{(2.592)}{0.9394}\, CMR_t$$

$$\bar{R}^2 = 0.99114 \qquad D.W. = 1.22947$$

where CMR_t is the average annual call money rate.

In our effort to fit a private gross savings function, we found that the use of the dummy variable representing the revival of the capital sector after 1956 proved insignificant and appeared with the wrong sign. A stock adjustment model was tested and resulted in either an insignificant coefficient on the lagged capital stock variable or a significant coefficient with the wrong sign. Again, the call money rate, representing the opportunity cost of business savings, proved to have a significant effect on private gross savings, primarily through its effect on the business gross savings component of private gross savings. Changes in the level of private gross income had a significant effect on private gross savings, primarily through the effect on business expectations and business gross savings. The final regression results were corrected for serial correlation, and the g.l.s. results were:

$$S'_t = \underset{(0.1247)}{-0.3472} + \underset{(32.82)}{0.2459}\, Y_{pg_t} + \underset{(4.809)}{0.301}\,(Y_{pg_t} - Y_{pg_{t-1}}) - \underset{(1.893)}{1.165}\, CMR_t$$

$$\bar{R}^2 = 0.9907 \quad **$$

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*Alternatively, the results derived are:

$$S_{rg} = \underset{(2.344)}{5.604} + \underset{(2.113)}{0.4829}\, P_{g_t} + \underset{(1.308)}{0.1737}\, Y_{pg_t} - \underset{(3.008)}{0.2068}\, Y_{pg_{t-1}} - \underset{(2.351)}{0.9014}\, CMR_t$$

$$\bar{R}^2 = 0.99059 \qquad D.W. = 1.17334$$

**Alternatively, the results derived, again after adjusting for serial correlation, were:

$$S'_t = \underset{(0.1247)}{-0.3473} + \underset{(9.248)}{0.5470}\, Y_{pg_t} - \underset{(4.809)}{0.3010}\, Y_{pg_{t-1}} - \underset{(1.893)}{1.165}\, CMR_t$$

$$\bar{R}^2 = 0\ 9907$$

An interesting result is that Denison in the Review of Economics and Statistics, August, 1958, pp. 261-270, found that a highly stable relationship

One conclusion of our investigation is that, at least in the case of private aggregate and business gross savings function, financial and growth factors played a significant role in explaining savings behavior in post-war West Germany. Contrary to the savings behavior assumed in classical and neo-classical theory and incorporated into the analysis of Chapter III, private and business savings decisions can be affected by financial and economic growth factors in the short-run.

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existed between private gross savings and current and lagged Private G.N.P. This relationship was in fact more stable than for sectoral savings functions. The same regression was run on West German data and yielded the following results (after adjusting for serial correlation):

$$PGS_t = \underset{}{-4.554} + \underset{(2.500)}{0.3725}\ PGNP_t - \underset{(5.706)}{0.1733}\ PGNP_{t-1} \quad \underset{(2.545)}{}$$

$$\bar{R}^2 = 0.98923$$

Although significant, this relationship is less significant than our own private gross savings and business gross savings functions.

BIBLIOGRAPHY

1. Bank Deutscher Länder Annual Reports for the years 1949-1956.

2. Bator, Francis. "On Capital Productivity, Input Allocation and Growth." Quarterly Journal of Economics. February, 1957. pp. 86-106.

3. Brittain, John A. Corporate Dividend Policy. The Brookings Institution, Washington, D.C. 1966.

4. Chow, Gregory C. "Tests of Equality Between Sets of Coefficients in Two Linear Regressions." Econometrica, Vol. 28. July, 1960. pp. 591-605.

5. Denison, Edward F. "A Note on Private Saving." The Review of Economics and Statistics. August, 1958. pp. 261-68.

6. Deutsche Bundesbank Annual Reports for the years 1957-1968.

7. Goldsmith, Raymond W. Financial Structure and Development. Yale University Press, New Haven. 1969.

8. Grünig, F. Income and Wealth, Series VIII. pp. 154-156.

9. Klopstock, Fred H. "Monetary Reform in Western Germany." Journal of Political Economy. August, 1949. pp. 279-292.

10. Lewis, W. Arthur. "A Review of Economic Development." A.E.A. Papers and Proceedings. May, 1965. pp. 1-17.

11. Lutz, F. A. "The German Currency Reform and Revival of the German Economy." Economica. May, 1949. pp. 122-142.

12. Reuss, Frederick G. Fiscal Policy for Growth Without Inflation. John Hopkins Press, 1963.

13. Roskamp, Karl W. Capital Formation in West Germany. Wayne State U. Press, 1955.

14. Sohman, Egon. "Competition and Growth: The Lesson of West Germany." American Economic Review. Dec., 1959. pp. 986-1004.

15. Wallich, Henry C. Mainspring of the German Revival. Yale U. Press, 1965.

CHAPTER V

THE TRANSFORMATION OF THE WEST GERMAN FINANCIAL SECTOR

In the present chapter, we examine the consequences of the changing patterns of savings discussed in Chapter IV. In order to acquire some perspective, we will begin by comparing the degree of financial integration in West Germany with that in other developed and developing countries. Cross country comparisons of the level of economic development across time are presented in order to indicate important respects in which West Germany in 1948 differed sharply from less developed countries today. Attention is then focused on the first major step toward financial integration in the post-war period -- the currency reform of 1948 -- and its immediate impact on financial conditions in West Germany.

Section II of this chapter will present a discussion of the links that exist between the sources of savings and the composition (internal vs. external funds) and time structure (short-term vs. long-term) of investment. In Chapter III, this discussion was deferred in order to sharpen our focus on classical and neoclassical income distribution models. In section III, we will relate the changes in the sources of savings discussed in Chapter IV to the changes in the composition and time structure of finance that have taken place in West Germany since 1948.

Section I: Financial Conditions and Changes before 1948

In order to gain some perspective, we will begin by presenting figures which give us some notion of the size and importance of the financial sector in West Germany during the period we are analyzing. Table 1 contains a number of financial statistics. As shown, the ratio of money holdings (notes, coins and sight deposits) to private income (labor plus business after tax income) remained fairly stable around 24% throughout the 1950-1968 period. The ratio of bank assets to private income has oscillated around an average value of 13.3% but shows no obvious trend. The Financial Intermediation Ratio represents the ratio of purchases of non-financial sector liabilities by the financial sector to the total supply of such issues. The average value of 69.92% for the time period 1950-1968 compares with average values for France, 1953-1963, of 56%; India, 1952-1961, of 62%; Japan, 1954-1963, of 60%; and the United States, 1949-1963, of 67%.[2, p. 319] Goldsmith concluded that due to the paucity of data for different countries one could not conclude whether or not systematic differences in intermediation ratios exist between developed and less developed countries.[2,p.32]

The Net Financial Issues Ratio is the ratio of financial asset formation by the non-financial sector to G.N.P. The average value of this proportion, expressed in percentage terms, was 11.5% for the period 1950-1963 and 11.3% for the period 1950-1968. Goldsmith calculated what he called the Issue Rate of Financial Institutions, which is comparable to our Net Financial Issue Ratio, for a number of countries for the years 1949-1963 (our financial issue figure excludes issues within the financial sector). Some of the results he obtained were as follows: Germany, 12.8%; Great Britain, 8.6%; France, 11.4%; the United States, 9.6%. Even using our more conservative estimate of 11.5%, West Germany's financial issue ratio is comparable to the ratios obtained in other developed economies throughout the 1950-1963 period and considerably higher than for less developed economies: India, 3.1%; Pakistan, 2.7%; Thailand, 4.5%; and Venezuela, 5.4%.[3,p.191]

Another statistic, Non-Government Gross Asset Formation (financial assets issued plus shares and securities) as a percentage of private income rose from an average of 26.8% during the interval 1950-1954 to an average of 33.6% for the period 1965-1968.

Table 1

Measures of Financial Development

Year	Money Holdings as a % of Personal Income	Bank Assets as as a % of Private Income	Financial Intermediation Ratio	Net Financial Issues Ratio	Non-Gov't Gross Asset Formation as a % of Private Income
1950	----	14.6	80.21	13.29	28.9
1951	23.3	11.3	74.43	10.28	21.4
1952	23.0	12.2	66.98	11.84	24.8
1953	23.7	15.1	73.07	12.54	28.7
1954	24.7	16.2	75.29	12.04	30.1
1955	23.6	14.0	70.31	11.70	27.5
1956	22.9	11.8	68.88	11.60	25.6
1957	23.3	11.4	59.61	13.16	29.2
1958	24.4	12.3	70.25	11.23	29.5
1959	25.6	12.3	61.27	12.32	31.3
1960	23.1	13.0	62.13	11.50	30.6
1961	24.5	14.4	73.74	10.57	30.5
1962	24.3	10.9	66.60	8.45	25.7
1963	24.6	13.5	67.96	9.78	30.7
1964	24.3	12.3	60.61	10.80	30.6
1965	23.6	11.8	61.15	10.45	32.2
1966	22.9	10.8	74.99	9.31	27.9
1967	24.8	15.7	81.86	10.81	33.5
1968	24.6	18.9	79.13	12.61	40.6
Avg. 1950-1954	23.7	13.9			26.8
1955-1959	24.0	12.4			28.6
1960-1964	24.2	12.8			29.6
1965-1968	24.0	14.3			33.6

Unfortunately, as interesting as these measures may be, one could hardly hope to gain any appreciable insight into the relative importance of different sectors of the economy in the financing process from such highly aggregated data. Still these ratios do suggest that the relative size of the financial structure in West Germany is not drastically different from that found in other developed economies and that it has remained fairly constant throughout the period under analysis, 1948-1968.

Even in 1948, West Germany, hardly fit the description of a less developed country today. As suggested by the data in table 2, Germany was among the more economically advanced and financially sophisticated nations during the latter part of the 19th century. Total G.N.P. in Germany between 1861 and 1913 was equivalent to 335 billion dollars; this figure compares favorably with total G.N.P. figures for France and Britain during this same period of 300 billion dollars and 410 billion dollars respectively. The adjusted new issues ratio, which was 9.8% in the U.S., 7.8% in France and 6.2% in Britain during the 1861-1913 interval, stood at 10.6% for Germany. Though not conclusive by any means, this does suggest that the financial growth that occurred in West Germany after World War II was not an unfamiliar experience for the German people.

The ratio of new issues of domestic shares and securities to G.N.P. stood at 7% in Germany for the period 1861-1913 while the comparable figures for France, Britain and the U.S. were 8%, 6%, and 12%. In fact, during the 1901-1913 period, the German ratio of 14% actually exceeded the comparable ratios for France, Britain and the U.S. of 8%, 6% and 11%. [2, p. 119] Using Goldsmith's estimates of Net External Financing Ratio (the ratio of the domestic new issues ratio to the domestic capital formation ratio), we find that the German ratio of 80% exceeds the ratios for France, 64%; Britain, 67%; and the U.S., 50%, for the period 1901-1913. [2, p. 137] Finally, the high ratio of Gross Investment to G.N.P. experienced in post-war West Germany (25%) is not a unique experience

for the German people. As shown in table 3, during the period 1891-1913, the gross capital formation ratio of 23% in Germany exceeded those for France, 14%; Britain, 9%; and the U.S., 22%.

Table 2

Estimation of Ratio of Net Issuance of Financial Instruments by Nonfinancial Issuers To Gross National Product, 1861-1913 (Billions of Dollars)

	Securities (Stocks & Bonds) Owned, 1912 (1)	Increase in Assets of Financial Institutions 1861-1913 (2)	Col (1) Adjusted (3)	Col. (2) Adjusted (4)	G.N.P. 1861 to 1913 (5)	New Issue Ratio (per cent of G.N.P.) A (6)	B (7)
1. France	22.3	9.1	12.0	11.4	300	10.5	7.8
2. Germany	21.0	20.5	10.0	25.6	335	12.3	10.6
3. Britain	29.0	10.7	12.0	13.4	410	9.7	6.2
4. U.S.A.	56.1	32.8	43.0	36.0	815	10.9	9.8
5. Total	128.4	73.1	77.0	86.4	1,861	10.8	8.8

Source: Goldsmith, Raymond W. Financial Structure and Development, Yale University Press, New Haven and London, pp. 114-115.

The rather disappointing turn of economic events in Germany after the first world war can be seen by referring to tables 4, 5 and 6. [2] Table 4 contains estimates of the ratio of asset holdings of financial institutions relative to G.N.P. for a number of developed and less-developed countries. The significance of this ratio is that it gives a rough measure of the relative size of the financial superstructure in different countries and within countries over time. As shown, by 1913, the ratio for Germany was 158% and well above the comparable ratios for France, Great Britain and the United States of 104%, 103% and 91% respectively. Only Denmark, Norway and Switzerland with ratios of 184%, 166% and287% had relatively larger financial sectors than Germany in 1913. But, by 1948, the ranking of countries had changed significantly. The financial asset-G.N.P. ratio of 107% for West Germany, although still greater than the ratio for France, 63%, was well below the ratios for Great

Britain and the U.S. of 184% and 185% respectively. More importantly, the financial asset ratio declined in absolute terms in Germany by a factor of almost 1/3 between 1913 and 1948.

Table 3

Trend in Domestic Capital Formation Ratio (Excluding Consumer Durables), 1860-1963
(Percent of Gross National Product)

Country	1861-1890	1891-1914	1921-1939	1948-1963
1. Argentina	--	15	13	19
2. Australia	17	14	17	27
3. Canada	--	22[a]	15	24
4. Denmark	11[b]	13	13	20
5. France	--	14[c]	16	22
6. Germany	16	23	13	25
7. Great Britain	9	9	9	16
8. Italy	11	14	18	22
9. Japan	--	11	16	33
10. Norway	11[d]	14	17	30
11. Sweden	11	13	16	22
12. U.S.A.	21[e]	22	18	18

[a]1896-1915, [b]1870-1889, [c]1896 and 1913, [d]1865-1889, [e]1869-1889

Source: Goldsmith, Raymond W. Financial Structure and Development, Yale University Press, New Haven and London, 1969. Table 3-7, p. 132.

Table 4

Asset/G.N.P. Ratios of Financial Institutions in Individual Countries (Per Cent)

Country / Year	1880	1900	1913	1929	1938	1948	1963
Belgium	71	94	109	85	140	102	161
Denmark	95	147	184	186	198	166	166
France	50	96	104	90	130	63	104
Germany	73	114	158	89	99	107	124
Great Britain	95	93	103	131	158	184	162
Italy	36	61	97	95	137	67	174
Japan	13	82	97	223	212	61	217
Norway	107	136	166	241	187	219	148
Sweden	89	123	136	138	161	142	148
Switzerland	153	184	287	261	325	225	272
U.S.A.	49	86	91	129	185	147	167

Source: Goldsmith, table 4-13, p. 209

Table 5 [2] contains estimates of the ratio of issues by financial institutions relative to G.N.P. in individual countries over time. This indicates how the relative size of the financial superstructure is changing over time. The German ratio of 8.5% for the period 1901-1913 was well above the comparable ratios for France, Great Britain, and the United States of 3.6%, 2.8% and 5.3% respectively and was exceeded only by Denmark, Norway and Switzerland with ratios of 9.9%, 9.4% and 15.1% respectively. During the intervals 1914-1929 and 1939-1948, the financial issues ratio was actually negative for Germany with values of -2.9% and -5.3% suggesting the contraction in the relative size of the financial sector in Germany indicated in table 4. While the German ratio decreased by 5.3% during the 1939-1948 period, France, Great Britain and the United States showed increased ratios of 6.6%, 13.6% and 12.6% respectively.

Table 5

Issue Ratios of Financial Institutions in Individual Countries (% of G.N.P.)

Country // Year	1881-1900	1901-1913	1914-1929	1930-1938	1939-1948	1949-1963
Belgium	3.3	5.4	6.5	3.7	9.8	10.6
Denmark	6.5	9.9	7.4	6.7	13.7	11.8
France	3.0	3.6	8.5	5.5	6.6	11.4
Germany	5.3	8.5	-2.9	4.2	-5.3	12.8
Great Britain	2.4	2.8	5.2	5.6	13.6	8.6
Italy	1.9	6.2	7.2	6.0	23.1	18.6
Japan	7.7	6.5	14.0	18.4	31.8	29.3
Norway	6.5	9.4	9.8	1.3	19.8	8.8
Sweden	5.4	7.0	6.0	7.5	9.2	10.9
Switzerland	7.1	15.1	12.2	3.4	9.9	20.4
U.S.A.	4.3	5.3	7.8	4.4	12.6	9.6

Source: Goldsmith, table 4-7, p. 191.

Table 6 [2] shows the issue ratio of thrift institutions relative to G.N.P. and gives a rough indication of the relative supply of long-term

external finance within and across countries. Prior to World War I, thrift institutions were relatively important in Germany. The German ratio of 2.94% is the highest shown for the period 1901-1913 and well above the ratios of 0.3%, 0.53% and 0.62% for France, Great Britain and the United States. But, thrift institutions showed negative growth rates of -0.93% and -2.77% for the periods 1914-29 and 1939-48. The negative ratio of -2.77% for Germany for the period 1939-48 is well below the comparable figures of 0.82%, 3.08% and 1.13% for France, Great Britain and the United States.

Table 6

Net Issues of Thrift Institutions in Individual Countries (Percent of Period's G.N.P.)

Country // Year	1880-1900	1901-1913	1914-1929	1930-1938	1939-1948	1949-1963
Belgium	1.08	1.10	0.44	0.99	1.31	2.04
Denmark	1.76	1.18	1.67	0.74	2.35	1.33
France	0.63	0.30	0.92	1.02	0.82	2.38
Germany	1.55	2.94	-0.93	2.22	-2.77	4.91
Great Britain	0.53	0.53	0.93	2.51	3.08	1.53
Italy	0.72	1.54	1.70	1.75	4.56	4.35
Japan	1.00	1.76	4.16	6.11	7.97	8.74
Norway	1.88	2.73	3.35	-0.76	2.75	1.70
Sweden	1.21	1.33	1.71	1.57	2.64	2.68
Switzerland	0.31	0.56	0.58	0.74	0.67	0.94
U.S.A.	0.72	0.62	0.98	0.17	1.13	2.03

Source: Goldsmith, table 5-11, p. 238.

The two world wars and the depression imposed heavy economic costs on all of the advanced economies. Germany was undoubtedly one of the hardest hit. The task facing West Germany after World War II was one of rebuilding its financial structure and recapturing its pre-World War I position as one of the most advanced economies in the world.

Currency Reform

By 1936, the Nazi government had imposed extensive price controls in Germany. Since these controls had been in effect for 10 years before the allies took over control of the government, the initial decision was to maintain price controls in each of the four zones. The formation of bipartite Anglo-American economic policy bodies occurred in late 1946. As talk of currency reform grew in the spring of 1946, the repudiation of the Reichsmark as a medium of exchange and store of value began, and black market activities assumed large proportions. Barter and compensating trade became increasingly important as means of exchange. [5]

The black market developed primarily in finished goods between traders and final consumers. Black market prices were typically 50 to 75 times the control prices, and bilateral trade assumed major importance. In September, 1947, U.S. military government experts believed that between 1/3 and 1/2 of all business transactions in the bizonal area proceeded in the form of compensated trade. [7]

> "Many barter transactions were performed with the aid of cigarettes, which served not only as a medium of exchange but also as a unit of account and store of value. As the distrust of the Reichsmark spread, sellers of currently produced goods were willing to accept in payment all sorts of real assets, such as jewelry and various second hand articles. The disinvestment of such articles added to the aggregate demand for currently produced goods just as effectively as did the dissaving of cash balances."[5, p. 279]

Because of legal restrictions forcing public authorities to maintain balanced budgets, the burden of controling aggregate economic activity fell on the monetary authority in West Germany. The Reichsbank had been closed down in 1945. The U.S., France and Britain all established land banks in 1947 and agreed to develop a central bank. The Bank Deutscher Lander opened its doors April 1, 1948. The U.S. favored decentralized banking and was responsible for the creation of the land central banks.

Land central banks held the legal reserves of commercial banks, acted as lender of last resort and performed many of the services of a central bank. But, the land central banks could neither issue notes nor determine their own monetary policy. These powers rested in the Bank Deutscher Lander, which owed its existence to the British insistence on the creation of a central policy making authority. The Bank Deutscher Lander held the legal reserves of the land central banks, lent money to them, rediscounted paper for them and set the rates at which these transactions could take place. The Bank could also specify, within legal limits, the reserves the commercial banks had to hold with the land central banks, to set the interest rates on loans against security, and to set the rediscount rates of the land central banks.

The board of directors determined policy and consisted of the presidents of the nine central banks and the president of the board of directors and the president of the board of managers (the board of managers administered the central bank) elected by the nine presidents. Originally, there were 11 land banks. On January 1, 1953, the banks of Baden, Wurttemberg-Baden, and Wurttemberg-Hohenzollern were merged into the land central bank of Baden-Wurttemberg with the consolidation of the three land governments. [1] Through the early 1950's, the Bank Deutscher Lander directed monetary policy and was officially recognized as the only central bank with the formation of the Deutsche Bundesbank in 1957.

When the currency reform of June, 1948, was put into effect and the new currency introduced into West Berlin, the city was blockaded. The main features of the currency reform were: (1) the contraction of the nominal money supply and (2) the reorganization of the public and private debt structure. Originally, the conversion was intended to be at the rate of 10:1. Half of the money was put at the owners immediate disposal,

2/10 of the other half was made freely available later, 1/10 was set aside for investment purposes in blocked accounts, and 7/10 was cancelled. The implied conversion was actually 100:6.5. The severe scaling down applied to savings deposits as well as demand and time deposits, a fact that became a source of much bitterness and social distress. [10]

> "To provide people with cash during the conversion period a per-capita 'allowance' was given to each individual totaling 60 D.M. Of this, 40 D.M. were available on the day of the reform, 20 D.M. two months later. The allowance could be obtained against old R.M. at a rate of 1:1. But, to the extent that the applicants funds exceeded 60 R.M., the D.M. allowance was charged against them at the 10:1 rate. Businesses were allowed 60 D.M. per employee on the same basis to avoid a complete stoppage of wage and other payments. State and local governments and other public authorities were given an allowance equal to one months revenue. Their old funds were cancelled in toto." [10, p. 69]

Debts were devalued at the rate of 10:1. Banks were given new government obligations sufficient to bring their assets to the level of their liabilities plus a modest allowance for capital. These equalization claims (Ausgleichsforderungen) bore interest of 3%, which made them de facto non-negotiable. Banks were given reserves of 15% of demand deposits and 7.5% of time and savings deposits with the central banking system. These reserves were 50% above the reserve requirements fixed by the system. [10]

A week after reform it was announced that the initial 40 D.M. allowance would be counted against deposits in banks. In fact, 30% of all deposits, mostly those of small savers, were wiped out through this provision. In October, 1948, 70% of the blocked deposits were declared void. This step was taken in the face of mounting inflationary pressure. Deposits were thus converted at a ratio of about 16:1. Businesses that had hoarded inventories and farmers who had hoarded livestock were the net gainers. [9]

This

> "cancellation of D.M. was definitely a psychological error. The Germans were quite willing to have the Reichsmark cancelled, but the fact that a few months after the reform the occupying powers should cancel part of the newly created D.M. seriously undermined their confidence in the new currency. Moreover, the change in the ratio did not apply to private claims, so that the holders of money were penalized as compared with the holders of private claims, and this accentuated the belief of the man in the street that holding cash was the least advantageous thing to do." [6, p. 123]

Ignoring 3 billion D.M. of money created by the banking system, the money supply (135 billion D.M.) was reduced 93%. The Equalization of Burden Funds, discussed in Chapter IV, were raised by special taxes and were intended to pay for injustices resulting from bombing, expulsion from the east, reparation payments and currency reform. In 1948, income and property taxes were reduced from their high levels of 1946, and the corporate income tax was made less progressive. [7]

In assessing the immediate impact of the currency reform, Horst Menderhausen wrote,

> "The effect of the monetary and economic measures was impressive. If the Reutenmark of 1923 performed a miracle, the Deutschmark of 1948 may be said to have wrought a revolution. Beyond the immediate change in the availability of goods, a significant change in economic relations took place. It was as if money and markets had been invented afresh as reliable media of the division of labor." [7, p. 645]

In this context, we begin our analysis of West German development. Model I of Chapter III, which excludes the availability of external finance and incorporates classical savings assumptions, is a simplified representation of financial conditions in West Germany during the 1948-1956 period. In section I of Chapter IV, we argued that West German development policy followed the prescriptions of traditional development theory, which were shown to be relevant and beneficial within the context of model I.

West Germany began to free financial markets in 1955, and by 1957 the primary responsibility for maintaining rapid growth had been shifted

from the government to the private sector. Financial markets rapidly emerged as important suppliers of external finance to the business sector. As suggested by our analysis of model IV in Chapter III, the emergence of integrated financial markets called for new development policies. Traditional policy prescriptions, which seemed valuable in the context of model I, may be irrelevant and counter-productive in the context of model IV.

Section II: Sources of Savings and the Supply of External Finance

In order to understand how the relative importance of external versus internal finance changes during the early stages of financial development, let us assume that our hypothetical economy begins in a position of rapid price inflation, pure internal financing and no or slow growth. While attempting to reduce fears of inflation and promote private savings, the government might use tax incentives to increase the supply of funds going to investment through retained earnings. Since the capital sector is unable to provide external funds for investment, long-term investment will depend largely on the ability of individual enterprises to diversify their portfolios and reduce the private risks of investment. Since this ability to diversify will not be strong, the government may find itself directly involved in promoting long-term capital investment in housing, transportation, steel producing, coal mining, electric power generation, etc. This is the kind of environment described in model I, and the policies outlined follow the prescriptions of traditional development theory.

As monetary stability is achieved, the expected rate of inflation will fall and the riskiness of short-term and long-term bank deposits will decline. (The asset demand functions underlying the narrative of this section are developed systematically in appendix B). At the same time, even if nominal deposit rates are constant, the real deposit rates, $d_s - \dot{P}^*$ and $d_\ell - \dot{P}^*$, will rise as a result of the fall in the rate of inflation, $\dot{P}^*$. These changes result in increased household savings through the banking sector. As the size of the bank portfolio grows, principally through increased houshold savings, banks will be able to provide short-term and long-term loans to businesses. Since the ability to lend long-term is positively related to the size of the portfolio, in the early stages of

development bank loans will be predominantly short-term.

To the extent that monetary stability, taxes and subsidies and some access to external finance succeed in stimulating higher rates of capital formation and economic growth, the level of current economic activity, Y, and the level of expected permanent income and expected permanent profits will rise. Consequently, household savings and business savings in the banking sector will grow. To the extent that the government becomes convinced that voluntary savings can support high rates of capital formation, it can begin to remove tax incentives and subsidies to external financing and let the capital market operate freely. The argument that capital markets should have been controlled during the early stages of development is not obvious. Such controls were used in West Germany; and, as demonstrated in Chapter IV, we have been providing a general summary of financial development in West Germany between 1948 and 1956.

Once financial markets begin to generate and allocate private savings efficiently, the necessity for traditional policy intervention loses much of its force, i.e., the appropriateness of continuing to apply traditional policy intervention techniques becomes questionable. In the case of West Germany, there can be little doubt that government limitations on equity issues and the designation of low bond market rates in the early 1950's to encourage housing construction discouraged the purchase of bonds and shares by householders and the banking community. This hindered the growth of external finance and prolonged the dependency of business investment programs on government support.

As the capital sector grows and becomes more highly integrated, bonds and equities will become more marketable in general. Consequently, the supply of external finance in the form of bond and equity demands by households and banks will expand with increased size and integration of

financial markets. Increased household and business savings in the form of bank deposits resulting from monetary stability, higher real deposit rates (and perhaps deposit insurance) and higher expected real permanent income and profits will cause rapid growth in the size of the banking sector. The resulting increase in ability to diversify investments by banks will decrease their short-term and long-term lending rates and permit a trend toward long-term lending. The decline in the costs of external finance will also promote higher levels of desired investment. In summary, the consequences of financial growth will include higher equilibrium levels of investment and savings, a rise in the share of external financing in business net investment and a trend toward long-term lending by banks as well as a rapid increase in household savings and in the size of the financial sector.

West Germany, during the period 1957-1968, represents an example of a developing economy in which trends in the scale, composition and time structure of finance were similar to the chronology just traced out. The extent to which West German experience conforms to this description will be discussed in detail in section III.

In the presence of the more complex financial structure of model IV (as described in appendix B), the need for a coherent financial development policy becomes apparent. The policy recommendations suggested here and more systematically developed in appendix B include monetary stability, higher real deposit rates, deposit insurance and de-emphasis of government controls on financial markets.

Section III: Consequences of the Changing Savings Pattern in West Germany

We are now in a position to evaluate the effects of changing savings rates in West Germany. As shown in table 7, the government share of aggregate savings declined from an average value of 45.738% for the period 1950-1954 to an average of 34.635% for the period 1965-1968. The business share of aggregate savings declined from an average value of 41.176% for the period 1950-1954 to only 13.570% for the period 1965-1968. But, the household share of aggregate savings rose steadily from a value of 23.444% for the period 1950-1954 (below the government and the business sector savings shares for the same period) to an average value of 54.438% for the period 1965-1968.

Table 7

The Distribution of Saving in West Germany

	Aggregate Net Saving Bill.D.M.	Gov't Share of Net Saving %	Business Share of Net Saving %	Household Share of Net Saving %	Foreign Share of Net Saving %
1950-54	16.938	45.738	41.176	23.444	-6.974
1955-59	34.746	42.918	41.876	29.530	-14.360
1960-64	60.266	44.010	25.510	33.960	-3.470
1965-68	69.148	34.635	13.570	54.438	-7.820

The emergence of the household sector as the dominant source of savings shows up elsewhere in the financial structure. Referring to table 8, we find that the government share of asset formation (gross purchases of assets from other sectors) declined steadily from an average of 21.95% during the 1950-1954 period to 6.23% during the 1965-1968 period; and the business share of asset formation decline from 15.92% during the 1950-1954 period to 10.45% for the interval 1965-1968. At the same time, the household sector's share of total asset formation rose from an average of 15.23% during the 1950-1954 period (below the percentage shares of both government an siness at that time) to 29.29% during the

1965-1968 period. Consequently, the average share of business plus government in asset formation declined from an average value of 37.87% in the interval 1950-1954 to 16.68% during the interval 1965-1968. A direct consequence of the rise in household savings was that the share of the financial sector in total asset formation rose from 45.43% during the 1950-1954 period to 48.45% during the 1965-1968 period. This occurred despite the decline in the bank share of asset formation because of household savings through building and loan associations and insurance companies.

Table 8

Asset Formation in West Germany

	Total Asset Form. Bill.DM	% Share of Asset Formation							
		Govern-ment	Busi-ness	House-hold	Foreign	Bank	Building & Loan Assn.	Insur-ance Co.	Gov't plus Business
1950-54	31.166	21.95	15.92	15.23	1.05	40.30	2.18	2.95	37.87
1955-59	52.404	18.21	12.78	21.70	1.87	35.28	5.02	3.92	30.99
1960-64	81.732	13.40	11.32	24.68	5.09	37.46	2.82	5.23	24.72
1965-68	118.655	6.23	10.45	29.29	5.60	39.58	3.46	5.41	16.68

Although the bank share of total asset formation declined from an average of 40.30% for the 1950-1954 period to 39.58% for the 1965-1968 period, the structure of bank asset formation changed significantly. Referring to table 9, we find that the relative share of medium and long-term finance in the banking sector's portfolio rose from 47.76% for the period 1950-1954 to an average rate of 59.68% for the 1965-1968 period. If we include share and security purchases by banks in medium and long-term asset formation, this ratio rose from 53.79% for the 1950-1954 period to 75.67% for the 1965-1968 period. No doubt the shift toward long-term financing by banks was facilitated by the increase in outstanding bank liabilities from 10.11 billion D.M. in 1950 to 67.84 billion D.M. in 1968. This six-fold increase in the size of the banks portfolio, due largely to increased

household savings, made it easier for the banking sector to diversify its aggregate portfolio and move more heavily into long-term business financing.

Table 9

The Time Structure of Lending in West German Banks, 1950-1968

	Short Term bank credit - - Bill.	Medium & long-term bank credit of D.M.	Acq. of Securities & shares	Total	Short term bank credit	Medium & long-term credit	Acq. of Securities & Shares	
					- - as proportion of total Assets - -			
1950	5.29	4.89	.51	10.11	.5232	.4837	.0504	
1951	2.57	4.45	.20	9.26	.2775	.4806	.0216	
1952	3.22	4.65	.64	11.27	.2857	.1426	.0568	
1953	2.91	7.39	.96	14.87	.1957	.4970	.0646	
1954	3.78	8.93	1.88	17.37	.2176	.5141	.1082	
1955	2.92	10.82	1.70	17.29	.1689	.6258	.0983	
1956	1.82	9.00	.23	16.14	.1128	.5576	.0143	
1957	3.22	7.45	1.37	17.17	.1875	.4339	.0798	
1958	1.14	10.72	4.92	19.97	.0571	.5368	.2464	
1959	4.65	14.13	4.82	21.39	.2174	.6606	.2253	
1960	5.68	12.43	.43	26.63	.2133	.4668	.0161	
1961	9.40	21.28	4.57	32.00	.2938	.6650	.1428	
1962	3.87	20.38	3.46	26.03	.1487	.7829	.1329	
1963	6.07	20.70	3.66	34.19	.1775	.6054	.1070	
1964	5.39	25.43	4.94	34.21	.1576	.7433	.1444	
1965	7.68	26.20	3.97	36.24	.2119	.7230	.1095	
1966	6.65	23.98	1.93	35.11	.1894	.6830	.0550	
1967	9.59	23.60	12.60	51.66	.1856	.4568	.2439	
1968	9.11	35.56	15.69	67.84	.1343	.5242	.2313	
Avg. 1950-54					29.99	47.76	6.03	53.79
1955-59					14.87	56.29	13.28	69.57
1960-64					16.67	65.27	10.86	76.13
1965-68					18.03	59.68	15.99	75.67

Table 10 shows the composition of household savings. As can be seen, savings deposits by the household sector rose from a level of 0.96 billion D.M.

in 1950 to 20.68 billion D.M. in 1968. The ratio of short-term savings (notes, coins, sight deposits and time deposits) to total household savings declined rapidly from a value of 36.36% in 1951 to 6.83% in 1968. As suggested by the analysis of section II, monetary stability and the expectation of economic prosperity established in the early 1950's re-enforced the incentive to save and to save long-term.

Table 10

The Distribution of Household Savings (Bill. of D.M.)

	Net Savings	Notes, Coins & Sight Deposit	Time Deposit	Savings Deposit	Other Funds w/banks	Monies w/ Ins. Cos.	Monies w/bldg. & loan Assn.	Acq. of shares & fixed Inter. Secur.	Other Assets	Liquidity ratio(notes, coins, sight dep. + time dep. as % of net savings
1950	2.04	0.53	0.03	0.96	0.01	0.46	0.40	0.02		27.45
1951	2.31	0.80	0.04	0.85	0.01	0.57	0.32	0.05		36.36
1952	4.34	1.35	0.06	2.15	0.01	0.67	0.50	0.15		32.49
1953	5.43	1.13	0.07	3.49	0.03	0.85	0.83	0.27		22.10
1954	6.66	0.87	-0.01	4.64	0.02	1.04	1.30	0.66		12.91
1955	6.88	1.23	-0.02	3.51	-0.06	1.55	1.16	0.72		17.59
1956	7.03	0.81	0.01	2.09	0.10	1.30	2.01	0.69		11.66
1957	11.10	1.55	0.05	4.69	0.01	1.53	2.58	1.23		14.41
1958	12.77	1.54	0.02	5.96	0.03	1.59	3.08	1.79		12.22
1959	14.13	1.20	0.04	6.89	0.03	2.21	3.80	2.28		8.78
1960	15.36	1.71	0.01	7.18	0.06	2.53	1.86	2.51	0.02	11.20
1961	17.36	2.45	0.05	6.54	0.04	2.87	1.94	3.66	0.02	14.40
1962	18.95	1.31	0.02	8.42	0.02	3.33	1.78	2.49	0.02	7.02
1963	22.81	1.39	0.01	11.01	0.03	3.84	2.12	3.40	0.03	6.14
1964	29.09	2.60	-0.02	13.23	0.04	3.98	2.09	5.96	0.02	8.87
1965	35.44	2.59	-0.02	17.00	0.00	4.32	3.25	6.82	0.02	7.25
1966	35.37	1.98	0.03	16.80	0.00	5.46	4.27	3.60	0.10	5.68
1967	35.03	1.33	0.26	17.36	0.21	6.05	2.62	3.97	0.10	4.54
1968	40.83	2.35	1.44	20.68	0.00	6.70	2.38	4.80	0.10	6.83

Source: D.B.M.R., July, 1960; June, 1961; April 1966; April, 1967; April, 1968; October, 1969.

The willingness of individual households to accumulate wealth in the form of long-term savings accounts meant that the ratio of savings deposits to total bank liabilities rose steadily, as shown in table 11,* from 17.94% for the period 1950-1954 to 43.66% for the period 1965-1968. This trend toward long-term liability formation by the banking system facilitated its increasing ability to provide long-term finance to the business sector. This increased ability of banks to provide long-term lending was central to the transition away from government and toward private financing of long-term investment. This same transition is important in less developed countries if the dependency of business long-term investment on government support is to be remedied. In the case of West Germnay, the desire to save long-term by householders, which made long-term bank lending possible, was facilitated by a rise in the real long-term savings deposit rate from an average value of 1.95% for the period 1960-1964 to 2.53% for the period 1965-1968./ No doubt increasing real deposit rates in less developed countries could speed the transition to private financing of business long-term investment.

Table 12 shows the relative shares of asset formation by the household, business, government and foreign sectors in asset formation by the non-financial sector. The share of the business sector declined from 29.05% in the 1950-1954 period to 20.47% in the period 1965-1968,

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*The difference between total liabilities and the sum of the first three columns consists of sales of shares and fixed interest securities, sale of money market paper (after 1959) and other funds placed with banks (which were primarily counted as time deposits after 1965). If time deposits, which generally have a shorter legal period of notice than savings deposits, are counted in long-term deposits, the ratio of long-term deposits to total bank liabilities rose from an average of 31.58% during the 1950-1954 period to 63.97% for the 1965-1968 period.

/The rise in real deposit rates was facilitated by the repeal of interest rate ceiling on long-term deposits on April 1, 1967.

Table 11

The Time Structure of Deposits in West Germany, 1950-1968

	Bank Sector Liabilities			Total	Notes Coins & sight dep.	Time & savings deposits	Savings deposits as a % of total deposits
	Notes coins & sight dep.	Time deposits	Savings deposits		as a prop. of total liabilities		
	Billions of D.M.						
1950	1.87	2.04	1.01	10.11	.1850	.3017	9.99
1951	2.89	1.48	.90	9.26	.3121	.2570	9.72
1952	2.67	2.06	1.42	11.27	.2369	.3088	12.60
1953	3.49	2.18	3.84	14.87	.2347	.4048	25.82
1954	4.55	-.15	5.48	17.37	.2619	.3069	31.55
1955	3.81	.03	3.95	17.29	.2204	.2302	22.85
1956	3.22	1.70	2.70	16.14	.1995	.2726	16.73
1957	1.28	3.44	4.81	17.77	.0745	.4805	28.01
1958	4.42	.99	6.48	19.97	.2213	.3741	32.45
1959	1.70	1.63	7.95	21.39	.0795	.4479	37.17
1960	4.95	.75	8.20	26.63	.1859	.3361	30.79
1961	8.90	1.35	7.49	32.00	.2781	.2763	23.41
1962	3.91	1.79	9.55	26.03	.1502	.4357	36.69
1963	4.96	1.69	11.96	34.19	.1451	.3992	34.98
1964	4.80	1.10	14.01	34.21	.1403	.4417	40.95
1965	4.97	.63	17.85	36.24	.1371	.5099	49.25
1966	1.76	8.72	17.42	32.72	.0538	.7989	53.24
1967	10.75	9.16	18.57	49.36	.2178	.5618	37.62
1968	7.10	20.12	22.26	64.47	.1101	.6881	34.53
Avg. 1950-54					24.61	31.58	17.94
1955-59					15.90	36.11	27.44
1960-64					17.99	37.78	33.36
1965-68					12.97	63.97	43.66

Table 12

Sectoral Shares of Financial Asset Formation by Non-Financial Sectors, 1950-1968

	Asset Form. by Non-fin Sector	H'hold Sector	B'ness Sector	Gov't Sector	For'n Sector	% Share of H'holds	B'ness	Gov't	For'n	B'ness & Gov't
1950	13.09	2.40	5.80	4.17	0.59	18.33	44.31	31.86	4.51	76.17
1951	12.79	2.63	4.44	5.55	0.05	20.56	34.71	43.39	0.39	78.10
1952	17.05	4.89	4.58	6.77	0.65	28.68	26.86	39.71	3.81	66.57
1953	20 16	6.66	4.68	8.61	0.04	33.04	23.21	42.71	0.20	65.92
1954	21.57	8.52	3.49	9.39	0.13	39.50	16.18	43.53	0.60	59.71
1955	24.05	8.10	4.87	10.32	0.22	33.68	20.25	42.91	0.91	63.16
1956	26.00	7.82	5.18	10.73	1.69	30.08	19.92	41.27	6.50	61.19
1957	31.47	11.63	7.34	9.31	2.57	36.96	23.32	29.58	8.17	52.90
1958	29.11	13.99	7.52	6.62	0.05	48.06	25.83	22.74	0.17	48.57
1959	35.58	16.44	9.00	9.48	0.18	46.21	25.30	26.64	0.51	51.94
1960	42.46	15.90	8.11	11.83	6.63	37.45	19.10	27.86	15.61	46.96
1961	42.27	17.57	11.01	12.95	0.74	41.57	26.05	30.64	1.75	56.69
1962	37.87	18.38	7.00	8.93	3.56	48.53	18.48	23.58	9.40	42.06
1963	45.88	21.83	9.81	9.60	4.65	47.58	21.38	20.92	10.14	42.30
1964	54.30	27.91	10.44	10.90	5.05	51.40	19.23	20.07	9.30	39.30
1965	59.61	33.96	11.31	6.64	7.71	56.97	18.97	11.14	12.93	30.11
1966	51.03	32.25	6.54	6.67	5.57	63.20	12.82	13.07	10.92	25.89
1967	57.18	31.68	16.04	7.95	1.51	55.40	28.05	13.90	2.64	41.95
1968	75.18	38.46	16.56	7.75	12.40	51.16	22.03	10.31	16.49	32.34
			Avg.							
			1950-54			28.02	29.05	40.24	1.90	69.29
			1955-59			39.00	22.92	32.63	3.25	55.55
			1960-64			45.31	20.79	24.61	9.24	45.46
			1965-68			56.68	20.47	12.11	10.75	32.57

and the government sector share declined from 40.24% in the period 1950-1954 to 12.11% for the 1965-1968 period. Consequently, the share of business and governmen in asset formation declined from 69.29% for the 1950-1954 period to 32.57% for the 1965-1968 period. At the same time, the household sector share of asset formation by the non-financial sector rose from 28.02% for the 1950-1954 period to 56.58% for the 1965-1968 period.

The household sector share of 37.45% in 1960 was below the levels recorded for the U.S., France, Japan and the United Kingdom (1962) of 59%, 48%, 41% and 54% respectively. By 1965, the household sector share of asset formation by the non-financial sector of 56.97% in West Germany was second only to the French ratio of 59% and well above the rates for the U.S., Japan and the United Kingdom of 53%, 43% and 50% respectively. Finally, the business plus government share of non-financial asset formation declined from 46.96% in 1960 to 30.11% in 1965 in West Germany while this share rose from 31% to 44% in the U.S. and 31% (1962) to 38% in the United Kingdom.[8]

The trend away from business and government financing and toward financing by the household sector also showed itself in the acquisition of shares and securities by different sectors of the economy. Referring to table 13, we find the government plus business share of bond and equity purchases declined from an average of 44.26% for the period 1950-1954 to 14.96% for the period 1965-1968. At the same time, the household sector's share of such purchases rose from an average of 4.2% for the 1950-1954 period to 28.2% for the period 1965-1968. The share of equity and security purchases by the financial sector, which Goldsmith calls the financial intermediation ratio, rose in West Germany primarily because of the increase in long-term savings by the household sector from an average value of 45.32% during the 1950-1954 period to 55.38% during the 1965-1968 period.

Table 13

The Acquisition of Share and Fixed Interest Securities (Bill. D.M.)

	Total	Gov't Sector	B'ness Sector	H'hold Sector	Foreign Sector	Bank Sector	Bldg. & Loan Assns.	Insur. Cos.	Gov't plus B'ness share of Total
1950-54	2.348	0.740	0.318	0.098	-0.014	0.838	0.024	0.202	44.26
1955-59	7.004	1.052	0.998	1.018	0.378	2.608	0.058	0.694	34.17
1960-64	13.310	1.898	1.774	3.268	1.744	3.412	0.072	1.182	29.83
1965-68	18.757	0.533	2.040	5.295	0.623	8.548	0.145	1.692	14.96

As one might expect, these trends in asset formation were accompanied by shifts in the structure of borrowing and lending in West Germany in the post-war period. Table 14 contains average net surpluses and deficits for the non-financial sectors of the economy. The government sector shifted from average net surpluses of 5.375 billion D.M. in the 1950-1954 period to average net deficits of 3.620 billion D.M. during the 1965-1968 period; and the business sector increased its average net borrowings from 7.206 billion D.M. in the 1950-1954 period to 27.233 billion D.M. for the 1965-1968 period. The trend toward greater net borrowing by the government and business sectors was accommodated by an upward shift in net savings by the household sector from an average of 4.586 billion D.M. during the 1950-1954 period to an average of 32.553 billion D.M. during the 1965-1968 period.

Table 14
Financial Surplus(+) or Deficit(-) (Bill. of D.M.)

	Gov't Sector	Business Sector	Household Sector	Foreign Sector
1950-54	5.375	-7.206	4.586	-2.234
1955-59	7.442	-13.794	10.984	-4.628
1960-64	6.630	-25.110	19.274	-0.794
1965-68	-3.620	-27.233	32.553	-3.670

As explained in section II and appendix B, one consequence of government financing of business investment was that the capital market was kept small. This discouraged household and bank purchases of business shares and securities. As financial markets developed and government financing declined, purchases of shares and securities became more attractive and banks gained an incentive to offer higher real deposit rates to attract savings. In part, the decline in government finance facilitated the rise in household finance both directly and through the banking sector.

External vs. Internal Finance

An obvious question that comes to mind is whether or not the shifts that occurred in the structure of savings and asset formation and in the time structure of asset formation have had any effect on the division between internal and external financing of business investment. Although the capital market began to show signs of life in 1957-1958, the revival was short lived. In an effort to counteract inflationary pressures, the discount rate rose from 2-3/4% in January, 1959, to 5% by mid-1960, with the rate on advances being 1% higher at all times. Reserve requirements on short- and long - term deposits rose considerably from the middle of 1959 to the middle of 1960. Consequently, when picking a breaking point to test for structural shifts of the internal - external mix in business finance, we chose 1960 rather than 1956, as had been done for sectoral savings rates. As will be discussed shortly, this change in bench mark dates is not trivial and is relevant to the results we obtained.

Table 15 contains a breakdown in the sources of funds for the business sector between 1950 and 1968. On important point to be made before discussing the trends in the data is that we include figures for net capital transfers from the household sector to the business sector in our measure of external finance. The O. E. C. D. capital market study treated all capital transfers as

internal finance. Yet, capital transfers from the household sector largely involved funds placed with building and loan associations and remittances to them. We viewed these transfers as sources of external finance and obtained extimates for them. We assumed that all business transfers went to the household sector and that all transfers to the government sector came from the household sector. This minimized the estimate of "capital transfers" from the household sector to the business sector. This lower bound estimate of household transfers to the business sector in the form of funds placed in building and loan associations was then treated as part of the external supply of funds.

First, we estimated external finance as a proportion of business gross investment. As shown, this percentage rose from an average value of 28.61% for the period 1950-1960 to 33.77% for the period 1961-1968. An attempt was made to get some measure of the structural significance of this shift toward external financing by conducting an F-test. We regressed business external finance (BEF) on business gross investment (BGI) and tested the sub-periods 1950-1960 and 1961-1968 for structural shift. After adjusting for serial correlation, the results were as follows:

1951-1968

$$BEF = .3290\ BGI\ ,\ T = 18.7967\ ,\ \bar{R}^2 = .8127$$

1951-1960

$$BEF = .3173\ BGI\ ,\ T = 16.7446\ ,\ \bar{R}^2 = .8226$$

1961-1968

$$BEF = .3339\ BGI\ ,\ T = 10.7347\ ,\ \bar{R}^2 = .5349$$

The F-statistic obtained was $F(1, 16) = 0.0928$. And, we accepted the null hypothesis that no significant structural shift occurred in the share of external financing of business gross investment.

Table 15

Sources of Business Finance

	Business Gross Investment	Business Depreciation	Net Investment	Net Saving	Net Capital Trans. fr.gov't *	Net Capital Trans. fr. H'holds*	Net Liability Formation	External Finance as a % of Gross Invest.	External Finance as a % of Business Net. Invest.
1950	19.37	9.66	9.71	4.67	0.09	0.00	4.95	25.55	50.98
1951	23.09	11.42	11.67	7.55	-0.07	0.00	4.19	18.15	35.90
1952	28.03	12.75	15.28	8.38	-0.04	0.00	6.94	24.48	45.42
1953	27.28	12.82	14.46	5.77	-0.08	0.00	8.76	32.11	60.58
1954	31.94	12.97	18.97	7.80	-0.03	0.00	11.19	35.03	58.99
1955	41.47	14.10	27.37	13.59	-0.17	0.00	13.95	33.64	50.97
1956	43.26	15.83	27.43	14.75	-0.20	0.00	12.89	29.80	46.99
1957	45.76	17.53	28.23	13.96	0.80	0.00	13.46	29.41	47.68
1958	47.08	19.10	28.07	14.59	1.64	0.00	11.85	25.17	42.22
1959	52.91	19.87	33.04	15.56	0.66	0.00	16.82	31.79	50.91
1960	69.50	25.14	44.36	19.29	4.51	0.00	20.56	29.58	46.35
1961	75.26	28.36	46.90	16.50	3.93	1.20	25.27	35.17	56.44
1962	79.53	32.35	46.18	13.65	6.82	2.55	24.16	33.58	56.61
1963	81.03	36.12	44.91	11.91	5.03	3.43	24.54	34.52	62.28
1964	94.61	40.07	54.54	13.89	6.04	3.59	31.02	36.58	63.46
1965	107.73	44.93	62.80	13.25	7.88	3.60	38.07	38.68	66.35
1966	100.96	48.93	51.76	5.58	7.57	5.75	32.86	38.24	74.59
1967	88.35	51.77	34.58	4.78	7.32	6.82	15.66	25.44	65.01
1968	108.54	55.76	52.77	15.08	6.50	8.03	22.34	37.98	57.55

Column 8 avg. 1950-1960, 28.61
1961-1968, 33.77

Column 9 avg. 1950-1960, 48.82
1961-1968, 62.79

*The allocation of net transfers to the business sector is calculated by treating all transfers to government as being from the household sector and all transfers from the business sector as transfers to the household sector. This yields a minimum estimate of capital transfers from the household sector to the business sector.

Second, we estimated the percentage share of external financing in business net investment. The reasoning applied here was that once the most profitable use of depreciation laws to finance replacement as well as some part of what in fact is net investment is made, the firm must still decide

how to finance investment projects that will show up on the books as net investments. The ratio of external finance to business net investment rose from an average value of 48.82% for the 1950-1960 period to 62.79% for the interval 1961-1968.

We conducted an F-test by regressing business external finance (BEF) on business net investment (BNI) and obtained the following results (once again, one observation was lost because of the need to run generalized least squares regressions to remove serial correlation):

1950-1968

$$BEF = .5919\ BNI\ ,\ T = 29.2103\ ,\ \bar{R}^2 = .9144$$

1950-1960

$$BEF = .5011\ BNI\ ,\ T = 31.4217\ ,\ \bar{R}^2 = .9423$$

1961-1968

$$BEF = .6397\ BNI\ ,\ T = 27.7572\ ,\ \bar{R}^2 = .7980$$

The F-statistic obtained was $F(1, 17) = 22.1408$, and we rejected the null hypothesis that no upward structural shift occurred in the share of external financing in business net investment.

One explanation for the fact that the share of external finance in business gross investment did not shift significantly while the share of external finance in business net investment did shift is that increases in the allowances for accelerated depreciation after 1958 caused the ratio of depreciation to business gross investment to rise from an average of 41.43% for the period 1950-1960 to an average of 45.68% for the period 1961-1968. This tended to stabilize the external finance-gross investment ratio despite the significant shift in the external finance-net investment ratio.

To demonstrate that the choice of sub-periods is not insignificant to our results, business external finance was regressed on business net investment for the periods 1950-1956 and 1957-1968. The value of the F-statistic obtained

was $F(1, 16) = 1.47$, and no significant structural shift is detectable. The choice of sub-periods should not be taken lightly.

Certainly no less important than the ratio of external to total finance is the time structure of the external finance obtained. The trend toward long-term asset formation by both the household sector and the financial sector facilitated a trend toward long-term external financing for business investment. Table 16 shows the structure of business liability formation for the period 1950-1968. As shown, the ratio of short-term to total credit fell from 23.82% for the period 1950-1960 to 12.61% for the period 1961-1968. The shift away from short-term external financing is particularly pronounced after the liberalization of financial markets began in 1954. The last column of table 16 shows an interesting occurrence that has generally been ignored in the literature -- the ratio of shares and securities purchased to the quantity sold by the business sector rose from an average of 32.21% for the 1950-1956 period to 39.24% for the 1957-1968 period suggesting that, following the liberalization of financial markets, business enterprises assumed a larger role in supplying investment funds to one another. This trend complemented the rise in the supply of finance provided to the business sector by the household and financial sectors.

Table 16

The Structure of Business Gross Liability Formation

	Total Liabil. Formation	Sale of Shares & Secur.	Short-Term Bank Credit	Loans of Bldg. & Loan Assns.	Loans of Ins. Cos	Medium & Long-Term Bank Credit	Other Liabil.	Short-Term Bk. Cred. as a % of Total Credit	Purchase of Shares & Securities as a % of Sales of Sha & Securities
1950	10.75	0.31	4.22	0.38	0.35	4.37	1.13	39.26	3.23
1951	8 63	2.60	2.47	0.34	0.43	3.90	1.28	28.62	0.77
1952	11.52	3.35	3.12	0.35	0.54	3.87	3.27	27.08	1.49
1953	13.44	2.96	2.79	0.61	0.60	5.85	3.04	20.76	18.24
1954	14.68	1.07	3.36	1.00	0.84	6.60	1.82	22.89	90.65
1955	18.82	1.81	2.70	1.41	0.87	8.63	3.42	14.35	67.40
1956	18.06	2.06	1.41	1.89	1.11	7.55	4.03	7.81	43.69
1957	20.80	2.46	2.24	2.26	1.14	6.08	6.63	10.77	24.80
1958	19.37	3.63	0.21	2.56	1.21	8.18	3.59	1.08	9.37
1959	25.82	2.62	2.15	3.20	1.53	10.47	5.86	8.33	73.28
1960	28.67	4.64	5.64	1.43	1.74	9.91	5.83	19.67	31.68
1961	36.28	4.88	7.13	1.65	2.59	13.96	6.10	19.65	35.66
1962	31.16	4.39	2.90	1.50	2.58	16.41	3.58	9.31	20.96
1963	34.35	3.36	3.58	1.75	3.58	16.80	6.00	10.42	24.11
1964	41 46	3.73	5.13	1.76	3.80	18.51	9.19	12.37	35.39
1965	49 38	5.67	6.60	2.57	3.37	19.07	11.70	13.37	44.44
1966	39.40	2.28	5.97	3.89	2.65	17.12	7.49	15.15	65.79
1967	31.70	4.00	2.97	2.20	2.52	16.57	3.97	9.37	41.00
1968	38.90	3.88	4.98	1.90	2.75	19.42	6.05	12.80	64.43
					Avg.				
					1950-1960			23.82	
					1961-1968			12.81	
					1951-1956				32.21
					1957-1968				39.24

BIBLIOGRAPHY

1. Emmer, Robert. "West German Monetary Policy, 1948-1954." Journal of Political Economy. Feb., 1955. pp. 52-70.

2. Goldsmith, Raymond W. Financial Structure and Development. Yale University Press. 1969.

3. Hicks, John R. "Liquidity." The Economic Journal. December, 1962.

4. ----------. Critical Essays in Monetary Theory. Oxford: Clarendon Press, 1967.

5. Klopstock, Fred H. "Monetary Reform in Western Germany." Journal of Political Economy. August, 1949. pp. 277-92.

6. Lutz, F. A. "The German Currency Reform and Revival of the German Economy." Economica. May, 1949. pp. 122-142.

7. Menderhausen, Horst. "Prices, Money and the Distribution of Goods in Postwar Germany." American Economic Review. June, 1949. pp. 645-72.

8. O.E.C.D. Capital Market Study. Vol. II. Paris, 1968. p. 15.

9. Roskamp, Karl W. Capital Formation in West Germany. Wayne State University Press, 1965.

10. Wallich, Henry C. Mainsprings of the German Revival. Yale University Press, 1955.

CHAPTER VI

CONCLUSIONS AND CAVEATS

Following the assumption that financial change is slow, optimal intervention analysis implies that the only way to cope with highly fragmented capital markets is by direct government intervention. However, this makes direct intervention seem too easy to apply and too certain in its effects--as was shown in Chapter II. The fragmentation problem exists within the agricultural sector as well as within the manufacturing sector. The result of fragmentation is an inherent bias against technological change and innovation in all sectors of the economy.

Suppose one believes that the economy can be divided into two sectors, according to output produced, and that intrasectoral capital distortions are not important, then the questions of who to subsidize, who to tax, which industries and firms should be expanding and which contracting, get reduced to deciding which commodity outputs to subsidize. If, in addition, one believes that, "Higher saving does not necessarily go with higher real output, since the level of saving is a function of the distribution of income rather than of the level of real income per head." [3, p. 224], more specifically, that "The ratio of savings to national income is a function not just of inequality, but more precisely of the ratio of profits to national income." [3, p. 22]*, the choice is clear. Subsidize

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*In contrast to this assumption, the simple correlation between the business gross income share and the aggregate gross savings rate was -0.13383 in the case of West Germany.

that sector in which profits are accumulated and saved, and tax the sector which does not save. Traditionally, the decision has been to subsidize the modern sector at the expense of agriculture; and the problem of relocating agricultural workers in the industrial sector has been discussed extensively. [1, 2, 3, 6, 7, 8]

In our presentation of optimal intervention analysis, we were careful to point out that our dichotomy was between a traditional and a modern sector, which should not be identified with agriculture and manufacturing or indeed with any simple dichotomy based on output produced. This followed from the assumption that fragmentation in the capital market while creating a pervasive allocation problem also creates a bias against technological change and innovation, so that one can have backward and efficient producers of the same product. But, the Agriculture-Manufacturing dichotomy which fits so well into the optimal intervention framework and can be easily defined in most developing countries, also has appeal to traditional development theorists who indulge in the following sort of casual empiricism:

> Profit generates enterprise and saving. An economy can dispense with private enterprise if it possesses a capable and enterprising public service, (which most underdeveloped countries do not), but it cannot in any case dispense with profit, since profit is the major source of saving in a developing economy, whether in private or public enterprise. Small farmers do a fair amount of saving in kind, using their own labor for physical improvement of their farms and houses; but they tend to look outside agriculture for funds to finance those agricultural investments which require a good deal of money, whether on the farms (cattle, buildings, conservation, water) or off the farms (roads, irrigation, processing, research). So the modern sector has sometimes to finance not only itself but some part of agriculture as well, unless the farmers are properly taxed. The working classes save very little, and what the salaried classes save goes mainly into housing and education. Profits (private and public, corporate and unincorporated) provide most of the saving for new investment in commerce and

> industry. They are also a major source of taxation. An economy will grow rapidly if profits are high and will stagnate if profits are low. [5, p. 93]

Together, optimal intervention analysis and traditional development theory lead to direct government intervention into capital markets (as well as production subsidies or tariffs) to facilitate the allocation and accumulation of savings. Generally, this gets translated into government subsidies, loans, and direct investment in industrial development, often at the expense of agriculture. To the extent that business savings behavior can be influenced in the short-run, tax schemes to promote undistributed profits become part of the development plan. On the presumption that financial change is only a long-run possibility, it is given polite but token consideration. [1, 2, 7, 9]

By ignoring discussion of the relationship between financial development and the efficiency of capital allocation (which clearly would have a direct effect on private willingness to save, i.e., finance capital accumulation), optimal intervention analysis underestimates and traditional development theory ignores the problem of efficient capital use. Assuming that market intervention can allocate capital efficiently, the early optimal intervention studies ignored the production distortions and loss of social welfare that Bhagwati and Johnson have shown can take place in a two period model with factor distortions. Indeed, our finding in Chapter IV, showing that the rate of return on capital increased in West Germany as financial liberalization took place, suggests that early intervention policies may have reduced the efficiency of capital allocation. Direct government intervention runs the risk of intensifying capital market distortions.

The analysis of Chapters III, IV and V make several points clear. The traditional notion that savings rates and financial integration cannot

change significantly in the short-run is clearly incorrect for the case of West Germany. The presumption of a simple functional relationship between the aggregate savings rate and the profit share of income is also shown to be incorrect for West Germany. Our analysis suggests that the oversimplified view of the capital allocation problem by optimal intervention theorists and the failure in traditional development theory to consider the positive relationship between the degree of financial integration and the private incentive to save represent serious errors.

To the extent that private savings behavior can change quickly and is responsive to policies which improve capital allocation, intervention in the form of subsidies, loans, tariffs and quotas, which run the risk of increasing capital distortions, might also dampen private willingness to save; this would make policy intervention an open ended self-perpetuating program. Redistributing income toward profits and encouraging self-finance will also have self-perpetuating effects. The redistribution of income away from households will discourage private savings which would limit the supply of external finance and re-enforce the need for self-finance.

Policy Implications of Our Analysis

The analysis of Chapters III, IV and V indicate that monetary stability and financial integration are important inputs into the proper allocation of capital and into the creation of a private willingness to save. Unfortunately, the role of government in promoting private participation in savings and investment decisions through deposit insurance, price stability, and freely functioning capital markets has been ignored both in traditional development theory and in many developing countries. Price stability and deposit insurance would create new incentives to hold

financial instruments (savings deposits, shares, bonds) in the private sector. The consequent increase in bank deposits would permit greater portfolio diversification and counteract the bias toward small-scale, short-term investment created by fragmented capital markets. The expansion in the supply of external finance, which could also be enhanced through improved communications and laws of disclosure, would counteract the bias against technical change and innovation created by imperfections in the supply of market information. Most important of all, such policies provide a means of solving the fragmentation problem rather than a self-perpetuating and imperfect substitute for a properly functioning capital market.

Although we have shown that financial change occurred quickly in West Germany, we have not proven that this is generally the case. As pointed out, post-war West Germany had many advantages in terms of accumulated capital, experience and skill not available to most underdeveloped economies today. We would want evidence from a number of different historical examples before we could accept rapid financial development as a viable policy alternative for developing countries. In addition, we have not proven that financial development will produce rapid growth. Even in the case of West Germany, the direction of causality is unclear. However, we have shown that, in at least one case the traditional assumptions of constant savings rates, a slow rate of financial development and a stable functional relationship between the aggregate savings rate and the profits share of income do not hold.

Our study does suggest that traditional development policies are applicable in the early stages of development when external finance is virtually non-existent, as in Model I. But, it is also clear that the comparative advantage of government intervention in investment planning

diminishes as financial markets develop and private savings are accumulated and distributed to businesses by the household and banking sectors, as in Model IV. The prolonged adherence to traditional policies creates a drag to financial development and forestalls the important transition away from a dependence of business investment on government support.

BIBLIOGRAPHY

1. Fei and Ranis. Development of the Labor Surplus Economy. Richard D. Irwin, Inc. Illinois, 1964.

2. ----------. "Agrarianism, Dualism and Economic Development." Adelman and Thorbecke, Eds. The Theory and Design of Economic Development. John Hopkins Press, Baltimore, 1966. pp. 3-41.

3. Lewis, W. Arthur. The Theory of Economic Growth. Allen and Unwin, Ltd. London, 1955.

4. ----------. "A Review of Economic Development." A.E.A. Papers and Proceedings. May, 1965. pp. 1-17.

5. ----------. Development Planning. Harper and Row, New York, 1966.

6. Marglin, Stephen A. "The Rate of Interest and the Value of Capital with Unlimited Supplies of Labor." Karl Shell, Ed. Essays on the Theory of Optimal Economic Growth. pp. 141-165.

7. Nurkse, Ragner. Problems of Capital Formation in Underdeveloped Countries. Oxford University Press, N.Y., 1962.

8. Sen, Amartya. "Some Notes on the Choice of Capital Intensity in Developing Planning." Quarterly Journal of Economics. Nov., 1957. pp. 561-84.

9. Tinbergen, Jan. The Design of Development. John Hopkins Press, 1958.

APPENDIX A

I. Given the two production functions:

$$T = f_T(K_T, L_T) \quad , \quad M = f_M(K_M, L_M)$$

we know that along any isoquant for the production of T:

$$(1)\quad df_T = 0 = \frac{\partial f_T}{\partial L_T} dL_T + \frac{\partial f_T}{\partial K_T} dK_T$$

$$(2)\quad \frac{dK_T}{dL_T} = -\frac{\partial f_T / \partial L_T}{\partial f_T / \partial K_T}$$

and in the production of M

$$(3)\quad \frac{dK_M}{dL_M} = -\frac{\partial f_M / \partial L_M}{\partial f_M / \partial K_M}$$

If the wage rate w is the same in both sectors and the return to capital is r in the traditional sector and br in the modern sector ($b > 1$), we find

$$(4)\quad \left|\frac{dK_M}{dL_M}\right| = \left|\frac{-w}{br}\right| < \left|\frac{-w}{r}\right| = \left|\frac{dK_T}{dL_T}\right|$$

The marginal rates of technical substitution are not equal (as would be the case along the contract curve). This implies that the operating production locus will be interior to the transformation surface (aB'm interior to aBm in figure 1).

The distortion in the factor market also results in an inequality between the Domestic Rate of Transformation (DRT) and the Domestic Rate of Substitution (DRS) between the two goods for society as a whole. This inequality is represented by the non-tangency between the international price line, $\ell'\ell'$, and the production frontier aB'm. The direction of the inequality can be derived as follows:

II. (1) $$df_T = \frac{\partial f_T}{\partial L_T} dL_T + \frac{\partial f_T}{\partial K_T} dK_T$$

(2) $$df_M = \frac{\partial f_M}{\partial L_M} dL_M + \frac{\partial f_M}{\partial K_M} dK_M$$

(3) $$\frac{df_T}{df_M} = \frac{\frac{\partial f_T}{\partial L_T} dL_T + \frac{\partial f_T}{\partial K_T} dK_T}{\frac{\partial f_M}{\partial L_M} dL_M + \frac{\partial f_M}{\partial K_M} dK_M}$$

Substituting

(4) $$\omega_T = P_T \frac{\partial f_T}{\partial L_T}, \quad r_T = P_T \frac{\partial f_T}{\partial K_T}, \quad \omega_M = P_M \frac{\partial f_M}{\partial L_M}, \quad r_M = P_M \frac{\partial f_M}{\partial K_M}$$

into equation (3) with the additional assumptions that $\omega_T = \omega_M = \omega$. and $r_M = b r_T$, we find:

(5) $$-\frac{df_T}{df_M} = \left| \frac{\omega dL_T + r_T dK_T}{\omega dL_M + b r_T dK_M} \right| \cdot \frac{P_M}{P_T}$$

Assuming full employment, $dL_T = -dL_M$ and $dK_T = -dK_M$ and $b > 1$ we find that $-\frac{df_T}{df_M} < \frac{P_M}{P_T}$ and the price line is steeper than the transformation curve, as shown in figure 1 . This non-tangency reflects the fact that the higher return to capital in the modern sector results in an overvaluation of the real social cost of transforming production of T into production of M. From an aggregate standpoint, there is an overproduction of T and underproduction of M. It is worth noting that if the full employment assumption is dropped we have the inequality $|dK_M| > |dK_T|$ and the slope condition once again is:

$$-\frac{df_T}{df_M} < \frac{P_M}{P_T}$$

The simple linear model developed in the following pages can be used to assess the effects of capital market distortions. An increase in the distortion in the capital sector (or the introduction of such a distortion) decreases the production of M, increases the production of T and raises the capital:labor ratio in both sectors of the economy when we assume that factors are fully employed, perfectly mobile and flexibly priced. By the marginal conditions for Pareto Optimality, this implies that the relative price of labor rises in both sectors (see p. A-7). An intuitive explanation of these results is as follows: Since we assume that factors remain fully employed, capital and labor released from the modern sector as b rises will be employed by the traditional sector. The fact that the modern sector is capital intensive means that, given the initial factor price ratio, capital is being released from the contracting modern sector in too high a proportion to labor for capital to remain fully employed. The capital:labor ratio in the traditional sector must rise which can only occur if there is a fall in the relative price of capital to the sector. The rise in the relative wage rate encourages factor substitution and an increased capital intensity in both sectors.

The decline of production in the modern sector is also reflected by the decline in the proportion, h, of the labor force employed in the modern sector. Since we assume that T is the export sector and M is the import sector, and assuming that the product of the traditional sector is a normal good with low income elasticity (that it has an income elasticity between zero and one), the expansion of T and the contraction of M correspond to an increase in both exports and imports, i.e., trade increases.

III. A Simple Linear Model Incorporating Factor Market Distortions

$$M = L_M f(k_M)$$

$$T = L_T g(k_T)$$

$$m = M/L, \quad t = T/L$$

(1) $m = hf(k_M)$, where $L_M + L_T = L$

(2) $t = (1-h)g(k_T)$ $\qquad h = L_M/L, \quad 1-h = L_T/L$

$$\frac{K}{L} = \frac{K_M}{L} + \frac{K_T}{L} \qquad \text{when } K_M + K_T = K$$

$$= \frac{K_M}{L_M} \cdot \frac{L_M}{L} + \frac{K_T}{L_T} \cdot \frac{L_T}{L} \qquad k_M = \frac{K_M}{L_M}, \quad k_T = \frac{K_T}{L_T}$$

(3) $k = h k_M + (1-h) k_T$

Profit maximizing conditions

(a) $P_M f' = br$

(b) $P_M (f - k_M f') = w$

(c) $P_T g' = r$

(d) $P_T (g - k_T g') = w$

(4) $\dfrac{g - k_T g'}{f - k_M f'} = P$, where $P = P_M / P_T$

(5) $P \cdot \dfrac{1}{b} = g'/f'$

(6) $i = t + P_M$

(7) $m^c = m^c(i, P)$

(8) $t^c = t^c(i, P)$

(9) $t^c = t - e$

(10) $m^c = m + I$

(11) $e = PI$

i = real income/capita measured in terms of units of T

I = imports/capita, e = exports/capita

b = the differential paid by modern sector producers on capital

P_M = price of modern goods

P_T = price of traditional goods

m^c = domestic consumption/capita of modern goods

t^c = domestic consumption/capita of traditional goods

Let S_M and S_T represent the % changes in the capital : labor ratios for a small % change in the marginal products of capital to labor.

$$(1)\quad S_M = \frac{d(k_M)}{d\left(\frac{f'}{f - k_M f'}\right)} \cdot \frac{\frac{f'}{f - k_M f'}}{k_M}$$

$$(2)\quad = \frac{d k_M}{d b} \cdot d\left[\frac{\frac{d b}{f'}}{f - k_M f'}\right] \cdot \frac{\frac{f'}{f - k_M f'}}{k_M}$$

$$(3)\quad d\left(\frac{f'}{f - k_M f'}\right) = \frac{(f - k_M f') f'' \frac{d k_M}{d b} - f'(-k_M f'' \frac{d k_M}{d b}}{(f - k_M f')^2}$$

$$(4)\quad = \frac{f f'' \frac{d k_M}{d b}}{(f - k_M f')^2}$$

from (1) and (4)

$$(5)\quad S_M = \frac{d k_M}{d b} \cdot \frac{(f - k_M f')^2}{f f'' \frac{d k_M}{d b}} \quad \frac{f'}{k_M (f - k_M f')} = \frac{f'(f - k_M f')}{f f'' k_M}$$

I

$$\boxed{(6)\quad S_M = \frac{f'(f - k_M f')}{f' f'' k_M} < 0}$$

where S_M represents the elasticity of substitution between capital and labor in the modern sector.

Similarly,

II

$$\boxed{(6)\quad S_T = g'\frac{(g - k_T g')}{g g'' k_T} < 0}$$

Solve for $\frac{dk_M}{db}$ and $\frac{dk_T}{db}$

eqn. 4 $\quad \frac{(g - k_T g')}{(f - k_M f')} = P$

eqn. 5 $\quad P/b = g'/f'$

differentiating (4) and (5) w.r.t. b

$$(1)\quad (f - k_M f')\left(-k_T g'' \frac{dk_T}{db}\right) - (g - k_T g')\left(-k_M f'' \frac{dk_M}{db}\right) = 0$$

$$(2)\quad -P/b^2 = \frac{f' g'' \frac{dk_T}{db} - g' f'' \frac{dk_M}{db}}{f'^2}$$

Solve for $\frac{dk_T}{db}$ from eqn. (2)

$$(3)\quad \frac{dk_T}{db} = \frac{g' f''}{f' g''}\frac{dk_M}{db} - \frac{P f'^2}{b^2 f' g''} = \frac{g' f''}{f' g''}\frac{dk_M}{db} - \frac{P f'}{b^2 g''}$$

sugstituting into eqn. (4)

$$(4)\quad \left[(g - k_T g') k_M f'' - (f - k_M f') k_T g''\left(\frac{g' f''}{f' g''}\right)\right]\frac{dk_M}{db} = \frac{k_T g'' P f' (f - k_M}{b^2 g''}$$

$$\frac{g'}{f'} = \frac{P}{b}, \quad g - k_T g' = P(f - k_M f')$$

$$(5)\quad \left[P(f - k_M f') k_M f'' - \frac{P}{b}(f - k_M f') k_T f''\right]\frac{dk_M}{db} = -\frac{k_T P f' (f - k_M f}{b^2}$$

$$(6)\quad \frac{dk_M}{db} = \frac{k_T f' (f - k_M f')}{f'' b (k_T - b k_M)(f - k_M f')}$$

$$f'/b = g'/P$$

III

$$(7)\quad \frac{dk_M}{db} = \frac{k_T g'(f - k_M f')}{P f''(k_T - b k_M)(f - k_M f')}$$

$$(8)\quad S_M = \frac{f'(f - k_M f')}{f f'' k_M}$$

IV

$$(9)\quad \frac{dk_M}{db} \simeq S_M \cdot \frac{g' k_M k_T f}{P(k_T - b k_M)(f - k_M f')}$$

With $k_M > k_T$, $b > 0$ and barring factor reversals $\frac{dk_M}{db} > 0$

Similarly,

V

$$(6)\quad \frac{dk_T}{db} = \frac{g' k_M (g - k_T g')}{g''(k_T - b k_M)(g - k_T g')}$$

$$(7)\quad S_T = \frac{g'(g - k_T g')}{g g'' k_T}$$

VI

$$(8)\quad \frac{dk_T}{db} = \frac{S_T}{(k_T - b k_M)} \cdot \frac{g k_M k_T}{(g - k_T g')}$$

With $k_M > k_T$, $b > 1$ and assuming no factor reversals $\frac{dk_T}{db} > 0$

Calculate dh/db

equation (3) $\quad k = h k_M + (1-h) k_T$

$$(1)\quad h = \frac{k - k_T}{k_M - k_T}$$

$$(2)\quad \frac{dh}{db} = \frac{(k_M - k_T)\left(-\frac{dk_T}{db}\right) - (k - k_T)\left(\frac{dk_M}{db} - \frac{dk_T}{db}\right)}{(k_M - k_T)^2}$$

$$(3)\quad \frac{dh}{db} = \frac{-(k_M - k_T)\frac{dk_T}{db} - h(k_M - k_T)\left(\frac{dk_M}{db} - \frac{dk_T}{db}\right)}{(k_M - k_T)^2}$$

VII

$$(4)\quad \frac{dh}{db} = \frac{-h\frac{dk_M}{db} - (1-h)\frac{dk_M}{db}}{k_M - k_T}$$

since $\frac{dk_M}{db}$, $\frac{dk_T}{db}$ and $k_M - k_T$ are always of the same sign,

$$\frac{dh}{db} < 0$$

$$m = h f(k_M)$$

$$t = (1-h) g(k_T)$$

$$\frac{dm}{db} = hf'\frac{dk_M}{db} + f\frac{dh}{db}$$

$$\frac{dt}{db} = (1-h)g'\frac{dk_T}{db} - g\frac{dh}{db}$$

With M capital intensive $\frac{dt}{db} > 0$ but $\frac{dm}{db}$ is indeterminate

we can show graphically that $\frac{dM}{db} < 0$ which implies $\frac{dm}{db} < 0$

With unemployed capital this effect is accentuated.

Calculate $\frac{de}{db}$ and $\frac{dI}{db}$

differentiating equation (9) w.r.t. b

$$(1)\quad \frac{de}{db} = \frac{dt}{db} - \frac{dt^c}{db}$$

$$(2)\quad \frac{dt^c}{db} = \frac{\partial t^c}{\partial i}\left[\frac{dt}{db} + P\frac{dm}{db}\right]$$

VIII

$$(3)\quad \frac{de}{db} = \left[1 - \frac{\partial t^c}{\partial i}\right]\frac{dt}{db} - P\frac{\partial t^c}{\partial i}\frac{dm}{db}$$

as long as $0 \leq \frac{\partial t^c}{\partial i} \leq 1$ and M is capital intensive $\frac{de}{db} > 0$

$$(4)\quad \frac{dI}{db} = \frac{1}{P}\frac{de}{db} > 0$$

Several of the assumptions made in the original Bhagwati-Ramaswami paper have been attacked in the literature. For example, the derivation of the inner transformation curve aB'm is based on the assumption that the factor price differential, b, is constant over the entire range of aB'm. As Fishlow and David suggest,

> ". . . there is no guarantee that with comodity prices, and hence production and resource demands, changing the differentials would indeed remain constant. . . . Moreover, to the extent that differentials are a function of dynamic conditions, and the future time path of the system is dependent upon the present output mix, the differentials will also be influenced by this fact. Thus, there may be only one point on the inner transformation locus at which the market mechanism would establish a consistent set of commodity prices and differential factor payments."[7, p. 535]

In an unpublished dissertation, Stephen Lewis [14] addressed himself to this problem and suggested a possible reformulation of the model. The inner transformation curve derived from figure 1, assuming a constant value of b, is replaced by the locus of such curves representing the fact that $db/dP \neq 0$. Before moving on, it might be of interest to know what effects, if any, this adjustment will have on the equilibrium value of our simple model.

Equations IX and X on pages A-19 and A-20 yield the effect on factor ratios in both sectors given an increase in the relative price of the modern sector product, assuming that $db/dP = 0$. This would correspond to the production effect of a product subsidy-cum-tax or a tariff on the production of M. Assuming that M is capital intensive, we find that a rise in the relative price of M lowers the capital:labor ratio in both sectors of the economy (see pp. A-19--A-20). And, by our marginal conditions, we can conclude that the rise in the relative price of M raises the return to capital relative to the return to labor, i.e., a rise in the price of a good raises the relative return to its intensive factor in both sectors (For a number of interesting general propositions

relevant to this fixed differential model, (see McGee [15], pp. 80-109). Intuitively, a rise in the relative price of M will cause producers of M to expand production, and resources will shift from the traditional sector to the modern sector. An expansion of the modern sector means that factors shift from the traditional sector to the modern sector. Since the traditional sector is relatively labor intensive, an expansion of M with factor prices unchanged would result in unemployed labor. Our assumption of full employment of both factors will only hold if the price of labor falls so that producers of M substitute labor for capital in production. The fall in the relative price of labor also encourages factor substitution in the traditional sector. Consequently, the capital:labor ratio falls in both sectors in response to the fall in the relative price of labor to both sectors of the economy. As we would expect, when the relative price of M rises, the proportion of the labor force employed in the modern sector expands.

Turning to the trade sector, we find that the result of a relative rise in the price of the modern sector good is a contraction of exports and imports, when the product of the traditional sector is a normal and income inelastic good (income elasticity between 0 and 1) and M is capital intensive (for the derivation, see pp. A-20 and A-21). The response of the trade sector corresponds to our graphical analysis in figure 2 where we considered a production subsidy-cum-tax to the modern sector and a tariff as possible policy interventions in our distorted economy.

We now wish to know how these results will be affected by the fact that our inner transformation curve is not the simple fixed differential curve derived in figure 1, but rather the locus of such interior curves, i.e., that $db/dP \neq 0$. In order to proceed with this analysis, we

must know something about the response of the capital market to a change in relative output prices. To the extent that an expansion of the modern sector will provide information about potential investments and thereby lower subjective estimates of the riskiness of such undertakings, we would expect db/dP to be less than zero. Incorporating this assumption into our model, we can recalculate the effects of a relative increase in the price of M on our two sector economy. From pages A-21 and A-22, we find that the rise in the relative price of M results in an expansion of the modern sector and a reallocation of resources away from the traditional sector. As we have already mentioned, if relative factor prices remained fixed, expansion of the capital intensive modern sector and contraction of the labor intensive traditional sector would result in less than full employment of labor. The full employment assumption implies that the relative price of labor falls and the labor intensity of the modern sector increases. The fall in the relative cost of labor will cause factor substitution in the traditional sector, too; and the labor:capital ratio will rise in both sectors as the relative return to labor falls in both sectors. But now, as the modern sector expands, the factor market differential will fall, reducing costs, raising profits, and causing a further expansion of the modern sector and contraction of the traditional sector. Consequently, the full employment assumption is met only if there is a further fall in the relative return to labor in both sectors; this will encourage additional factor substitution and a further rise in the labor:capital ratio in both sectors. Again, the proportion of labor employed in the modern sector expands if M is capital intensive and if $\frac{db}{dP} < 0$. We also find that exports of T and imports of M contract and to a greater extent than in the fixed differential model. The important point to note is that given our assumption about db/dP our results, after incorporating the variable

differential model, are qualitatively the same as those implied by the analysis of figure 2.

Throughout the preceding analysis, we assumed that both factors were flexibly priced, perfectly mobile and fully employed. We turn now to a more critical evaluation of these assumptions. Referring to the possible causes of factor market differentials, Fishlow and David suggest that

> "the continued existence of such differentials must . . . be directly related to factor immobilities, for with perfect, instantaneous responsiveness they could not persist. Any explanation thus invokes cost impediments to resource movements, imperfect knowledge, the existence of time lags, etc However, the direction of the distortion will, in general be determined by cost conditions. The sector which must bid resources away from other employments in order to satisfy increasing demand will have to pay higher prices to factor owners." [7, p. 534]

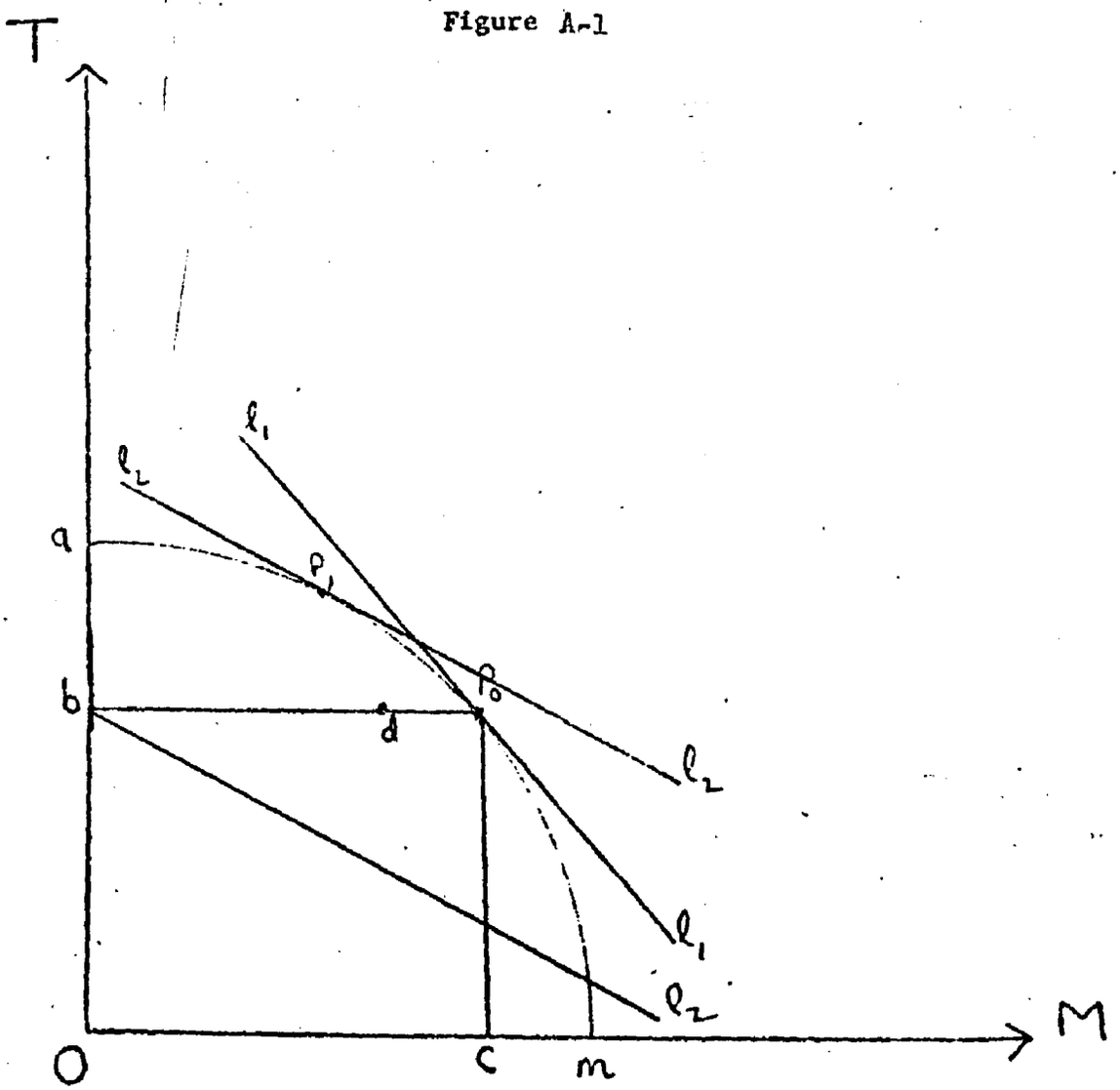
In a recent article, Harry Johnson points out that even if factors are perfectly immobile it is possible for production to be at the optimal point P_o in figure A-1 as long as factor prices are perfectly flexible.

> ". . . immobility does not by itself entail a distortion of the first order conditions of Pareto Optimality. So long as factor prices are flexible and immobility is taken as an immutable fact of life, factor prices will reflect the alternative opportunity costs of factors to the economy; hence there is no domestic distortion to be offset by protection and protection [a tariff] will simply introduce a distortion of the marginal conditions for optimality in foreign trade." [12, p. 15]

However, the transformation curve facing the economy when factors are perfectly immobile, bP_oc, is interior to the transformation curve under the assumption of perfect factor mobility, aP_om, everywhere except at point P_o.

Referring again to figure A-1, with the domestic price ratio represented by the slope of the line l_1l_1, P_o is the autarky production

Figure A-1



point when factor prices are perfectly flexible and factors are either perfectly mobile or perfectly immobile. When the free trade terms of trade are represented by the slope of line l_2l_2 then:

a) with perfectly flexible factor prices and perfect factor mobility, production would take place at point P_1;

b) with perfectly flexible factor prices and perfect factor immobility, production will take place at point P_o;

c) with both factor prices rigid and both factors perfectly immobile, production of M ceases altogether and its factors are completely unemployed and production of T remains at point b;

d) with one factor rigidly priced and one factor flexibly priced and both factors perfectly immobile, production of M will not cease entirely and production will occur at some point d along the line segment $P_o b$;

e) with one factor rigidly priced and perfectly mobile and the other factor flexibly priced and perfectly immobile, production will take place at some point above and to the left of point d in figure A-1 and inside of $aP_o m$;

f) with one factor flexibly priced and perfectly mobile and the other factor rigidly priced and perfectly immobile, production will occur at some point above $P_o b$ and below $aP_o m$.

As both Johnson [12] and Magee [15] suggest, in all cases where factor prices are rigid, the shift in production which results from trade liberalization depends upon whether the rigid factor prices are measured in terms of T, M, or some constant utility combination of the two.

Stephen Lewis [14] has examined the problem of deriving the production frontier in the presence of distorted factor prices when either factor price rigidity, factor immobility or both result in less than full employment of one or both factors. Lewis depicts the resulting transformation curve as aP''m in figure A-2. But, if capital cannot be perfectly mobilized in the presence of distorted factor prices when both goods are being produced, it seems illogical to assume that specialization will result in full employment of both factors. Therefore, the appropriate transformation surve is represented by a'P''m' in figure A-2.

We can now reformulate our model in a more theoretically sound way and question whether or not our revisions have any effect on the policy ranking derived earlier. Referring to figure A-3, we represent the production frontier by aBm when markets are perfectly competitive, factors perfectly mobile, flexibly priced and full employed, and there are no distortions in the economy. With the international terms of trade represented by the slope of line l_1l_1, production takes place at point B. The economy exports BE_1 units of T and imports E_1C_1 units of M. The level of social welfare is represented by U_1. The production frontier a'B'm' represents the production possibilities facing the economy when the price of capital is higher in the modern sector than in the traditional sector, reflecting the fact that capital is not perfectly mobile or fully employed and that the differential is inversely related to the relative price of M. With the world terms of trade represented by the slope of l_1l_1, the country produces at G'. The economy exports $B'E_2$ units of T and imports E_2C_2 units of M. The level of social welfare has declined from U_1 to U_3. As we found earlier, the introduction of the differential leads to a decrease in the production of M, an increase in the production of T and an increase in the level of exports and imports.

Figure A-2

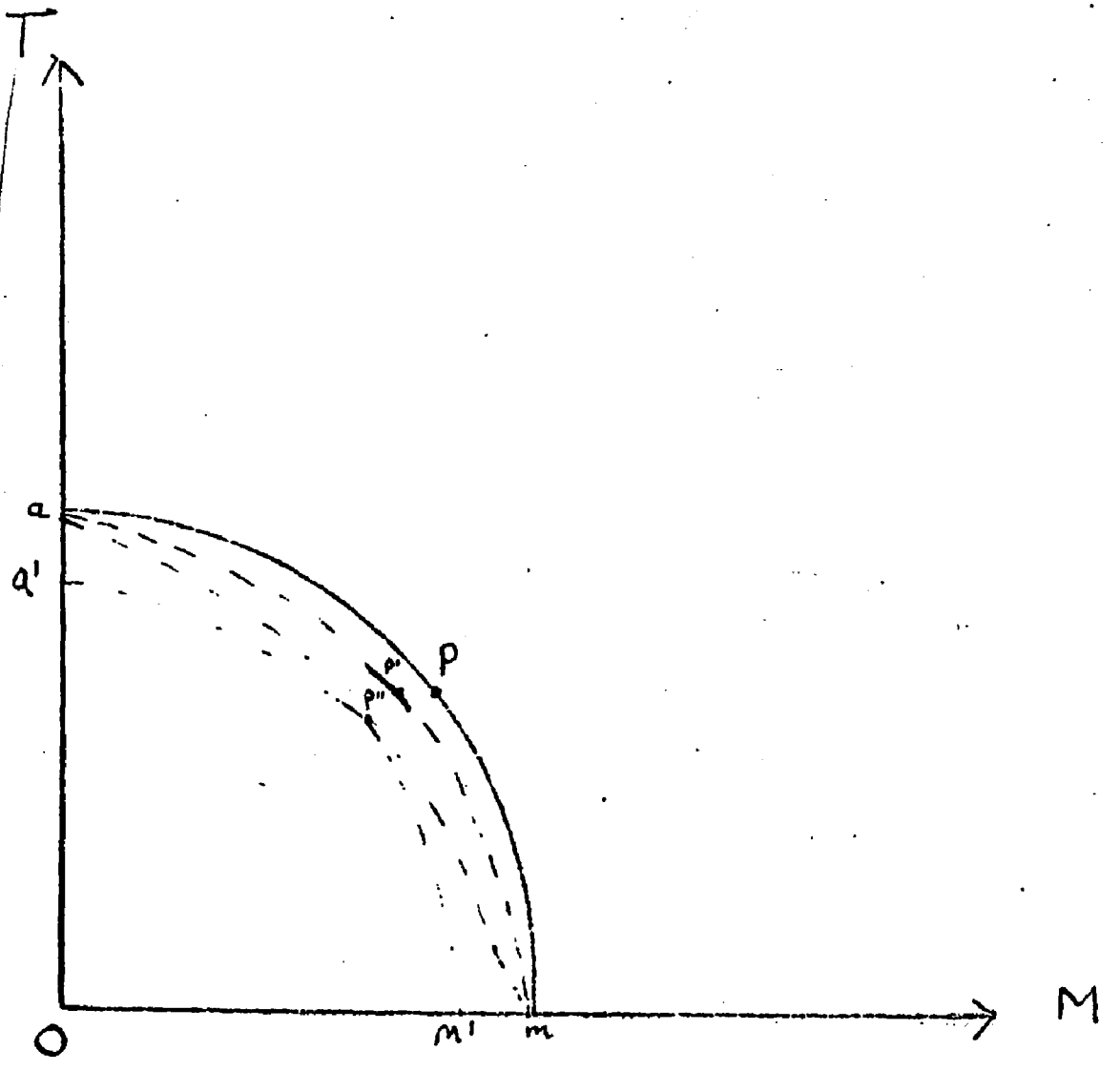
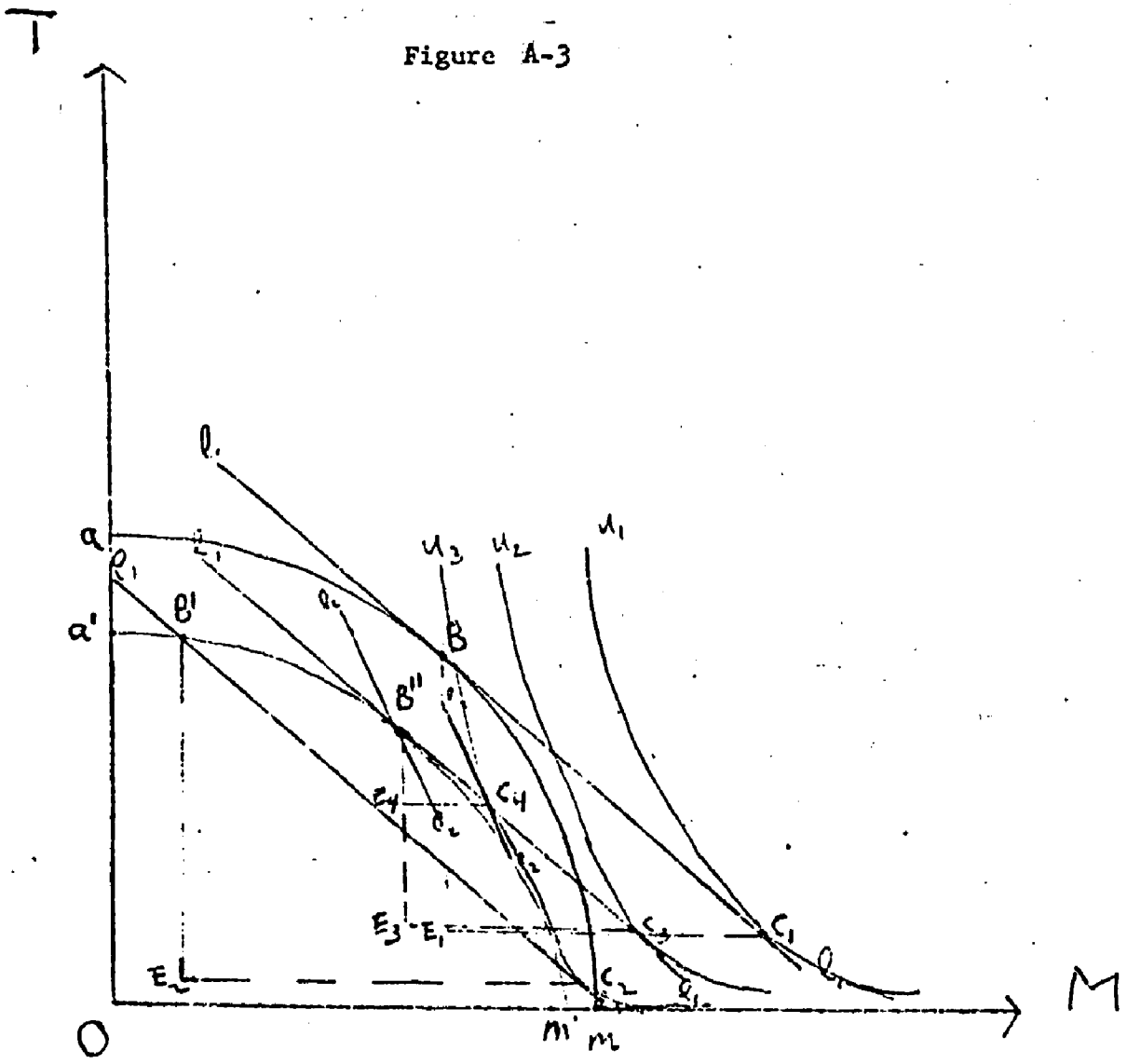


Figure A-3



Beginning with a production subsidy-cum-tax on the production of M, the domestic terms of trade can be changed from l_1l_1 to l_2l_2 reflecting a rise in the relative price of M paid to producers. Production shifts to the point B" while exports decrease to $B"E_3$ and imports decrease to E_3C_3. Consumption is at point C_3, and social welfare has been raised from U_3 to U_2.

A tariff could be used to change the domestic terms of trade to producers and consumers to the slope of l_2l_2, and again the economy would produce at point B". Exports shrink to $B"E_4$, and imports shrink to E_4C_4. The level of social welfare is U_3, and the economy is no better off with a tariff than it was before any policy intervention occurred. As we mentioned earlier, a tariff involves a production gain (as does the production subsidy-cum-tax), but it also involves a consumption loss by distorting the final purchasing prices faced by consumers. Intervention in the form of a tariff could worsen an already bad situation.

A factor subsidy-cum-tax to the users of capital in the modern sector could move the economy to production point B on the outer transformation curve aBm, with exports of BE_1 units of T, imports of E_1C_1 units of M, consumption at point C_1 and the level of social welfare U_1. Again the factor subsidy-cum-tax is the superior form of policy intervention. Ranking policies in terms of their efficiency, we again derive the policy ranking given by Bhagwati:

1) Factor subsidy-cum-tax
2) Production subsidy-cum-tax
3) Tariff.

Solve for $\frac{dk_M}{dP}$ and $\frac{dk_T}{dP}$ assuming $\frac{dP}{db} = 0$

differentiating equation 4 w.r.t. P we get

(1) $(f - k_M f')(-k_T g'' \frac{dk_T}{dP}) - (g - k_T g')(-k_M f'' \frac{dk_M}{dP}) = (f - k_M f')^2$

since $g - k_T g' = P(f - k_M f')$

(2) $-k_T g'' \frac{dk_T}{dP} + k_M f'' P \frac{dk_M}{dP} = f - k_M f'$

differentiating equation 5 w.r.t. P we get

(3) $\frac{f'g'' \frac{dk_T}{dP} - g'f'' \frac{dk_M}{dP}}{(f')^2} = \frac{1}{b}$

(4) $\frac{g''}{f'} \frac{dk_T}{dP} - \frac{Pf''}{f'b} \frac{dk_M}{dP} = \frac{1}{b}$

(5) $\frac{dk_T}{dP} = \frac{Pf''}{g''b} \frac{dk_M}{dP} + \frac{f'}{bg''}$

substituting (5) into (2) and rearranging terms

(6) $Pf''(bk_M - k_T) \frac{dk_M}{dP} = k_T f' + b(f - k_M f')$

(7) $\frac{dk_M}{dP} = \frac{k_T f' + b(f - k_M f')}{Pf''(bk_M - k_T)}$

IX

(8) $\frac{dk_M}{dP} = -S_M \cdot k_M f \left[\frac{k_T f' + b(f - k_M f')}{Pf'(f - k_M f')(k_T - bk_M)} \right]$

i.e., $\frac{dk_M}{dP} < 0$ if M is capital intensive and > 0 if M is labor intensive.

Similarly,

X

$$(7)\quad \frac{dk_T}{dP} = -\frac{S_T\, g\, k_T\, f}{g'(k_T - b\,k_M)(g - k_T g')}$$

$\frac{dk_T}{dP} < 0$ if M is capital intensive and > 0 if M is labor intensive

The rise in the relative price of M has increased the return to its intensive factor in all of its uses.

Calculate $\frac{dh}{dP}$

$$(1)\quad k = h\,k_M + (1-h)\,k_T$$

$$(2)\quad h = \frac{k - k_T}{k_M - k_T}$$

$$(3)\quad \frac{dh}{dP} = \frac{(k_M - k_T)\left(\frac{-dk_T}{dP}\right) - (k - k_T)\left(\frac{dk_M}{dP} - \frac{dk_T}{dP}\right)}{(k_M - k_T)^2}$$

XI

$$(4)\quad \frac{dh}{dP} = \frac{-(1-h)\frac{dk_T}{dP} - h\frac{dk_M}{dP}}{k_M - k_T}$$

$\frac{dh}{dP} > 0$ if M is capital intensive, < 0 if M is labor intensive

from equations (1) and (2)

$$(a)\quad \frac{dm}{dP} = h f' \frac{dk_M}{dP} + f\frac{dh}{dP}$$

XII

$$(b)\quad \frac{dt}{dP} = (1-h)g'\frac{dk_T}{dP} - g'\frac{dh}{dP}$$

when M is capital intensive, (b) is negative but (a) is indeterminate.

We can show geometrically that $\frac{dM}{dP} > 0$, $\frac{dT}{dP} < 0$ and therefore $\frac{dm}{dP} > 0$, $\frac{dt}{dP} < 0$

Calculate $\frac{de}{dP}$ and $\frac{dI}{dP}$

differentiating equation (9) w.r.t. P and solving for de/dP

(1) $\frac{de}{dP} = \frac{dt}{dP} - \frac{dt^c}{dP}$

(2) $\frac{de}{dP} = \frac{dt}{dP} - \frac{\partial t^c}{\partial i}\left[\frac{dt}{dP} + m + P\frac{dm}{dP}\right]$

XIII

(3) $\frac{de}{dP} = \left(1 - \frac{\partial t^c}{\partial i}\right)\frac{dt}{dP} - m\frac{\partial t^c}{\partial i} - P\frac{\partial t^c}{\partial i}\frac{dm}{dP}$

when M is capitol intensive and $0 \leq \frac{\partial t^c}{\partial i} \leq 1$

$\frac{de}{dP} < 0$

(4) $\frac{dI}{dP} = \frac{1}{P}\left(\frac{de}{dP} - I\right)$

Suppose $\frac{db}{dP} \neq 0$

from equations (4) and (5)

(1) $-\frac{k_T g''}{P}\frac{dk'_T}{dP} + k_M f''\frac{dk'_M}{dP} = \frac{f - k_m f'}{P}$

(2) $\frac{g''}{f'}\frac{dk'_T}{dP} - \frac{Pf''}{bf'}\frac{dk'_M}{dP} = \frac{1}{b} + \frac{P}{-b^2}\frac{db}{dP}$

(3) $\frac{dk'_M}{dP} = \frac{bg''}{Pf''}\frac{dk'_T}{dP} - \frac{f'}{Pf''} + \frac{f'}{bf''}\frac{db}{dP}$

(4) $\left[\frac{k_M f'' bg''}{Pf''} - \frac{k_T g''}{P}\right]\frac{dk'_T}{dP} = \frac{f - k_m f'}{P} + \frac{k_m f'' f'}{Pf''} - \frac{k_m f'' f'}{bf''}\frac{db}{dP}$

(5) $-g''\left[k_T - bk_M\right]\frac{dk'_T}{dP} = f - \frac{k_m f'}{b}P\frac{db}{dP}$

(6) $\frac{dk'_T}{dP} = \frac{-f}{g''(k_T - bk_M)} + \frac{k_m g'}{g''(k_T - bk_M)}\frac{db}{dP}$

XIV

$$(7)\quad \frac{dk'_T}{dP} = -S_T \cdot \left[\frac{f g k_T}{g'(k_T - b k_M)(g - k_T g')} - \frac{k_M k_T g}{(k_T - b k_M)(g - k_T g')} \frac{db}{dP} \right.$$

$$\frac{dk'_T}{dP} < \frac{dk_T}{dP} < 0 \quad \text{if } \frac{db}{dP} < 0$$

and,

XV

$$(6)\quad \frac{dk'_M}{dP} = -S_M f k_M \left[\frac{b(f - k_M f') + k_T f'}{P f'(k_T - b k_M)(f - k_M f')} \right] + \frac{S_M f k_M \cdot k_T g'}{P f'(k_T - b k_M)(f - k_M f')} \frac{d}{dP}$$

$$\frac{dk'_M}{db} < \frac{dk_M}{dP} < 0 \quad \text{if } \frac{db}{dP} < 0$$

(a) $$\frac{dm'}{dP} = h f' \frac{dk'_M}{dP} + f \frac{dh'}{dP}$$

(b) $$\frac{dt'}{dP} = (1-h) g' \frac{dk'_T}{dP} - g' \frac{dh'}{dP}$$

when M is capital intensive, (b) is negative but (a) is indeterminate.

We can show geometrically that $\frac{dM}{dP} > 0$ and $\frac{dT}{dP} < 0$ and therefore

$$\frac{dm'}{dP} > 0 \qquad \frac{dt}{dP} < 0$$

and, if $\frac{db}{dP} < 0$

(c) $$\frac{dm'}{dP} > \frac{dm}{dP} > 0 \;,\; \frac{dt'}{dP} < \frac{dt}{dP} < 0$$

(d) $$\frac{dh'}{dP} = \frac{-(1-h)\frac{dk'_T}{dP} - h \frac{dk'_M}{dP}}{k_M - k_T}$$

$$\frac{dh'}{dP} > 0 \quad \text{if M is capital intensive and } \frac{dh'}{dP} > \frac{dh}{dP}$$

(e) $$\frac{de'}{dP} = \left(1 - \frac{\partial t^c}{\partial i}\right)\frac{dt'}{dP} - m\frac{\partial t^c}{\partial i} - P\frac{\partial t^c}{\partial i}\frac{dm'}{dP}$$

when M is capital intensive and $0 \leq \frac{\partial t^c}{\partial i} \leq 1$

$\frac{de'}{dP} < 0$ and if $\frac{db}{dP} < 0$

$$\frac{de'}{dP} < \frac{de}{dP} < 0$$

(f) $$\frac{dI'}{dP} = \frac{1}{P}\left(\frac{de'}{dP} - I\right)$$

$\frac{dI'}{dP} < \frac{dI}{dP} < 0$ if $0 \leq \frac{\partial t^c}{\partial i} \leq 1$, M is capital intensive

and $\frac{db}{dP} < 0$

Appendix B

The Sources of Finance

In Chapter III, we focused upon the relationship between income distribution and the private savings-income ratio. Our analysis permitted us to derive and evaluate traditional development policy prescriptions in different financial settings. Discussion of the importance of financial development for economic growth was only touched on. The purpose of this appendix is to make explicit the underlying financial conditions of models I and IV and to derive development policies addressed to improving allocative efficiency and promoting external finance.

Section I: Pure Internal Finance

In model I, we assumed that all finance was internal and that no external finance was available. We assumed that workers do not save and that the business savings rate was constant. In this context, we derived traditional development policies aimed at redistributing income to the business sector and/or raising the retained earnings of business.

Our present objective is to get some feel for the factors that determine the desired savings and investment rates. Even within the context of a model of pure internal finance, there will still exist a demand for cash balances as a means of payment. An interesting aspect of the means of payment demand for cash balances arises from the nonsynchronization of earnings and investment expenditures within the firm.* Businesses find themselves accumulating cash balances until they have accumulated sufficient reserves to undertake a desired investment. This suggests that for the business sector cash balances are complementary to rather than substitutes for real investments.

The fact that investment is imperfectly divisible suggests that the ability of the firm to diversify its portfolio and reduce its overall risk of investment will depend upon the size of the firm's portfolio relative to the size of individual investment projects. If as in the case of West Germany during the period 1948-1954 businesses have little or no access to external finance and the supply of internal funds is small, the responsibility of financing large scale investments falls to the government. As discussed in section I of Chapter IV, the West German government responded to this need through direct intervention in investment programs (distribution of Counterpart funds and administration of the Investment Aid Program) and

*This interesting relationship was first suggested to me by Professor McKinnon.

by subsidizing particular kinds of investment (sections 7c, 7d and 7f of the tax law).

The fact that one's opinions about economic conditions 10 or 20 years from now are held with less certainty than one's opinions about economic conditions six months or a year from now suggests that the subjective risk of long-term investment is high vis a vis short-term investment. In addition, committing funds to long-term investments ties up a portion of a firm's portfolio and reduces the flexibility of portfolio management. In a world of uncertainty, this inflexibility can only increase the overall risks of investment. These considerations suggest that the term structure of investment will also depend on the size of the individual firm's portfolio. Starved for finance, business investment programs have an inherent bias toward small scale, short-term investment which may conflict with social profit maximization. This discrepancy arises from the fact that indivisibilities in investment raise private above social risks of investment. It is within this context that the need for heavy government intervention in investment planning of the kind experienced in early port-war West Germany can be rationalized.

Incorporating these ideas into an aggregate desired investment function we have:

$$I = I(r^*, \sigma_I^{2*}, \Delta \dot{P}^*, P) \qquad (1')$$

with $I_1 > 0$, $I_2 < 0$, $I_3 < 0$, $I_4 > 0$

where r^* is the vector of expected rates of return on the different forms of capital held by businesses; σ_I^{2*} is the vector of subjective estimates of risk attaching to different forms of capital held by businesses, $\Delta \dot{P}^*$ represents the % change in the expected rate of inflation and P is the vector of current profits in the business sector which indicates the extent to which firms can diversify their portfolios.

The desired level of investment is an increasing function of the level of profits in each firm and of the vector of expected rates of return on investment. Desired net investment is a decreasing function of the expected risks of investment, σ^{2*}_{I}, and of the risk of accumulated cash balances measured by the % change in the expected rate of inflation $\Delta \dot{P}^*$. The fact that savings and investment decisions are made jointly in a pure internal finance model means that the savings function will contain the same arguments as the desired investment function and with the same signs.

$$S_p = S_p(r^*, \sigma^{2*}, \Delta \dot{P}^*, P) \qquad (2')$$

$$S_{p_1} > 0, \quad S_{p_2} < 0, \quad S_{p_3} < 0, \quad S_{p_4} > 0$$

This model is an exaggerated representation of the structure of finance in early post-war West Germany. Household savings rates were extremely low or negative throughout the late 1940's and early 1950's. The volume of bank loans was small and primarily short-term. There was virtually no market for private bonds and shares. The lack of external finance was partially policy imposed and financial liberalization after 1954 created a dramatic change in the structure of finance. Model I served as a useful tool for explaining economic policy in early post-war West Germany in section I of Chapter IV. Within this context, traditional development policies emphasizing government control and financing of investment could be rationalized.

To the extent that policy makers recognize that savings rates need not be constant over time, policies can be used to stimulate higher levels of retained earnings. Monetary stability (a reduction of price fluctuations) has a direct and positive influence on the rate of savings and investment in the economy, even in the absence of financial intermediation. Real cash balances held by the business sector are complementary to rather

than competitive with real investment. Policies geared to increase domestic savings often ignore the role of financial development in reducing the subjective risks of investment, increasing the ability of investors to diversify their portfolios, allocating savings efficiently, and encouraging capital accumulation. Direct government intervention in investment planning may be successful in the short-run in promoting more rapid growth, but it includes controls over financial markets which hinder financial development and further postpone the date when private investors will provide the external finance needed to sustain rapid economic growth. Even in the context of a pure internal finance model, monetary stability and financial liberalization, ignored in traditional development theory, can make a positive contribution to rapid economic progress.

Section II: Sources of Savings and the Supply of External Finance

In our discussion of model IV in Chapter III, we treated the financial sector superficially. In the present section, we assume that banks offer two liabilities to potential savers -- a short-term liability, money, and a long-term liability, savings deposits. Banks also supply external finance to businesses in the form of short-term and long-term loans. Businesses can acquire investible funds in the form of retained earnings, short-term and long-term bank loans and sales of shares and securities to the household sector and banking sector. For simplicity, we assume that intrasectoral flows do not occur.

Household Savings

Household savings will be distributed between short-term and long-term bank deposits and direct purchases of shares and securities. The desire by the household sector to hold short-term bank deposits, $(M/P)_H$, will be positively related to the level of economic activity, Y, reflecting the assumption that the level of transactions and, therefore, the average cash holdings of the household sector are proportional to the current level of economic activity. The demand for cash balances by households will also be a positive function of the real rate of return on money holdings, $d_s - \dot{P}^*$, where d_s is the nominal rate of return on money holdings, and on the risks of holding wealth in other forms, σ_l^{2*}, σ_e^{2*}, σ_b^{2*}, where σ_l^{2*} represents the risk of holding long-term or savings deposits, σ_e^{2*} represents the vector of risks associated with holding the equities of different enterprises and σ_b^{2*} represents the vector of expected risks of default on different business securities. The demand for money balances by households is negatively related to the change in the expected rate of inflation $\Delta \dot{P}^*$ and the expected rates of return on savings deposits, equity and bonds

represented by $d_\ell - \dot{P}^*$, r_e^*, r_b^* respectively. In functional form, we have the following relationship:

$$\left(\frac{M}{P}\right)_H \quad L(d_\ell - \dot{P}^*, Y, \sigma_\ell^{2*}, \sigma_e^{2*}, \sigma_b^{2*}, d_\ell - \dot{P}^*, r_e^*, r_b^*, \Delta\dot{P}^*) \qquad (3')$$

where $L_1, \ldots, L_5 > 0, \quad L_6, \ldots, L_9 < 0$

The demand for long-term deposits by the household sector will be positively related to the expected real rate of return on savings deposits, $d_\ell - \dot{P}^*$, where d_ℓ is the nominal deposit rate on savings deposits. The household demand for savings deposits is also positively related to the ability of households to commit funds on a long-term basis, which is measured by expected permanent income, Y_p^*, and to the risks of alternative forms of wealth holding, σ_e^{2*} and σ_b^{2*}. The demand for savings deposits by the household sector will be negatively related to the expected risk of default on savings deposits by banks, σ_ℓ^{2*}, and the rates of return on alternative forms of wealth holding, $d_s - \dot{P}^*$, r_e^*, and r_b^*, and the change in the expected rate of inflation $\Delta\dot{P}^*$. In functional form, we have the following household demand function for savings deposits:

$$D_H = D_H(d_\ell - \dot{P}^*, Y_p^*, \sigma_e^{2*}, \sigma_b^{2*}, d_s - \dot{P}^*, r_e^*, r_b^*, \sigma_\ell^{2*}, \Delta\dot{P}^*) \qquad (4')$$

where $D_{H_1}, \ldots, D_{H_4} > 0$ and $D_{H_5}, \ldots, D_{H_9} < 0$

The demand for equity holdings by individual savers will be positively related to the vector of expected real rates of return on equity issues, r_e^*, and to the expected risks associated with other forms of wealth holding, σ_b^{2*}, σ_ℓ^{2*}. The household demand for shares will also be positively related to the ability of investors to diversify their portfolios measured by Y and on their ability to rearrange their portfolio quickly, which will be represented by m_1; this last variably is a vector of values representing the marketability of shares issued by different enterprises. The demand

for shares will be negatively related to the rates of return on alternative forms of wealth holding, $d_s - \dot{P}^*$, $d_\ell - \dot{P}^*$, and r_b^*, to the vector of expected risks associated with investment in equity issues, σ_e^{2*}, and to the change in the expected rate of inflation, $\Delta \dot{P}^*$. In functional form, we have:

$$E_H = E_H(r_e^*, Y, m_1, \sigma_b^{2*}, \sigma_\ell^{2*}, d_s - \dot{P}^*, d_\ell - \dot{P}^*, r_b^*, \sigma_e^{2*}, \Delta \dot{P}^*) \qquad (5')$$

where $E_{H_1}, \ldots, E_{H_5} > 0$ and $E_{H_6}, \ldots, E_{H_{10}} < 0$

The household demand for bonds can be viewed as a positive function of the expected real rates of return on bonds, r_b^*, of the risks of investment in other forms of wealth holding, σ_e^{2*}, σ_ℓ^{2*}, of the ability to diversify portfolios, Y, and of the ability of investors to move in and out of bonds quickly, measured by m_2, the vector of values indicating the marketability of bonds issued by different firms. Both m_1 and m_2 are indicators of the level of development of the capital market. The more integrated the capital market is, the higher the values of m_1 and m_2 will be, implying increased household demands for bonds and equities.[3] The household demand for bonds will be negatively related to alternative rates of return on savings, $d_s - \dot{P}^*$, $d_\ell - \dot{P}^*$, r_e^*, to the vector of expected risks associated with investing in bond issues of different firms, σ_b^{2*}, and to the change in the expected rate of inflation, $\Delta \dot{P}^*$. In functional form, we have:

$$B_H = B_H(r_b^*, Y, m_2, \sigma_e^{2*}, \sigma_\ell^{2*}, d_s - \dot{P}^*, d_\ell - \dot{P}^*, r_e^*, \sigma_b^{2*}, \Delta \dot{P}^*) \qquad (6')$$

where $B_{H_1}, \ldots, B_{H_5} > 0$ and $B_{H_6}, \ldots, B_{H_{10}} < 0$

The four equations, (3'), (4'), (5') and (6'), are stock equations which define the levels of various asset holdings desired by the household sector. Net savings represent a flow and are positive when individuals are induced to increase their stocks of money, savings deposits, equity and bonds. From a policy standpoint, we would want to know what changes

could induce the household sector to increase its asset holdings and thus generate positive savings. We note that

$$S_H = s_H(\Delta\left(\frac{M}{P}\right)_H,\ \Delta D_H,\ \Delta E_H,\ \Delta B_H) \qquad (7')$$

$$s_{H_1}, \ldots, s_{H_4} > 0$$

The household demand for money balances could be increased by increased monetary stability which would reduce fluctuations in the expected rate of inflation, $\Delta \dot{P}^*$. Monetary stability would also have a positive effect on household demands for savings deposits, bonds and equities. Economic growth itself, i.e., $\Delta Y > 0$, would have the effect of generating positive savings as individuals attempted to maintain the positive functional relationship between their level of asset holdings and their real wealth by increasing their holdings of money, savings deposits, equity and bonds.

The demand for savings deposits would be increased by policies such as deposit insurance which reduce the risk of default on savings accounts (causing a reduction in σ_1^{2*}). The household demand for equity could be increased by financial development. Financial growth implies a more efficient market for the purchase and sale of equity, i.e., increased marketability which reduces the locked-in nature of investment. Similarly, the household demand for bonds could be stimulated by financial development. The increased salability of bonds would be reflected by a rise in m_2 in equation (6').

Business Sector

Aside from tax considerations, the primary determinants of the desired level of retained earnings will be the desired level of investment, the opportunity costs of keeping funds in the business rather than investing in other enterprises' liabilities and the cost of acquiring external finance.

The aggregate desired level of investment in the economy will be positively related to the vector of expected rates of return on investment to different firms, r_o. For any one firm, we have the following relationship:

$$r_o^{i*} = \frac{r_e^{i*} E_i + r_b^{i*} B_i}{E_i + B_i} \qquad (8')$$

where r_o^{i*}, r_e^{i*}, r_b^{i*} are the expected real rates of return on investment, equity and bonds issued by the i^{th} firm. E_i and B_i are outstanding share and security issues by the firm. Desired investment will be negatively related to the risks of investment, σ_I^{2*}, and to the costs of finance, r_1, r_2, r_b^*, r_e^*. The rates r_1 and r_2 are vectors of short-term and long-term lending rates by banks to different firms. The private, domestic investment function can be written as follows:

$$I = I(r_o^*, r_1, r_2, r_b^*, r_e^*, \sigma_I^{2*}) \qquad (9')$$

$$I_1 > 0, \quad I_2, \ldots, I_6 < 0$$

The costs of obtaining external finance are r_1, r_2, r_e^*, r_b^*. The opportunity costs of retained earnings can be measured by the rates of return they could receive if they were distributed. Since businesses will need cash balances in order to conduct day to day transactions and retained earnings could be earning interest in bank accounts while waiting to be reinvested, we will assume that retained earnings are held in short-term and long-term bank deposits. The opportunity costs of retained earnings are therefore r_e^* and r_b^*. The functional form for retained earnings will be:

$$S_r = s_r(r_o^*, r_1, r_2, r_e^*, r_b^*, \sigma_I^{2*}) \qquad (10')$$

where $S_{r_1} > 0$ and $S_{r_2}, \ldots, S_{r_6} < 0$

The business sector's demand for cash balances will be positively related to the level of activity, Y, to the level of retained earnings, S_r,

to the real rate of return on cash balances and to the risk of default on savings accounts. The demand will be negatively related to the expected real rate of return on savings deposits, $d_\ell - \dot{P}^*$, and to the change in the expected rate of inflation, $\Delta \dot{P}^*$. In functional form, we have:

$$\left(\frac{M}{P}\right)_B = M(d_s - \dot{P}^*, \sigma_\ell^{2^*}, Y, S_r, \Delta \dot{P}^*, d_\ell - \dot{P}^*) \qquad (11')$$

$$M_1, \ldots, M_4 > 0 \text{ and } M_5 < 0, \quad M_6 < 0$$

The business sector's demand for savings deposits will be positively related to the rate of return on savings deposits, to the level of retained earnings, and to the expected ability to commit funds on a long-term basis, measured by expected permanent profit, P_p^*. The demand for savings deposits will be negatively related to the risk of default on savings deposits, $\sigma_\ell^{2^*}$, to the rate of return on cash balances, $d_s - \dot{P}^*$, and to the change in the expected rate of inflation. In functional form, we have:

$$D_B = D_B(d_\ell - \dot{P}^*, P_p^*, S_r, \sigma_\ell^{2^*}, d_s - \dot{P}^*, \Delta \dot{P}^*) \qquad (12')$$

$$D_{B_1} > 0, \quad D_{B_2} > 0, \quad D_{B_3} > 0, \quad D_{B_4} < 0, \quad D_{B_5} < 0, \quad D_{B_6} < 0$$

The Banking Sector

The ability of the banking sector to provide loans to the business sector will depend positively on the size of the bank's portfolio, $M/P + D$, where $M/P = (M/P)_H + (M/P)_B$ and $D = D_H + D_B$. These two variables M/P and D also indicate the extent to which the banking sector can diversify its portfolio. The desire to hold assets on the part of the banking sector will be positively related to the expected rates of return on assets, represented by the vectors r_b^*, r_e^*, r_1, r_2, where r_1 and r_2 are vectors of short-term and long-term lending rates. The willingness of banks to invest in bonds and equities will be positively related to the marketability of

such issues, measured by m_1 and m_2. The demand for assets by banks will be negatively related to the risks of investment measured by σ_1^{2*}, σ_2^{2*}, σ_e^{2*}, σ_b^{2*}, and to the marginal costs of servicing deposits, C_L, and managing its portfolio, C_A. The primary costs associated with C_L are the bookkeeping costs of managing deposits, the service costs in terms of tellers, etc., of selling liabilities and the interest to be paid on deposits. The primary costs associated with C_A will be the transaction costs of making desired portfolio changes and the information costs one incurs in trying to maximize portfolio earnings in a world of imperfect information.

The differences $r_1-(C_A + C_L)$ and $r_2-(C_A + C_L)$ will equal the risk premiums for short-term and long-term lending to different firms if banking is competitive. If banking is not competitive, the differences will also contain an element of monopoly profit. We suggested in Chapter III that increased household savings through bank deposits could reduce lending rates. If marginal costs were constant and total deposits increased, the reduced risk of investment resulting from increased portfolio diversification could reduce r_1 and r_2 by decreasing the risk premiums represented by $r_1-(C_A + C_L)$ and $r_2-(C_A + C_L)$. Even if marginal costs rise with the size of the banking sector's portfolio, the reduction in investment risks resulting from portfolio diversification could still lower r_1 and r_2, easing credit conditions.

Putting all of these effects together, we can formulate an asset demand function for the banking sector:

$$E_B = E_B(r_b^*, r_e^*, r_1, r_2, M/P, D, m_1, m_2, \sigma_b^{2*}, \sigma_e^{2*}, \sigma_1^{2*}, \sigma_2^{2*}, C_A, C_L) \qquad (13$$

where $E_{B_1}, \ldots, E_{B_8} > 0, \quad E_{B_9}, \ldots, E_{B_{14}} < 0$

Equations (5'), (6'), (10') and (13') represent stock relationships. The supply of savings will be equal to the sum of net increases in asset demands,

i.e.,

$$S = \Delta E_H + \Delta B_H + S_r + \Delta E_B \qquad (14')$$

The demand for investment was represented by equation (9')

$$I = I(r_o, r_1, r_2, r_b^*, r_e^*, \sigma_I^{2*}) \qquad (9')$$

$$I_1 > 0, \quad I_2, \ldots, I_6 < 0$$

We suggested earlier that increased monetary stability and economic growth themselves would raise household demands for bonds and equity, B_H and E_H. Financial development and integration would increase the marketability of bonds and equity, reducing the locked-in nature of capital and raising the level of desired bond and equity holdings by the household sector, i.e., m_1 and m_2 would rise in (5') and (6').

Referring to the equations for household demands for money holdings and savings deposits, (3') and (4'), we noted that increased monetary stability and economic growth induced positive savings by the household sector. Deposit insurance could increase household savings in the form of savings deposits by reducing the risks of default on savings deposits, σ_l^{2*}. And, higher real rates of return on money holdings and savings deposits, ($d_s - \dot{P}^*$ and $d_l - \dot{P}^*$), could increase the flow of household savings to the banking sector.

Increased household savings in the banking sector would increase the volume of bank liabilities, M/P + D, which would increase the ability of banks to diversify their portfolios. The result would be a decline in the risk premiums on short-term and long-term loans which would lower r_1 and r_2 increasing desired investment, I, and retained earnings, S_r. Increased financial development and integration would increase the marketability of bank asset holdings which would raise bank asset demands, E_B.

Therefore, the level of aggregate savings would be raised by increased monetary stability, economic growth, higher real deposit rates, deposit insurance and financial development and integration. The key to increases in the supply of external finance by the household sector directly or through the banking sector is to generate increased asset demands by the household sector through the various policies that we have just discussed.

In this context, the potential drawbacks of traditional development policies can be enumerated. In the case of West Germany, government intervention in the early 1950's included artificially low bond rates and severe limitations on equity issues in an effort to promote housing construction. As a result, r_e^* and r_b^* were kept below market equilibrium levels which discouraged the accumulation of equity and bonds by the household and banking sectors. This discouraged external finance and increased the dependency of business investment programs on government support.

Low cost loans and subsidies to specific industries promoted the expansion of some industries and contraction of others without regard to the efficiency of capital allocation. Government control over bond and equity rates hindered the growth and integration of financial markets. This slowed the rate of improvement in the marketability of equity and bond issues which further diminished the rate of growth of external finance.

Because household savings were discouraged by government intervention in the early 1950's, the ability and willingness of banks to supply short-term and long-term loans to businesses remained small. In effect, government intervention helped to foster an increased dependency on government support by the business sector.

Inducements to higher rates of retained earnings in the presence of highly fragmented capital markets were limited in their effectiveness because of the inefficiencies in capital allocation which they fostered.

Policies which seemed unassailable in the context of model I are shown to be of ambiguous value in the context of model IV when we recognize the inefficiency and dependence on continued government support which they generate.