INVESTIGATING THE RELATIONSHIP BETWEEN
FOREIGN AID AND ECONOMIC GROWTH
IN RECIPIENT COUNTRIES

DISSERTATION

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By

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* * * * *

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To My Parents
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CHAPTER I:

INTRODUCTION

THESIS STATEMENT

The relationship between economic growth and its primary determinants, in less developed countries, is modified by, and varies with, levels of foreign economic aid.

HISTORICAL SETTING

Foreign aid has historical roots which extend back to the nineteenth century. Transferring money on concessional terms to the governments of colonies was common practice at the turn of the century. Britain, France, Germany and the United States all transferred funds under the label 'infant colony subsidies' before 1914 (Mosley, 1987). Transfer of private capital to less developed countries or colonies, however, was far less common. In 1914, approximately 75 percent of all overseas assets were held in North and South America, Europe and Oceania (World Bank, 1985).

The phenomenon of foreign economic aid as it is understood today, however, originates from the time of the second World War. In 1944, delegates of forty countries
agreed in Bretton Woods, New Hampshire, to create institutions for a new monetary system and a multilateral world economy. Among the newly created institutions was the World Bank, which came into existence in December of 1945. Its primary objective was to make financial resources available to war-torn economies of Europe. It became the basis for multilateral aid. Also at this time, a number of colonized nations gained their independence and became candidates for foreign aid. In 1947, however, the United States shifted its European development funds back to bilateral mechanisms by creating the European Recovery Program (leaving the Bank with only a minor role during the years of European reconstruction). After the creation of the bilateral US program and a UN program for European reconstruction, the Bank shifted its focus towards development in the poorer countries.

The European Recovery Program, better known as the Marshall Plan (named after General George C. Marshall), provided $497 million in reconstruction loans in 1947 and disbursed more than $13 billion by 1952, 89% of which went to Europe (Brown 1953). By all accounts the Plan was a great success, and was largely credited for the rapid economic growth rates of Western European economies by the early 1950s. From the onset, however, there was a rivalry between the US and the Soviet Union for strategic and political alignments. Aid money was often used as a tool in their struggle for dominance. Foreign aid programs in both countries were part
of a broader foreign policy. "Following on the heels of U.S. military victory in World War II, the success of the Marshall Plan contributed mightily to the belief that the limits of US foreign policy were on a distant and receding horizon" (Wood 1986). Although its modelers envisioned the need for foreign aid to be temporary, the Marshall Plan served as a precursor for permanent concessional external financing within the postwar world system.

In 1949, President Harry S. Truman gave his inaugural speech, the 'Fourth Point' of which formally committed the US to assisting less developed countries. The Act of International Development was passed the following year. And one year after that, in 1953, the Mutual Security Act established the new US foreign aid program as the Marshall Plan ended. US foreign aid was directed primarily toward preventing the spread of communism and consisted of military aid in large proportions. Until 1960, the US provided more than half of all development assistance (OECD 1985). It was not until the early 1960s that aid levels re-gained those of the Marshall Plan years.

A number of important developments occurred during the early 1960s, particularly in 1960. First, the International Development Association (IDA) was created as a concessional lending facility within the World Bank. Its primary objective was to lend long-term, interest-free loans to the poorer developing countries. Also during 1960, the Development
Assistance Group was created from within the Organization for European Economic Cooperation (OEEC), which was later reconstituted as the Organization for Economic Cooperation and Development (OECD). The Assistance Group was renamed the Development Assistance Committee (DAC) in 1961. In addition to its practical significance, the DAC was symbolic in bringing together the Marshall Plan aid partners and Japan. It included a research center and provided monitoring of aid trends. The DAC has played a key role in determining western responses to development needs (Browne 1990). Finally, within the same year, sixteen countries (primarily in West Africa) gained independence. And the developing countries became a formidable group within the United Nations, comprising two-thirds of the membership.

The following year aid administration agencies were formed in main donor countries, including the US Agency for International Development (USAID), the Ministries for Cooperation in France and West Germany, and the Overseas Economic Cooperation Fund in Japan. Also in 1961, the United Nations declared the decade to be the first 'Development Decade.' Targets for resource transfers (including aid and private investment) from developed to developing countries were set at one percent of the combined donor country incomes (the target was changed to 0.7 percent of GNP for the second 'Development Decade'). Optimism seemed to be in the air for the possibilities of development and self-sustaining growth in
the third world.

By the mid 1960s, three regional development banks had also formed: the Inter-American Development Bank (IDB) in 1959; the African Development Bank (AfDB) in 1964; and the Asian Development Bank (ADB) in 1966. And by the end of the decade, consensus had been reached for a formal definition of aid, termed 'official development assistance', to distinguish it from other resource flows.

Despite the influence of developing countries to attract attention to their plight, and the optimism of aid proponents everywhere, the intended beneficiaries (disadvantaged peoples of the developing world) remained victims. "Their representatives, encouraged to believe that aid would contribute crucially to development progress, had placed it high on the world agenda. But aid flows would continue to be subject mainly to the wills of the largest donors whose responses, except in the case of short-term relief campaigns, were tied more to immediate domestic economic exigencies than to broader development needs" (Browne pg 24).

Despite the flurry of activity in the aid 'business,' severe questions and concerns began to arise as to the effect popular capital-intensive projects were having on income distribution and basic needs in developing countries. At the end of the decade, the Pearson Commission reported on the 'crisis in aid.' Focus began to shift to the causes of perpetually uneven exchanges between the developed and less
developed countries. Foreign exchange earnings were being siphoned off to service mounting debt burdens. Foreign exchange earnings were already constrained by worsening terms of trade between primary and secondary products.

Donors themselves found recipients not 'repaying' them for their 'assistance' with higher demand for donor exports (as had been the case in Western Europe). Their response was to increasingly tie aid to the procurement of goods and services in the donor countries. Radicals from the left and the right began criticizing aid programs vehemently.

In 1973 the oil crisis from the Middle East and the food crisis in Africa led the developed countries into economic recession and many African countries into famine. At the end of the year, the second 'Development Decade' had been declared a failure and was followed by a UN program to establish a 'new international economic order.' Reforms were recommended for international trade, development finance, foreign investment, technology transfer and natural resource exploitation (Browne pg 29). The third 'Development Decade' was proclaimed in 1981.

But the 1980s brought a new set of concerns. The food crisis in Africa reached new proportions. Mass media brought pictures of the starving from Ethiopia and Sudan to the public. Aid became a widely discussed topic. The debt crisis also reached a new high and was well publicized. Developing countries had been simultaneously experiencing declining
demand for their exports in world markets and rising interest rates from industrialized countries. In August of 1982, Mexico moved to reschedule its debt and within a year, almost as many developing countries entered into debt rescheduling negotiations as in the previous twenty-five years (Krueger 1989; World Bank 1984). By 1988, the net transfer from developing to developed countries was $43 billion, yielding a total for the 1983-88 period of $143 billion (Browne pg 36; World Bank 1988).

High debt and slow economic growth have remained high priority concerns at the World Bank and other multilateral and bilateral agencies. The growth rate of aid donations fell during the 1980s, as did private flows from developed to developing countries (OECD 1985). The aid flows which were transferred in the 1980s began to take the form of non-project, or 'program' assistance. This type of aid was first developed by the Bank in 1980 as 'structural adjustment loans.' The trend of non-project assistance which spread to numerous other agencies, touched off a wide debate. On one side of the issue, domestic policies have often been partly responsible for aid ineffectiveness, and the conditions and consulting which accompany this type of aid address the appropriateness of policies in the recipient countries directly. On the other hand, conditionality at its worst erodes national sovereignty and invades the recipients' internal decision making structure with foreign interest in a
manner which may be exploitive and/or may perpetuate 'dependency.'

Nonetheless, policy dialogue between donors and recipients greatly expanded during the 1980s. Aid proponents have also been pleased to see aid restored to a position of relative prominence. In 1988, as in 1960, aid contributed about half of net resource flows to developing countries, having dropped to 30 percent in 1980. The share of direct investment has also rebounded in the same period (Browne 1990; OECD 1985).

THE RESEARCH PROBLEM

After more than forty years of foreign aid programs, conclusions about the relationship between aid and development are yet to be found. Results of statistical studies have been inconsistent and inconclusive. Even the DAC, which is a major aid proponent, conceded, "There can be no rigorous scientific proof that in the past the aggregate of everything officially designated as official development assistance has had an identifiable, assignable, positive and cost-effective impact on third world development" (Wood 1986; OECD 1981).

Typically the studies of aid effectiveness have used multiple regression to relate economic growth to variables brought forth from theory and from previous empirical research. Aid was then added to the list of independent variables. The effectiveness of aid in contributing to
economic growth was proven or disproved by the significance and sign of the aid coefficient, as well as by the amount of explained variance in economic growth. The aid-growth relationship being tested, however, was only the 'direct' relationship.

Thus, researchers of foreign aid effectiveness have frequently considered foreign aid to be merely an addition to foreign capital, and just added it as another independent variable. The impact of aid on the other variables in the model, and on their effect on economic growth, was not addressed. The traditional model did not incorporate the impact of aid on the relationship between economic growth and its primary determinants, which were selected from previous theoretical and empirical work. Rather, previous studies tested only the direct aid-growth relationship.

This study proposes to test if and how the traditional model of economic growth varies across levels of economic aid to determine more exactly how aid may act as a modifier of other relationships between growth and its determinants. The methodology to be employed is the Expansion Methodology, which allows the initial model to be 'expanded' into a model which is more responsive to its environment or 'context.' That is to say, from Expansion Methodology, an 'initial model' of economic growth in less developed countries can become a model which better explains the aid-growth relationship by incorporating the relationships aid may have with other
determinants of economic growth.

The theoretical literature which evolved into models of growth in less developed countries, and the empirical studies which have tested them, will be reviewed in Chapter Two. A review of previous theoretical and empirical literature leaves important research questions unanswered. These questions, and the methodological approach to answer them are discussed in Chapter Three. Results of data analysis and further exploration of key relationships are provided in Chapter Four. Finally, Chapter Five provides a summary of the study and conclusions which may be drawn from it.
CHAPTER II:

REVIEW OF LITERATURE

THEORETICAL BACKGROUND

Introduction

The subject of economic development within so-called third world countries has been an on-going debate, on theoretical and empirical grounds, since the end of World War II. The issue has been studied and critiqued through the eyes of numerous academic fields, including economics, sociology, and political science. From the debate, however, no single theory or perspective has emerged which has brought consensus regarding the role of foreign capital and domestic factors in the development of the less developed countries. Likewise, numerous empirical studies of the role of these factors in development have also failed to achieve a consensus on their relative and absolute importance. An overview of the most well-known theoretical perspectives, and the empirical studies which have attempted to test them, will be presented here to shed some light on the source(s) of their inconsistency and a reasonable way forward. The theoretical perspectives to be covered include economic theories of development, dependency theory, and the mercantilist perspective.
Economic Theories of Development

The subject of economic growth has been, and continues to be, a controversial area within the study of economics. Many great contributors in the field have attempted to explain economic growth since the eighteenth century, including Adam Smith, Karl Marx and Joseph Schumpeter. The period following World War II brought renewed interest in the subject. A number of different theories have resulted from work of that time. However, there is no general theory of economic growth which can prescribe policy at all stages of economic development or for all types of economic systems. The primary difference between economic theories is the varied importance assigned to different factors and the proposed relationships between those factors.

1) Classical Theory of Economic Growth

Economists of the eighteenth and nineteenth century, such as Smith, Ricardo, Malthus and Mill, have been categorized as classical economists. In general, classical theorists are those which pre-date the publication of Keynes' General Theory in 1936. Long-term growth of national income and the process by which growth occurs was their primary focus. Choi (1983, pg 21) summarized the contribution of classical economists to growth theory as follows: (1) They provided a list of crucial factors that are supposed to determine the pace of the output growth in the economy. The elements include factors of production (natural resources, capital and labor), technology,
and the institutional setting of economic activity; (2) They developed certain propositional relationships among the identified elements. One well-known proposition in this regard is the effect of diminishing returns resulting from the combination of capital and labor with limited natural resources; and (3) They suggest "some ranking in the growth-promoting properties of the different elements, some crucial factors on which to focus" (Deane, 1978, pg 41). The most important factor was capital accumulation.

The classical period of economics ended with the so-called Keynesian Revolution which began with the publication of Keynes' *The General Theory* in 1936. Within a decade, the vast majority of economists throughout the Western world were converted to the Keynesian way of thinking (Blaug, 1990, pg 25). Keynes challenged several basic assumptions of classic economic theory, which included: (1) economies are stable and are predisposed to full employment levels of output; and (2) there is no reason for government intervention to promote stability or full employment. Neither the classic economists, nor Keynes, were specifically concerned with the economic development of poor countries. But the implication drawn from the Keynesian Revolution regarding market intervention became an early building block for development theories yet to come.
2) The Harrod-Domar Growth Model

Roy Harrod (1939) and Evsey Domar (1946) built independent, yet similar, models of economic growth upon Keynesian economics. They have been most closely identified with the establishment of a theory derived from Keynesian thought (Browne, 1990, pg 102). Like the classic economists, they assigned an important role to growth of capital formation from investment. Also like their predecessors, neither was particularly concerned with developing countries per se. Their work was the beginning of a modern growth theory which extended Keynes' focus on short-run aggregate demand to the long-term, and expressed a relationship between savings, investment and income such that an economy would grow smoothly with full employment (Domar, 1946; Harrod, 1939).

Both of the economists proposed that within a country, and over time, the capital-output ratio was stable. Therefore, an increase in investment would lead to economic growth. The approaches of Harrod and Domar were later lumped together as the Harrod-Domar model, in which it is assumed that the long-term economic equilibrium (where aggregate supply equals aggregate demand) occurs when the savings rate \( S \), or investment rate \( I \), is equal to the change in national income \( (Y_t-Y_0) \) times the capital-output ratio \( k \). Note that \( k \) indicates the value of capital required to produce one unit of output in a single period. Thus, \( I = S = k(Y_t-Y_0) \). Stated differently, the growth rate at equilibrium is equal to
the savings rate divided by the capital-output ratio. Their definition of equilibrium conditions for growth connected an objective of development (economic growth) with a major constraint on growth (investment) (Colman & Nixon, 1986, pg 24). The model was used to determine rates of saving or investment required for a target growth rate, given a certain capital-output ratio.

Following World War II, the subject of economic growth became of great interest to economists, academics and politicians alike. Keynesian economics had taken hold within the industrialized countries and the Harrod-Domar model had become the dominant theoretical paradigm of economic growth. This theoretical perspective, and the success of the Marshall Plan within war-torn economies, led economists to apply the Harrod-Domar model to underdeveloped countries and fueled the arguments of aid supporters who believed that foreign economic assistance would lead to economic growth. In fact, the Harrod-Domar model was the theoretical foundation for the first national development plans in the developing world (de Silva, 1984).

3) Balanced and Unbalanced Growth Models

During the same period in which the Harrod-Domar growth model was developed, Rosenstein-Rodan (1943), Nurske (1952) and later Hirschman (1958) also focused on the importance of savings and investment for economic growth, with particular interest on industrial investment. Rosenstein-Rodan first
wrote about a need to raise savings-investment rates in Eastern and South-Eastern Europe to increase economic growth. He proposed that large amounts of investment should be channeled into several industries simultaneously in order to create demand for new products (by raising worker earnings in more than one industry). The so-called "big push" idea argued that an investment push could increase the savings-investment ratio and served as a theoretical justification for foreign aid. The economic rationale for a "big push" formed part of what became known as the doctrine of balanced growth.

According to Rosenstein-Rodan, "the purpose of an international program of aid to underdeveloped countries is to accelerate their economic development up to a point where a satisfactory rate of growth can be achieved on a self-sustaining basis" (1961, pg 107). His ideas fit well with aid supporters because he argued that aid would be needed on a temporary basis as a stimulus to domestic capital formation. Nurske used a similar line of reasoning to argue for a "balanced growth" approach, whereby production of a wide range of consumables would be increased to create more demand. The idea was that only investment in a large number of activities simultaneously could take advantage of various external economies of scale.

Unfortunately, the models of Rosenstein-Rodan and Nurske were interpreted by policy-makers as advocating industry over agriculture, which proved disastrous in both the Soviet Union
and in India (Colman & Nixon, pg 29). Other problems with the use of their models was their emphasis on capital intensive investment over labor intensive investment. These and other criticisms led Hirschman (1958) to advocate a model with opposite implications.

Hirschman argued for an "unbalanced growth" approach whereby large scale investment would be channeled by the state into only the leading industrial sector in order to "create new opportunities and bottlenecks elsewhere in the economy which would stimulate a secondary wave of investment and entrepreneurship" (Colman & Nixon, pg 30). This school of thought argued that a "big push" was not feasible and that development was best stimulated by creating imbalance.

Neither the balanced nor unbalanced growth models considered inherent differences between less developed countries, in terms of their objectives, resource endowments, trade prospects, population growth, etc. Neither model adequately explained the process of economic growth and development. Both were used to support arguments for the use of foreign assistance to promote economic growth in less developed countries following World War II. "These theories, emanating from the pro-aid school, were based on the general assumption that the provision of aid would lead directly to an increase in the resources available for development" (Browne, pg 105).
4) Rostow's Stages of Economic Growth

Like Rosenstein-Rodan, and other economists and academics of the 1940s and 1950s, Walt Rostow applied concepts from the Harrod-Domar model in his stage theory of economic growth in 1956, followed in 1960 with his book, *The Stages of Growth: A Non-Communist Manifesto*. As implied by the title, Rostow's book was an attempt to provide an alternative to the Marxist interpretation of history. Rostow claimed to have identified stages of economic development with which societies could be classified. The five stages were: traditional, transitional, take-off, maturity and high mass consumption. It was the take-off stage which incorporated Harrod and Domar's capital-output ratio. According to Rostow, there were three necessary conditions for take-off: (1) development of, and high growth in, at least one manufacturing sector; (2) a political, social and institutional framework which allows economic growth to be transmitted throughout the economy; and (3) a significant increase in investment (over ten percent of national income) (Thirlwall, 1989, pg 62). The implications for the role of aid were obvious. Rostow had described the importance of aid for development in earlier work (1957) and clearly indicated in his following book that external capital could help poor countries reach the take-off stage (Browne, pg 103).

The take-off stage was predicted to be short, during which time economic growth would become self-sustaining. Rostow said this period would last between ten and fifteen
years.

By stating that investment rate increases would accelerate the process of economic growth, Rostow gave a critical role to economic aid. Through the Harrod-Domar mechanisms, investment rates could be increased with foreign capital which would raise domestic savings, without lowering domestic consumption. So aid would accelerate countries toward and through the take-off stage. The proposition that aid would only be needed on a temporary basis, after which time growth would be self-sustaining, greatly enhanced its political attractiveness for aid proponents in donor countries (Wall, 1973).

Rostow’s stage theory gained wide appeal but also attracted much criticism during the 1960’s. Perhaps the greatest critic was Kuznet (1963). Among Kuznets’ and others’ criticisms were the tautological nature of stage definitions (one can not distinguish between the end of one and the beginning of another), lack of empirical testing by Rostow, contrary quantitative evidence, and erroneous assumptions that poor countries are in the traditional stage just as developed countries used to be (ignoring historical forces which have put rich and poor countries on different paths) (Colman & Nixon, pg 39; Thirlwall, pg 62).

Despite the many criticisms of Rostow’s and other stage theories, they continued to find supporters. According to Thirlwall, the purpose of these theories was to "distinguish
the situations in which an economy may find itself" and there was no counter-argument against the important role of investment for development (pg 63).

5) The Chenery-Strout Model

One of the most comprehensive theoretical justifications for aid was developed by Hollis Chenery and A.M. Strout in 1966, which clearly followed in the footsteps of its predecessors. It is Keynesian, in that it incorporated the mechanics of the Harrod-Domar model. It is neoclassical, in that it assumed that countries tend to be self-regulatory. And it is Rostovian, in that it incorporated conditions for take-off (Browne, pg 103).

Chenery and Strout detailed how aid acted to accelerate economic development by relieving bottlenecks that constrain growth. Different types of bottlenecks were found at different stages of development, including shortages of skills, shortages of domestic savings and shortages of foreign exchange receipts. The changes needed included increased human skills, higher levels of investment and saving, more productive technology, diversification of jobs and commodities, and new societal institutions. Because in many countries there was little or no excess consumption which could be reduced to increase savings (which supports investment), foreign capital (in the form of aid or direct investment) was needed.
Foreign capital could be used to fill two types of gaps which were detailed by the Chenery-Strout model. It was suggested that aid could bridge a gap in skills and savings and a gap in foreign exchange during different stages of development, until a self-sustaining stage was reached. A total of three phases of development were outlined in the model. During the first phase, investment levels are below the required rate to reach the target growth rate, due to a shortage of skills. During this phase, aid could fill the gap between available savings and required investment to reach targeted growth. Aid fills the gap until the rate of investment is high enough to reach the target growth rate (namely, when the domestic saving ratio rises to the level of target investment level). It was assumed that aid was not used to increase consumption by decreasing savings. So, there is an investment-limited gap but not a trade-limited gap. Phase one was predicted to last between five and ten years if the investment rate averages ten to twelve percent of gross output.

During the second phase, aid is still needed because skill shortages hinder the marginal savings rate required for targeted growth (i.e., the investment rate would still be above the savings rate). It is also during this time a trade (foreign exchange) gap appears, whereby export earnings are insufficient to finance needed imports of raw materials and other factors which can not be manufactured domestically. Aid
is thus needed to finance imports. During the third phase, the investment-savings gap has disappeared but structural rigidities continue the foreign exchange gap and the need for aid. When structural changes occur and the economy adjusts to changing prices and market conditions, the phase ends (Chenery & Strout, 1966).

It is important to note the importance of domestic policies and responses in moving a country through each of the phases. In fact, the authors clearly stated that the effectiveness of external resources in contributing to economic growth was greatly influenced by the manner in which recipient countries responded. "It is the need for rapid structural change which sets the lower limit to the time required to complete the transition to self-sustaining growth" (pg 726). In many ways, Chenery and Strout echoed the sentiments of Rosenstein-Rodan, who had been one of the earliest theorists to provide justifications for economic aid. Both parties cautioned aid supporters that the manner in which aid was used greatly determined its effectiveness. They were, nonetheless, optimistic. "The general aim of aid... is to provide each underdeveloped country a positive incentive for maximum national effort to increase its rate of growth...Knowledge that capital will be available over a decade...will act in many cases as an incentive to greater effort" (Rosenstein-Rodan, 1961 pg 107). Chenery and Strout expressed that the problem of a country’s inability to change
its productive structure was not likely to be serious in a slowly developing country (pg 682).

Following publication of the Chenery-Strout model, many articles began to appear in technical journals on the subject of aid and economic development. Most were not written to further develop theory but were more to test current theory with real-world evidence (Riddell, 1987, pg 92). The Chenery-Strout model continues to be a core component of development literature. As will be detailed in a later review of previous studies, a number of adjustments have been made to the model.

In addition to the influence of domestic policies noted by Rosenstein-Rodan, as well as by Chenery and Strout, many explanations began to emerge as to why most development programs appeared to be failing during the latter half of the 1960's. By the middle of the so-called 'development decade' of the 1960's, the United Nations reported that there had been little change or "painfully slow progress" (United Nations, 1966, pg 90). As noted by Zimmerman (1970), the United Nations cited many reasons for the failure of development assistance: (1) political instability; (2) indifference of the upper classes in the respective countries; (3) rapid population growth; (4) changes in disease control which lowered mortality rates without increasing standards of living; (5) unfavorable land tenure systems; (6) caste and class systems which hinder spread of knowledge among agrarianists; (7) general apathy connected with extreme
poverty and/or malnutrition; (8) education or literacy; (9) suspicion of or excessive dependency upon government; (10) planning in capital cities without knowledge of or contact with local people; (11) lack of an "extension" class of persons for leadership; (12) abnegation of responsibility by governments to allow take over by outside organizations; and (13) conflict of changes with religious values (pg 4).

The concept of a "vicious cycle" became prevalent in development literature, which implied that social, political and economic structures within the third world itself acted as the main deterrents to development (Nurske, 1953; Myrdal, 1957). The writings of liberal economic theorists made little if any connection between the development of industrialized countries and that of non-industrialized countries. The exploitive nature and impact of colonialism on the non-industrialized countries were not acknowledged (Smith, 1978; Bauer & Yancey, 1978). According to Foster-Carter (1974), no structural connection was recognized between development and underdevelopment. Development meant becoming more like the West. Thus, capital, technology and skills were needed from the West, primarily via multinational corporations. Multinationals were seen as an effective vehicle to assist underdeveloped countries make better use of resources and to become developed.
Criticisms of Economic Theories of Development

Critics of foreign aid programs which are based on economic theories of development (Bauer 1981, 1982; Krauss, 1983; Lappe et al, 1980, etc.) have argued that the issue of aid effectiveness lies not in whether or not aid leads to higher domestic savings or economic growth per se, but in the pattern of growth which is pursued. If aid does not effectively lower poverty levels or improve income distribution, its effect on savings levels, foreign exchange levels or growth rates are of little consequence. Real benefits from aid, they argue, have been non-existent or are marginal. Their arguments take the issue of aid effectiveness "beyond technical macroeconomic and quantifiable relationships associated with growth theory, to a consideration of quantifiable relationships that attempt to capture patterns of poverty and distribution and, relatedly, social and political aspects of the development process" (Riddell, pg 129). The issue is not so much the extent to which aid leads to economic growth, but the extent to which individual people gain or lose from the process.

Aid proponents have made the assumption that nation-states are able to influence and guide the development process in a way which benefits their poorest members. Critics have argued, on the other hand, that recipient states are not able, or choose not, to use the process to benefit their poorest. They have argued that "internal and external forces interact
to reinforce malevolent structural rigidity, thereby impeding the effect of benign social and economic forces that could lead to national development and substantial and effective poverty alleviation" (Riddell, pg 130). Clearly different conclusions have been drawn about the potential benefits from aid by different groups of theorists.

The Dependency Theory of Development

1. Raul Prebisch: A Precursor to Dependency Theory

Raul Prebisch was an economist in Argentina who had served as the head of the Central Bank from 1935 to 1943 and later established and became the director of the Economic Commission for Latin America (ECLA), an agency sponsored by the United Nations in Santiago Chile. He was one of the first development economists to question the mutual profitability of the international division of labor for developing countries. Prebisch made the first major statement of the ECLA in 1950. In his view, the world was divided into a center of industrialized countries (secondary producers) and a periphery of underdeveloped countries (primary producers). Together, the center and the periphery formed a world economic system, whereby an international division of labor relegated to the periphery the task of producing food and raw materials for the center (Prebisch, 1950). He found an unequal distribution of profits from productivity gains and different income elasticities for primary and secondary goods.
The unfavorable impact of unrestricted trade on the terms of trade and balance of payments of developing countries outweighed any advantages with respect to a more efficient allocation of resources (Thirlwall, 1989, pg 139). He urged the industrialization of the periphery, as well as trade protectionism, as a solution to disparities in development between center and periphery. This strategy became known as "import-substitution industrialization." "In the view of the theorists of the (ECLA) it (was) quite possible to break out of the dependent relationship characteristics of the periphery, largely through the process of import-substitution and, at least in some degree, autonomous industrialization" (Riddell, pg 138). The substitution of imports by home production of industrial commodities for the domestic market became the official strategy of the ECLA and most of its member governments during the 1950's (Frank, 1979). As a development policy, however, it failed.

The early work of Prebisch, as well as other ECLA economists, served as a precursor to dependency approaches. Their views have been referred to as structuralism (Mahler, 1980). Generally speaking, the structuralists believed it was inevitable that primary (export) product prices, upon which less developed countries were heavily dependent, would deteriorate relative to secondary (import) product prices. Thus developed countries would gain relatively more from productivity increases for primary products, and less
developed countries would continually battle with balance of payments problems and low economic growth. Regional trade organizations, preferential tariff treatment from developed countries, and import substitution (using tariffs to shelter infant industries and encouragement of foreign investment in manufacturing) were all strategies proposed by structuralists.

According to Mahler (1980), there were several key differences between structuralists and early dependency theorists. First, dependency theorists found that it was more than just the nature of the particular goods which are exchanged in global markets which leads to global inequity. Second, they were critical of structuralist support for foreign investment in periphery countries because north-south contacts are cumulative and mutually reinforcing. Third, they differed on the basic concept of development. Structuralists agreed with liberal economists that the goal of development is rapid industrialization and aggregate economic growth. Dependency theorists, on the other hand, believed that externally oriented development is distorted and seek more equitable approaches. In general, dependency theorists argued for a more fundamental change in the distribution of power between developed and less developed countries (pg 52). The central argument of structuralists became just part of the larger argument of the dependency theorists which followed them.
2. Dependency Theorists

The dependency perspective was developed concurrently with the structuralist perspective. Three early figures were Silvio Frondizi, Sergio Bagu, and Caio Prado Junior. All three sought socialism as a solution to the problems of underdevelopment in periphery countries (Chilcote 1984). They found fault with imperialism and international capitalism. Dependency on monopoly capital and multinational companies of the center was blamed for deformation of the periphery (pg 60).

The dependency perspective was brought to the English-speaking world by Andre Gunder Frank (1969, 1979). Frank developed and popularized the idea of the 'development of underdevelopment,' which proposed that development and underdevelopment were part of the same process. "Underdevelopment was and still is generated by the very same historical process which also generated economic development: the development of capitalism itself" (pg 9). Poverty was said to be the "consequence of the penetration of market forces into the peripheral third world from the capitalist centre, which creates and deepens the process of underdevelopment," rather than an original state (Riddell pg 136). The once flourishing and developed societies of Latin America, Asia and Africa had become underdeveloped from colonization and extension of capitalist economies based in Europe. Frank criticized Rostow who had defined
underdevelopment as an original stage of traditional societies, with no prior history and proposed that developed centers were once underdeveloped. Argentina, and other countries, according to Rostow, were taking off. But Frank said they were becoming more structurally underdeveloped. Frank hypothesized (among other things) that "satellites experience their greatest economic development and especially their most classically capitalist industrial development if and when their ties to their metropolis are weakest" (1969 pg 10).

With the failure of the import-substitution strategy, a new wave of dependency theorists arose in the early 1970's and began what is now referred to as the "new dependency perspective." Much of their focus was on explaining the failure of the strategy and many of them (Cardoso, 1972; Dos Santos, 1970, 1973; Floto, 1975; Furtado, 1970; Sunkel, 1969, 1974; etc.) came from within the ECLA. They began considering more than just economics. Celse Furtado, an ECLA economist, attributed the failure of import-substitution industrialization to rigidities of the internal structure of society, traced to the Spanish conquest and Portuguese colonialization. Rigid economic structures transferred to society left it resistant to social change. Therefore, the import-substitution industrialization strategy was unsuccessful. Others within the ECLA framework also looked at external relations. Theotonio Dos Santos said that import-
substitution failed because a new form of dependence formed and restricted the domestic market (1973).

Among the many criticisms of the import-substitution strategy were that it (1) produced inflationary pressure, (2) limited growth to meet only domestic market demands, (3) was limited by skill shortages and inadequate infrastructure, (4) was outpaced by population growth, (5) merely shifted dependency to intermediate products, and (6) did not sufficiently distribute benefits to the poor (Furtado, 1970; Dos Santos, 1973).

According to Dos Santos (1970), there had been three forms of dependence: (1) colonialism (2) financial-industrial (or classical dependence-Evans 1979) and (3) new dependence from multinational corporations producing for the internal markets of dependent countries. During the first two forms of dependency, goods are produced to export to the center. Labor is superexploited and income from exports goes abroad or to the upper class. The import-substitution industrialization strategy was attempted to diversify the industrial sector to overcome trade dependence, but a new form of dependence arose due to unavailability of investment capital. Capital from the export sector was largely foreign owned or controlled so profits went abroad. This had a negative balance of payments effect because of repatriated profits and negative terms of trade for raw materials versus industrial products.
Dos Santos also offered a formal definition of dependency: "By dependency we mean a situation in which the economy of certain countries is conditioned by the development and extension of another economy to which the former is subjected. The relation of interdependence between two or more economies, and between those and world trade, assume the form of dependence when some countries (the dominant ones) can expand and be self-sustaining, while the other countries (the dependent ones) can do this only as a reflection of that expansion" (1973, pg 109). He concluded that development was a world-wide historical phenomenon from the formation, expansion and consolidation of a capitalist system; dependency, a conditioning situation which limited development and its forms.

The "new dependency perspective" differed from its older counterpart in a number of important ways. The role of foreign capital played a more central role in the new perspective. Modern dependence and underdevelopment of peripheral countries was attributed to, not only unfavorable terms of trade between primary and secondary goods, but to the penetration of foreign capital as well (primarily via the multinational corporation).

New dependency theorists also placed greater emphasis on the role of the internal class structure of third world countries than had their predecessors. The upper class of the third world was said to be part of a transnational community
of the affluent who consume and live in ways common among the middle classes of developed countries (Sunke 1974). The upper class served as a link between the country and multinational corporations by forming joint ventures.

Thus new dependency theory put foreign capital investors and the internal class structure into the limelight of the development controversy. Development could occur, according to this perspective, despite dependence on the core; but it was limited, was not self-generating, and was not likely to distribute benefits evenly to a majority of the population.

Criticisms of dependency theory in general include that: (1) it is static in its formulations, especially regarding the role of external forces (O’Brien 1975, pg 24; Lall 1975, pg 800; Warren 1980, pg 165), which implies that definitions are tautological or meaningless; and (2) the theory does not fit the facts (Lall 1975), in that industrial countries have a high penetration of foreign capital too and because some former colonies have actually done well (such as countries of Asia, Argentina, and Brazil).

Dependency theory has made a lasting contribution to the debate and understanding of the development process and the importance of domestic and foreign forces within the process. It is now widely acknowledged that the process by which some countries have become more advanced has led to the opposite outcome for others. The basic tenets of dependency theory have carried through into the World System perspective,
whereby national societies are hierarchically positioned within a larger world division of labor.

The best known proponent of the World System perspective is Immanuel Wallerstein who traced the development of capitalism since the sixteenth century (Wallerstein 1974a, 1980). He identified the world system as a social system with a single division of labor: "a world economy with territorially defined division of labor organized as a set of competing political entities with unequal power (1974a, pg 222)." Individual nations' prosperity is determined by political and economic power. No one nation can maintain control over the economy of the entire system.

Wallerstein proposed that the world was divided into not two, but three tiers: the core, periphery and semi-periphery. Core countries have diversified and well-integrated economies with complex internal divisions of labor and high productivity in manufacturing and agriculture. A relatively free, high-wage skilled labor force is the primary form of labor exploitation. In the periphery, there is a dualistic economic structure with a modern export sector of raw materials and a traditional sector of villages and remote areas where labor is recruited for the modern sector. Labor is relatively unskilled, with low wages or is politically coerced. Some areas are better linked to the outside than to other internal areas. Also, a semi-periphery exists with core and periphery characteristics, which trades with both. It is the exploited
and the exploiter. The semi-periphery is not residual but holds a functional position. It is in the process of moving up or down in the system. It provides political stability so the exploited do not unite in opposition (Wallerstein 1974b). Reproduction of the core-periphery division of labor has resulted in upward and downward mobility for individual countries. The semi-periphery allows industrialization to occur outside the core without eliminating the basic core-periphery hierarchy.

3. Economic Aid from the Dependency Perspective:

Most Latin American dependency theorists focused on foreign direct investment, not aid, for the underdevelopment of the periphery. However, a number of dependency theorists, and aid critics outside of the dependency school, have offered discussion on both general and specific means by which aid impacts negatively on the development of periphery countries. Some of the most common criticisms of aid are outlined below.

Restrictions and conditions placed on aid prevent it from substituting for any domestic economic surplus which is drained from the periphery to the core due to foreign control of export sectors and capital deficits. Aid is often used to introduce ill-suited technology, to subsidize imports that compete with domestic products, or to finance foreign investment in low priority sectors (Dos Santos 1970). Aid is often used on projects which attract foreign investment, such as roads and schools, rather than on projects which help
create domestic industries. Much aid is 'tied' to donor goods which are often over-priced (Frank 1969). Aid is also often in the form of loans, rather than grants, which must be repaid in foreign exchange from export earnings. The result may be over-specialization in export industries, rather than domestic industries (Szymanski 1981). Aid lowers the domestic marginal propensity to save which distorts domestic capital formation (Griffin 1970). Agricultural or food aid may disrupt domestic production, distribution and land tenure, which leaves a country more dependent on aid than before (Lappe et.al. 1980; Linear 1985).

Aid has also been described as a new form of imperialism which maintains political and economic control over periphery countries. It is used to increase military presence, and to ensure free access to raw materials and trade, for donor countries. Donor countries influence the conditionality policies of multilateral organizations so that any economic development in the periphery will be capitalistic and dependent upon investment capital. Bilateral and multilateral organizations often make aid conditional on policies to 'stabilize' the economy which are designed to maintain trade patterns and flows of foreign investment, to continue debt payments and to build a social and economic system resistant to revolutionary change (Hayter 1971, 1981; Hayter & Watson 1985; McNeill 1981; Szymanski 1981; Carty & Smith 1985). In essence, aid is a tool of deception which allows exploitation

In general, criticisms of aid from the dependency perspective, and other perspectives, are that it (1) distorts periphery economies; (2) attracts and supports foreign-owned industries over domestic industries; (3) helps to maintain a capitalistic system on a world-wide scale; and (4) suppresses autonomous policies of governments to control their own economies.

Robert Wood (1980, 1986) describes how these things occur via an "international aid regime" which operates at the world level. The regime is designed to ensure continual dominance of core economies over peripheral economies by exerting influence over government policies within recipient countries. Four aspects of the foreign aid regime limit control of aid and thus exert influence upon government policies: (1) the negotiation framework; (2) strategic non-lending; (3) institutionalized noncompetition and; (4) emphasis on social and physical infrastructure rather than industrial development (Baldwin 1965; Wood 1980, 1986).

Mercantilist Theory of Development

A brief review of mercantilism serves to highlight another perspective on world economic order and economic development. Mercantilism can be easily contrasted with the dependency perspective, in that the role of the nation-state
is viewed as the future's most powerful influence on international capital flows, rather than the multinational corporation. As described by Gilpin (1971), "In the dependencia model...the flow of wealth and benefits is seen as moving from the global, underdeveloped periphery to the centers of industrial financial power and decision...In the interdependent world economy of the dependencia model, the multinational corporation reigns supreme...(In) the mercantilist view, the interdependent world economy, which has provided such a favorable environment for the multinational corporation, is coming to an end...The mercantilist model views the nation state and the interplay of national interests (as distinct from corporate interests) as the primary determinants of the future role of the economy" (pg 43-45).

The terms mercantilism (Gilpin 1975), neomercantilism (Bergstein et.al. 1978), organic statism (Stepan 1978) and nation-state independence theory (Braungart and Braungart 1981) have all been used to describe this perspective. Their distinction from other perspectives or theories of development is the importance they place on domestic factors, particularly state policy, as the center of analysis. This was not the case in either liberal economic theory, nor dependency theory.

In the way of a formal definition, Gilpin defines mercantilism as "the attempt of governments to manipulate economic arrangements in order to maximize their own interests, whether or not this is at the expense of others...a
far broader (definition) than its eighteenth-century association with a trade and balance-of-payments surplus" (pg 45).

The role of foreign capital is in opposition to, and by its nature a challenge to, the nation state (Stepan 1978); a view not dissimilar to dependency theorists’. However, nation-states have and will continue to have the power to limit the "disintegrative effects" of foreign capital and to use their resources to better meet the social and economic needs of their citizens (a view more similar to liberal economic theory). Bergsten (1975), Keohane and Ooms (1975), and Stepan (1978), found overestimation of the power of multinational corporations (to help or hinder development efforts) in other theories of development.

Thus it would seem that when testing the impact of foreign aid (and other forms of foreign capital) on economic growth, three very different outcomes would be predicted by the theories reviewed here: (1) Liberal economic theory would generally predict a positive relationship between foreign capital and growth; (2) Dependency theory would predict a negative relationship; and (3) Mercantilists would have no prediction because the issue is not amount of foreign capital penetration, but the effectiveness of nation-state policies to control and capitalize on its impact.
REVIEW OF EARLIER STUDIES

Econometricians and sociologists were the first to examine the relationship between aid and economic growth using statistical techniques during the 1960s. Many studies have followed, with little unanimity on the conclusions. A review of earlier studies from both the perspective of economic theory and alternative perspectives is necessary to discern the reason(s) for the lack of consensus regarding the effectiveness of aid in contributing to economic growth in third world countries.

Studies Evaluating Economic Theories of Foreign Aid

1. Early to mid 1960s:

The earliest studies of aid effectiveness using economic theory typically used the Harrod-Domar model. Among the best known studies were Rosenstein and Rodan (1961), Chenery and Bruno (1962), Chenery and Adelman (1966), and Chenery and Strout (1966). The independent variable in these studies was total resource inflow. Aid was assumed to be a large component of the flows, and was assumed to directly contribute to capital stock. The capital-output ratio of recipient countries was assumed to be stable. From these assumptions, a country (with a growth rate determined by the quotient of its marginal propensity to save (S) and its incremental capital-output ratio (k)) would raise its growth rate from (S/k) to (S+a)/k, where a is aid as a fraction of GNP. Thus,
inflows were assumed to only increase investment.

2. Late 1960s to early 1970s:

With the 1966 development of the Chenery-Strout model, numerous studies began to appear which tested the model and its assumptions. One of the first studies was Rahman's (1968) test of the savings-growth relationship and the Chenery-Strout savings-gap assumptions. Rahman took an earlier suggestion from Trygve Haavelmo (1965), that domestic savings was not a function of income alone but was also related inversely with foreign capital inflow, and tested it more formally. Rahman used the same cross-sectional data used by Chenery and Strout (for 31 countries in 1962) and ran ordinary least squares (OLS) regression of the savings ratio on the ratio of capital inflows to GNP. The result was a significantly negative association, which Rahman interpreted as "insight into the behavior of recipients of foreign capital that is yet to be recognized, especially by those who postulate domestic savings to be a function only of national income, with the presumption that foreign capital is used only for augmenting investment and not as a substitute for domestic savings" (pg 37). Rahman's conclusions were only the first of many to come which would challenge the assumptions of the Chenery-Strout model.

Tests of the model were also performed in 1970 by Keith Griffin, and by Griffin and J.L. Enos. It was also Griffin's intention to counter the savings-gap portion of the Chenery-Strout two-gap model which advocated foreign aid to promote
economic growth. Griffin proposed that aid is essentially a substitute for savings and that a large fraction of foreign capital is used to increase consumption rather than investment. This opposed the Chenery-Strout model which was based on the assumption that any increase in foreign capital is devoted entirely to raising the rate of capital accumulation. Griffin believed his study was the first of its kind and cautioned that it was based on data of poor quality.

Nonetheless, from an OLS regression analysis of 32 underdeveloped countries, from 1962-64, and other empirical evidence cited from the Organization of American States (1968), N.H. Leff (1968), and Colin Clark (date not given), Griffin concluded that aid had not contributed to economic growth and was associated with a drop in savings. A number of reasons were proposed: aid may be biased in favor of capital-intensive technology which raises the capital-output ratio and the need for more capital; aid may lead to diversion of government funds from investment toward social programs or to lower taxes.

With Enos, Griffin again intended to disprove some of the assumptions and predictions of previous literature. Again data availability was a constraint and the authors cautioned that "our method (is) largely unscientific and suggestive rather than assertive" (pg 313). A bivariate regression analysis was performed on fifteen less developed countries from 1962-64. The result was a non-significant association
between aid and growth. An OLS regression analysis on twelve Latin American countries from 1957 to 1964 found a significantly negative association between aid and growth. By their interpretation, aid not only did not help growth, it could lower growth. It was their conclusion that an extra dollar of aid is associated with a rise in consumption of about seventy-five cents and a rise in investment of only about twenty-five cents. "Our contention is that capital imports, and particularly direct private investment, hinder the development of local entrepreneurship" (pg 324).

Griffin and Enos disputed the assumption that foreign aid relieves a country's savings constraint, thereby permitting and encouraging the country to invest more in capital goods than its domestic savings rate would ordinarily allow. This assumption is a major part of the foundation of the "two-gap" model of growth from Chenery and Strout (Over 1975).

The following year several comments on Griffin's work were published, followed by his reply. The first comment (Kennedy and Thirlwall 1971), criticized Griffin on several counts, including: (1) Griffin too hastily assumed a causal relation between foreign capital and savings, and rejected the explanation that countries may receive aid because they save a low proportion of their national income; (2) Griffin improperly defined aid as the deficit on current account of the balance of payments; and (3) He improperly hypothesizes that some capital-intensive projects affect the overall
capital-output ratio for the entire economy and so concludes that foreign capital may actually reduce growth rates. Frances Stewart leveled similar criticisms, adding, "Such crude cross country analysis cannot be treated seriously" (pg 142). On his own behalf, Griffin noted his critics but countered that they had provided no empirical evidence. "If nothing else, we should be able to agree that there is a problem to be explained" (pg 157).

Challenges to at least part of the Chenery-Strout model from Rahman and Griffin were continued in a 1972 study by Thomas Weisskopf. His objective was to "test the hypothesis that the level of domestic savings in underdeveloped countries is behaviorally related not only to the level of national income, but also to the level of net foreign capital inflow" (pg 25). Weisskopf employed a model consisting of seven equations in nine variables, and three inequality constraints (which were emphasized in the two-gap literature). Time series data for at least seven years with 44 underdeveloped countries "supported the hypothesis that the impact of foreign capital inflow on ex ante domestic savings in underdeveloped countries is significantly negative...Foreign savings appear to have substituted for domestic savings" (pg 37).

In sum, most researchers during this phase seemed to agree that aid and other inflows reduced domestic savings and were used in part to increase consumption. Some also argued that aid and foreign investment had negative social and
political consequences as well. Among the most common criticisms of aid was that it was biased in favor of capital-intensive technology, had a tendency to increase subsequent need for capital, prejudiced exports, raised capital-output ratios, and decreased economic growth.

3. Mid-1970s

The methodology used by earlier researchers came under attack within the literature and studies of the mid 1970s. Previous researchers had used aggregate measures of aid and other inflows and had inferred a causal relationship from aid to savings. After correcting for these, and other problems, some third phase researchers found a positive correlation between aid and growth.

The aid-savings-growth pendulum swung in this direction with a 1975 study by A. Mead Over Jr. Over began by praising Griffin and Enos with a "refreshingly atypical examination of the sociopolitical surroundings of foreign aid whose net effect on this resource flow may turn it to the detriment of the recipient country" (pg 751). However, Over observed that the regression equation Griffin and Enos tested (whereby savings is a function of foreign aid plus the residual) was only half of a two-equation model.

The Griffin-Enos approach assumed that aid donations were not determined by the gap between necessary investment levels and insufficient savings levels, but rather according to donor interests (i.e., they assumed aid to be exogenous,
meaning the aid coefficient and the error term are independent). Over found this assumption to be naive and concluded that their use of ordinary least squares was inappropriate because aid was not independent of the error term (i.e., aid was more likely determined by savings-investment gap). Over replicated the Griffin-Enos study, using the same data but two-stage least squares rather than ordinary least squares regression. In the system of equations, aid was first taken as a function of investment levels; then savings was taken as a function of the fitted aid values from the first equation.

Over found that, contrary to Griffin and Enos' (as well as Weisskopf's) conclusions, his reestimation "firmly support(ed) the argument that aid complements growth-and even elicits an additional matching increase in the domestic savings rate" (pg 755). In the end, however, he cautioned that the raw data is "meager," the model is "primitive," and it is impossible to draw any conclusions about the more likely savings-aid-growth relationship.

Papanek (1972) had also criticized Griffin's view that aid leads to increased consumption instead of domestic savings. In Papanek’s view, one cannot say there is a causal relationship and cannot say that aid is the most important cause of declining savings. Papanek believed that almost all inflow (from aid and foreign direct investment) is directly invested, so income and savings rise. In any case, he
concluded, there must be some benefit from an increase in investment due to inflows, even if consumption also rises. Papanek also criticized Griffin for his measurement of aid and his exclusion of other factors, such as political turmoil, weather, terms of trade, influences of religion and culture on society, etc. Griffin's measurement of capital inflows should have been broken into private investment, aid, and other foreign inflows, according to Papanek.

Papanek estimated the separate effect of inflows on growth in 1973. First, he modified the Chenery-Strout model, eliminating the assumption that inflows affect growth through savings. Instead, he said inflows and savings are independent variables to explain growth. He used a cross-sectional study of 34 countries in the 1950s and 51 countries in the 1960s. The dependent variable was GDP growth rate. Aid was measured as net transfers received by governments, plus official long-term borrowing. He found that all three flows (aid, foreign private investment, and other foreign inflows) had a statistically significant positive effect on growth, and the effect from aid on growth was more significant than other factors. Also, he considered export rates, education, size of the manufacturing sector, and population, but found effects which were not significant.

By the mid-1970s aid effectiveness research had been altered in three important ways: (1) The use of total foreign capital inflows as a measure for aid was found to be improper;
Control for domestic capital formation became necessary when assessing the effects of other factors; and (3) The Chenery-Strout model was permanently modified (allowing that aid may increase consumption instead of increasing savings).

Chenery had also found that by the mid-1970’s as much as half of external resources had gone to increase consumption (Chenery & Syrquin, 1975). Chenery agreed that the Chenery-Strout model should be modified because not all of foreign capital inflows go to investment, and aid could be directed toward increased consumption (Chenery, 1979).

In 1975 Colin Stoneman tested a "new but simple model of the impact of foreign capital on the economic growth rate of poor countries." Stoneman described the impetus for his study as the "inappropriately narrow viewpoint" of related investigations (by Griffin, Griffin and Enos, Weisskopf, Papanek, and others). Stoneman criticized his predecessors for failing to distinguish between two main effects from foreign direct investment: (1) the balance of payments effect (inflows of capital enable higher investment and consumption); and (2) effects on the structure of the economy (foreign inflows induce export promotion, change the capital-output ratio, affect income distribution, etc.).

Stoneman performed ordinary least squares regression analysis for five year periods between 1955 and 1970 on a main sample of 188 countries, and several sub-samples, using the following independent variables: gross domestic investment,
net inflow on direct investment account, net inflow of foreign aid and other foreign long-term flows, and the stock of foreign direct investment. The dependent variable was annual average growth in GDP. His results "confirm(ed) the favorable impact of aid flows and domestic savings (on economic growth), but suggest(ed) that direct investment is associated with structural effects that retard growth".(pg 11). Stoneman made an important note that, like his predecessors, his model assumed a linear relationship between each of the variables and growth. "That is we can offer no opinion on the possibility that there is an initially favorable impact of foreign investment on growth, say up to 20 per cent of GNP, after which further domination has a negative effect" (pg 18).

4. The 1980s

Mosley (1980) also desegregated capital inflows, and in addition lagged foreign capital inflows by five years. With a sample of 83 countries and the time period of 1970 to 1977, Mosley performed a two-stage least squares regression with the following variables: (1) In the first equation, level of development was the dependent variable and the independent variables were savings, aid, and other foreign capital inflows; (2) In the second equation, aid was the dependent variable and level of development was the independent variable. Thus, he hypothesized that aid influenced and was influenced by a country's level of income. The effects of aid
and other inflows on growth were not significant, except for the 30 poorest countries where aid was significantly positive.

The use of level of development, rather than rate of economic growth, was a "curious substitution" in the Chenery-Strout model wherein aid influences growth, not income level (Lockwood 1990). Also, in his second equation, he implies that level of development affects aid. Yet aid was lagged for a time period before the level of development figure.

Dowling and Hiemenz (1983) commented that the question of aid effectiveness for economic development was gaining new prominence and had been the source of "vigorous debate" since the early 1970s. However, a ten-year neglect in the literature had arisen, according to Papanek (1983), not because the controversy had disappeared, but because of "general boredom with the whole issue of economic development" (pg 171).

The intention of Dowling and Hiemenz was to offer a counter-argument to their predecessors who found no general relationship between aid, savings, and growth. They focused exclusively on the Asian region to suggest that a significant and positive relationship existed between aid and economic growth in the seventies. They performed ordinary least squares regression, using the "standard explanatory variables" (aid, capital inflows and savings), plus four policy variables. Their sample covered 52 countries of the Asian region over the period of 1968-79, in three year periods.
All three standard variables were found to be positively and significantly related to growth. "These results strongly support the hypothesis that foreign aid contributes to economic growth and are roughly consistent with similar conclusions drawn by Papanek from an analysis of data drawn in the 1960s...and contradict Mosley's recent pessimistic estimates" (pg 7, 11). They also cautioned against any suggestions that they should have used the two-stage least squares approach. "The alleged bias in the least squares estimate of the coefficient on foreign aid arises because of the feedback between aid and the level of GDP...not between the growth rate in GDP and aid. There is no obvious reason why the rate of growth in GDP and the level of GDP/capita should be highly correlated at any point in time" (pg 8).

In 1987, Mosley continued his study of 'aid as an instrument of development.' As part of a fairly comprehensive investigation of aid effectiveness, Mosley considered whether aid effectiveness had changed over time and what factors were responsible for those changes. Mosley noted that he and his predecessors (by using the aid + savings + other inflows = growth equation) were in essence using a simple Harrod-Domar growth model, with investment divided into three components according to the source of finance: aid, commercial inflows from overseas, or domestic savings. It was his contention that this model was over-simplified and should also include changes in skills (literacy growth rates) and growth of export
values.

As in his previous study, Mosley chose to lag aid and other foreign inflows, but this time by seven years (rather than five). His analysis included ordinary least squares, two-stage least squares, and the Cochrane-Orcutt iterative procedure, for three time periods from 1960 to 1983. From OLS, aid had no significant relationship with growth, for the entire sample of 67 countries and for sub-samples. Only export growth retained significance throughout the twenty-year period. Mosley attributed the difference in results between he and Papanek, in part, to different data sets. They also used different measures of aid, different lag structures and a different set of independent variables alongside aid. Under both two-stage least squares (wherein aid is also a function of growth) and the Cochrane-Orcutt iterative method of estimation, aid flows remained non-significant as a determinate of GNP growth.

With John Hudson and Sara Horrell, Mosley (1987) summarized theoretical literature as "clear that if the giving of aid to a poor country depressed the savings rate or raises its capital-output ratio...there is a possibility that aid may 'immiserise' the recipient. The empirical literature suggests that this theoretical possibility has not yet materialized, in the sense that the partial regression coefficient of aid on growth is reported to be significant and positive for both the 1960s and the 1970s" (pg 616). They extended Mosley's earlier
two-stage model into a three equation system (using the same data and time periods). In the first equation, growth is a function of aid, other financial flows, savings, literacy growth and export growth. In the second equation, aid is a function of beginning per capita income, beginning mortality rate, and a dummy variable for OPEC and Arab League countries. The third equation represents change in mortality as a function of aid, beginning per capita income, and growth. The results were that aid flows were correlated with level of income, but not with growth. Aid shifted from negative to positive but was not significant.

They concluded that "it (is) impossible to establish any statistically significant correlation between aid and the growth rate of GNP in developing countries....The apparent inability of development aid over more than twenty years to provide a net increment to overall growth in the Third World must give the donor community, as it gives us, cause for grave concern" (pg 615).

In 1988 the study of foreign capital and its impact on economic growth of developing countries remained controversial (Rana and Dowling). Pradumna Rana and J. Malcolm Dowling Jr. summarized the results of previous studies as generally supporting that foreign capital is a partial substitute for domestic saving (Rahman, Griffin & Enos, Papanek, Weisskopf, etc.) but nevertheless a positive contributor to economic growth (Papanek, Stoneman, Dowling & Hiemenz, etc.).
Among their criticisms of earlier studies were that growth performance should include domestic savings, foreign capital, and export performance as explanatory variables; while foreign capital, per capita income, growth rate and export performance are important determinants of savings. Also, previous studies "considered only the direct effects of exogenous variables...total effects (direct plus indirect) could, therefore, be quite different from direct effects alone" (pg 4).

They tested a simple two-equation model: (1) growth = aid + foreign private investment + savings + export growth + change in labor force; and (2) savings = aid + foreign private investment + export growth + GDP per capita + GDP growth. The two-equation model was estimated by the indirect least squares technique. The data was pooled cross-section and time-series data from nine developing Asian countries during 1965-1982, using three year averages. The model was then estimated by the Fuller Battese technique. Foreign investment and growth of labor force were positively and significantly related to growth. From the second equation, only per capita GDP was statistically significant in its relationship with savings.

"The major finding of the paper is that foreign capital flows have made a positive contribution to the growth of Asian developing countries. While foreign direct investment has contributed to growth both by augmenting resources available for capital formation and by improving investment efficiency,
foreign aid has contributed only by aiding in capital formation" (pg 9).

A 1989 study by Jacques Morisset focused exclusively on the relationship between foreign capital inflows and domestic savings in Argentina. Previous studies were criticized for not specifying the savings function which underlies the foreign capital flows-domestic savings relationship, and assuming a causal relationship between the two. "Empirical results may actually be a consequence of exogenous factors, and therefore the econometric results should not be systematically interpreted as the impact of foreign capital inflows on domestic savings" (pg 1709). A savings function for Argentina was derived from economic theory and literature. The short-run savings function indicated that savings was a function of GDP, foreign capital inflows, the real interest rate, the inflation rate, and consumption. Results from OLS (1960-81) did not support the substitution hypothesis which assumes the foreign capital crowds out savings by allowing domestic residents to consume more. "We can conclude that the mid-specification of the savings function in previous studies resulted in over-estimating the impact of foreign capital on savings for Argentina" (pg 1713).

5. The 1990s

In 1990, Daniel Landau used the 'public choice approach' to study aid effectiveness. The approach applies the same basic assumption that is used in the study of consumers and
producers to political decision makers. "Decision makers in the public sector are assumed to be trying to maximize their personal benefits similarly to consumers and firms" (pg 559). His hypothesis was that governments would be motivated by aid to reallocate resources to create more transfers/rents, which would limit aid effectiveness but would not slow economic growth. Growth rates were calculated in 5, 7, 9, 11, and 13 year averages for 63 less developed countries. Independent variables included growth rate of world GDP, lagged level of per capita income, enrollment rates in three levels of education, share of government expenditure on goods and services, aid, and population growth rate.

"The results are consistent with the hypothesis. The coefficient for aid changes markedly in the positive direction when government consumption expenditure is held constant" (pg 565). Their conclusions were as follows: (1) aid is used directly on projects that further economic growth; (2) growth-promoting effects of aid are negated by reaction of recipient governments to increase rent/transfer-creating government activities. However, they cautioned that the statistical results were not strong and "there are a myriad of reasons why further research could overturn even these modest results" (pg 565).

The trio of Mosley, Hudson and Horrell continued their study of the matter and published "Aid Effectiveness and Policy" in 1992. They offered an important reminder that
"despite bleak macro evidence on the performance of aid so far, all prescriptions...concur in recommending that problems can be eased only if there is an increase in aid flows. It is urgent to ascertain whether this represents a potentially meaningful strategy, or simply the triumph of hope over experience" (pg 170). Their study differed from its predecessors in a number of ways: (1) It used data for most of the 1980s; (2) It explicitly addressed the impact of policy regime on aid effectiveness; and (3) It examined changes in aid effectiveness status between decades to look for a pattern in the changes.

They began with an OLS regression analysis of possible determinants of GDP growth rate (aid, other inflows, savings, exports, literacy, and a policy openness dummy variable) using a 9 year average for the 1980-88 time period on 71 developing countries. Aid and other foreign inflows were lagged by seven years. Aid was found to be positive and significant ("for the first time according to our measurements"), as well as savings and export growth; other inflows and the policy openness dummy variable were positive but not significant.

Next they split the scatter of aid and growth observations into four quadrants (divided by growth and the aid/growth ratio), labeled high aid-high growth, high aid-low growth, low aid-high growth, and low aid-low growth. The quadrants represented 'stages of aid effectiveness' through which countries move from near-subsistence levels (low aid-low
growth) to graduation out of the need for aid (low aid-high growth) in a counter-clockwise manner over time. The existence of countries in all four quadrants simultaneously, they hypothesized, could explain the often non-significant aid coefficients found in linear regression tests. Admittedly the model ignored the non-aid influences on growth which were controlled for in the regression analysis. Nonetheless they compared the first set of results by quadrant with a second set of quadrants for the time period of 1970-80 to find if indeed countries had progressed in an anti-clockwise manner. They found that, counter-clockwise movement dominated clockwise movement from one decade to the next. Particular attention is needed, they noted, for those countries which moved in a clockwise manner.

Studies From Dependency & World Systems Perspectives

"The attempt to transform dependency into a 'theory of Latin American underdevelopment' and in some cases even into a theory of underdevelopment in the whole of the periphery, was bound to succumb to the temptation to elaborate a corpus of formal and testable propositions which could by themselves explain the 'laws of motion of dependent capitalist underdevelopment.' Similarly, the attempt to construct a theory of this nature was bound to appear a seductive challenge for that part of the North American academic world which is ever anxious to consume unidimensional hypotheses referring to clearly established variables. While some are concerned to contribute to making the theory of underdevelopment consistent and operational, and therefore to seek to identify as clearly as possible a set of empirically testable hypotheses, with the aid of which they could construct a continuum running from 'dependence' to 'independence', others wish to demonstrate that this 'theory' has no 'scientific status', as it has not constructed to date a model whose hypotheses pass the various tests of significance" (Palma, 1978, pg 905).
Categorizing studies of the foreign capital (or aid) impact on economies of less developed countries by their theoretical perspective can generally be done quite easily. Studies from the dependency perspective and studies from the perspective of economic theory are found in different journals, by different authors, sometimes with little reference to the other. While researchers of dependency theory more often referred to the ‘other school’ than did their counterpart economists, the focus was more on contradiction than integration. And although their predictions regarding various relationships between domestic and foreign economic variables have many times been similar, they have not merged into a single stream of research.

One of the earliest studies of foreign capital in less developed countries from the dependency perspective was written by Paul Stevenson in 1972. His study attempted to "identify the impact of American direct investment in Latin America and American foreign aid to Latin America upon the economic growth rate of such countries...This study attempts to identify what variables seem to be preventing Latin America from reaching its economic growth goal" (pg 347). Stevenson used data from seven Latin American countries for the time period of 1961 to 1967. His independent variables were direct investment from the United States, direct capital outflow to the US, and foreign aid from the US (including military aid). The dependent variable was economic growth rate. His analysis
included simple rank order correlations, partial correlations and multiple correlations.

The results from multiple correlation found that from 1961 to 1967 the amount of direct investment had increased, as well as the private capital outflow to the US. The two variables had a strong negative relationship with economic growth in 1967 and a weak negative relationship in 1961. Stevenson concluded that the results indicated limited support for the 'neo-Marxian' position (whereby investment and aid are detrimental to development). "American direct investment and American foreign aid were not positively associated with the economic growth rate of seven major Latin American countries, with the exception of Mexico, vis-a-vis direct investment" (pg 355).

The following year Tyler and Wogart also looked at the middle 1960s data in a cross-sectional analysis of 39 less developed countries. Their three measures of economic dependency were the ratio of foreign trade to GNP, the percentage of total exports represented by the two major commodities, and the ratio of exports going to the two major markets to total exports. The consequence examined was income inequality and the authors found via bivariate regression that dependency was negatively related to the percentage share of national income received by the poorest 20 percent and poorest 60 percent and that dependency was positively related to the percentage of income going to the richest 5 percent of the
population. The findings were consistent with dependency predictions, but low percentage of variance explained suggested that factors other than economic dependence are important in determining income distribution (McGowan and Smith, pg 197).

In 1975, Kaufman, Chernotsky and Geller performed what they termed as a 'preliminary test of dependency theory.' They "attempted to cull from the burgeoning theoretical literature a variety of disprovable, bivariate propositions which we operationalized and tested in the Latin American setting" (pg 303). Their propositions covered the impact of dependency on land tenure structures, income distribution, balance of trade, levels of unionization, voting turnout, constitutional stability, and levels of militarism. Also they propositioned that, "countries with high levels of economic dependency are likely to have low rates of economic growth." Their operational measures of dependency tapped the extent of foreign involvement in Latin American economies, the degree to which a single metropolitan country dominates the flow of trade and the diversification or concentration of the 'satellite' export structure. The time period used to test their proposition about growth rates was 1961-1969. Contrary to their proposition, growth rates were positively associated with dependency indicators (from correlation matrices and multiple regression). From that and other results, they hypothesized that "if dependency produces inequality, it may
well do so indirectly, through the stimulation of economic growth (and capital formation)" (pg 320). Overall, their results were mixed. They concluded that "the article shifts the burden of proof onto the shoulders of proponents of dependency theory" (pg 329).

According to Palma, the most sophisticated empirical study of this kind (as of 1978) was that of Christopher Chase-Dunn in December of 1975. The research employed was panel regression analysis which used 1950 and 1970 as its points in time (the number of cases ranged from 24 to 46). The dependent variables were per capita income, kilowatt hours of electricity consumed and the percent of males not employed in agriculture (all measures of economic development). The independent variables included international economic dependence per capita (measured as the profits made by foreign direct investment in the host country) and debt dependence per capita (external public debt). Domestic capital formation (savings), as a percent of GDP and specialization in mining were used as two control variables.

Chase-Dunn found that debt dependence did not facilitate economic development, and there was weak evidence that it retarded it. There was some support for the hypothesis that dependence caused unequal distribution of income. He concluded that "dependency theory must be taken seriously as an explanation for uneven development in the world economy...Foreign capital must be seen as a form of control as
well as a flow of resources" (pg 735). The reasons for the results, he thought, were that dependent countries are not able to appropriate their own surplus capital for investment in balanced development; Transnational corporations, operate for their own good, and use political and economic influence to keep labor costs and taxes low and to maintain the conditions for their continued profitable operation. "This growing awareness of the core-periphery contraction and the effects of dependence may be the beginning of a political process which eventually will modify the grossly uneven development of the world economy" (pg 736).

A 1976 study by Szymanski continued the investigation of dependency theory. Economic growth rates of Latin American countries were compared to those of some developed capitalist countries for the 1960-1972 time period. Latin American rates were significantly lower. Bivariate rank-order correlation coefficients on US aid to Latin America were compared against a measure of overall structural aid dependency (accumulated US aid from 1945 to 1974, divided by 1960 GDP). A positive but non-significant correlation was found between aid and economic growth for 19 countries. He concluded that neither dependency theory, nor liberal economic theory, could be completely supported. "One of the most interesting findings is that within the class of dependent countries the greater the dependence, the more rapid the rate of growth, even though the more dependent countries as a class are growing more slowly
than the non-dependent countries" (pg 53).

Szymanski characterized the results of his and previous studies of dependency as mixed: "Chase-Dunn showed more or less unconditional support of dependency theory; Stevenson (like Szymanski) correlates measures of dependence of Latin American countries with rates of growth (and finds) mixed evidence in favor of the dependency theory; three other studies (Griffin and Enos, Kaufman, et al., Tyler and Wogart) concluded merely that dependency theory should not be rejected, since they were unable to find strong support for the thesis that dependency promotes clear and consistent economic development" (pg 54).

Rubinson (1977) contributed to the study by attempting to study intervening structural changes thought to produce a negative effect on economic growth. The purpose was to specify the negative relationship between dependence and growth by studying the role of state strength. Two relationships were tested: the effect of dependence on state strength and the effect of state strength on economic growth. Dependency should have a negative effect on state strength and state strength should have a positive effect on economic growth, if the theory is correct. Dependence was measured as the value of imports and exports (high trade indicates high dependence), export partner concentration, external public debt, and value of debits in investment income (profits made by foreign direct investment in a country). State strength
was measured by government revenues of a state as a proportion of GNP. Panel regression analysis was used, whereby the dependent variable was measured at 1955 and at 1970, and the independent variables were measured at 1955. The number of countries in the equations varied from 39 to 45. Among the findings was that two measures of dependence (export partner concentration and external public debt) negatively effected state strength, but the other two measures of dependence did not. The relationships were the same for rich countries as well. As for the effect of state strength on economic growth, it was positive and strong for poor countries; positive and weak for richer countries. They concluded that "most forms of economic dependence did have negative effects on economic growth and on state strength" (pg 24).

After reviewing many of the previous studies of dependency theory, McGowan and Smith (1978) found that cumulative evidence provided thusfar was not clear-cut enough to warrant policy recommendations. Their study introduced the variable of economic development potential in an effort to "expand our knowledge of the analytical usefulness of the concept of economic dependency itself and also the mechanisms through which dependency affects tropical African performance. The variable was operationalized as a state's known natural resources, capital, labor and technology.

Their first test of dependency theory found that the percent of bilateral foreign aid from the major donor, and the
three leading commodity exports as a percent of the total, were unrelated to a battery of 23 indicators of economic performance. However, there were many large and moderate positive correlations between economic performance and total trade value. Next they specified competing three-variable models relating economic dependency to economic performance and development potential. Thirty tropical African states were studied in the middle and late 1960s. Their analysis included bivariate analysis, multivariate analysis, and regression analysis. Little support was provided for the dependency based models.

In 1983, Kick and Conaty identified political and economic characteristics of Africa that were tied to postcolonial processes, including the penetration of Eastern and Western bloc states, and China. Two central contentions were presented: (1) Colonial Western hegemony was replaced by even more pervasive Western, Eastern and Chinese competitive influences over control of African political economy; and (2) The external influence encompassed penetration effects that, depending on the source and time, alternately heighten or impede economic development in African countries. For 31 African countries they measured economic development as per capita income as the dependent variable. Independent variables included stock of Western foreign direct private investment (circa 1967, divided by 1965 GNP) which indicates foreign capital dependency; total net Western loans and grants
(1960-1966 divided by 1965 population) which indicates debt and grant dependence; grants and credits from the Eastern bloc and China; total foreign debt in 1967 (divided by 1965 GNP) to adjust for the effects on development of undifferentiated debt stock; annual military expenditures; and internal and extranational warfare in Africa. Among their results was the finding that "Western investment and aid in the longer run have virtually no, or slightly negative, effects on per capita national wealth. Development depressing tendencies also appear to emerge for the longer-run impact of Chinese and Eastern bloc aid and for recent military expenditures. Economic development is encouraged in the short term by Eastern bloc assistance and in the longer run by military expenditures and undifferentiated debt stocks" (pg 283).

Bela Balassa (1985) reviewed the variety of interpretations of dependency theory and analyzed the key propositions that had been common to most writings on the subject. One of the 'principal tenants' of dependency theory identified by Balassa concerned the role of foreign capital. According to Balassa, dependency theory proposed that "foreign capital is increasingly directed to developing countries in search of high profits, which are then repatriated, counteracting the tendency of the declining rate of profit and permitting the payment of high wages to labour in the industrial countries" (pg 266). In contradiction to the proposition, Balassa found the share of the developing
countries in the direct investment abroad of the US declined continuously during the post-war period. Latin America had a decline much in excess of the developing-country average. New investments in the developing countries also declined in relation to domestic investment in the US. Also, there was no evidence of super-profits being made in Latin America by US firms. From these findings, and investigation of other 'tenants' of the theory, Balassa concluded that "the propositions which have been put forward by dependency theorists do not stand up to scrutiny" (pg 270).

The recent experience of East Asian newly industrialized countries raised new questions about the development process and the roles of policy and foreign investment in the economic transactions between core and peripheral countries. Simeon Hein (1992) presented a model of the way in which national trade strategy, foreign investment, and economic growth might interact. First, he assumed that a policy of autonomous development in Latin America leads to an inward-oriented economy based on import substitution, and that outward-looking Asian countries seek economic interaction with the international economy which leads to growth. These two assumptions were used as a simplified hypothetical model to describe Latin American and East Asian development. The two policies of import substitution and export-led growth repel or attract foreign investment which he expected to affect economic growth by stimulating the domestic economy and
creating new industries.

For the time period of 1970-1973, Hein generated eight regression equations to test first the hypothesis that effects of policy, political instability and level of development explain levels of foreign investment, and second that policy, political instability, foreign investment and population growth explain per capita income growth. His results were "not consistent with prediction of the dependency theory and lent some support for the policy-development model" (pg 512). Outward-oriented economies were more dependent on foreign capital but grew faster than neutral or inward-oriented, less dependent countries. Foreign investment had no appreciable effect on growth; and political instability and population growth had a negative effect on foreign investment and economic growth. He concluded that medium-term economic growth has little to do with foreign investment and that states play a significant role in the development process. "If policy can be used to foster autonomous development, then the prospect that the state can deliberately encourage other types of development deserves further investigation ... dependency theory appears underdeveloped specifically with respect to the role of the state" (pg 514).

Comparison and Summary of Previous Studies

Overall, the results of studies testing the dependency theory have been mixed. Considering the inconsistencies in
the variables used, time periods covered, countries included in the sample, types of analysis, etc., this is not surprising. Measures of dependency have included inflow of foreign direct investment, stock of foreign direct investment, profits earned from foreign investment, inflow of foreign aid (in only three studies), total value of loans and grants, outflow of capital, total value of trade, export partner concentration, export product concentration, external debt, etc. Dependent variables studied have included economic growth, income distribution, kilowatt hours of electricity consumed, and the percentage of males not employed in agriculture.

Time periods for the studies ranged from a few years to twenty years; samples ranged from a few countries in one geographical area to a large sample of less developed countries across all geographical areas. Methods of analysis have included correlational analysis, bivariate and multiple regression, panel regression analysis, etc. Finally, researchers have interpreted their results as (1) mixed (Stevenson, Kick & Conaty); (2) neutral, such that dependency theory was not rejected (Tyler & Wogart, Kaufman et.al., Szymanski); (3) non-supportive (McGowan & Smith, Balassa, Hein); and supportive (Chase-Dunn).

There appears to be some inconsistency as to where the burden of proof lies. Results have frequently been non-significant. Some researchers have interpreted non-
significance as evidence against other theories and hence support for dependency theory. Others have interpreted non-significance as evidence against dependency theory. While interpretation of results does and should remain at the discretion of the researcher, the basis on which interpretations are drawn should be stated explicitly to control for individual bias as much as possible. This might also lead to a more consistent and methodical approach to studying development through the eyes of dependency.

As for studies which have tested economic theories of growth, the role of aid is more consistently defined. While there is some variation to the variables and approaches used, the model being tested has generally remained in the tradition of its Harrod-Domar and Chenery-Strout predecessors. All the studies of the past twenty years have used the same "basic explanatory variables" (foreign aid, domestic savings, and foreign investment). The importance of foreign exchange earnings from exports has also emerged in studies over the past seven years, which is consistent with the two-gap theory and was most likely brought into focus by the export-led growth of newly industrialized countries.

A more detailed summary of studies of foreign capital and economic growth from the perspective of liberal economic theory is given in Table 1. It is from this theoretical and empirical tradition that the 'initial' model of this study has been selected. The methodological approach, data sources, and
estimation methods are explained in the following chapter.
### TABLE 1

**PREVIOUS STUDIES OF FOREIGN CAPITAL AND ECONOMIC GROWTH**

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Design DV</th>
<th>IV</th>
<th>Variables of Significance</th>
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<tr>
<td>Rahman</td>
<td>n=31 LDC</td>
<td>1962 OLS</td>
<td>S Y,TI</td>
<td>TI -</td>
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<tr>
<td>1968</td>
<td>1962</td>
<td>S</td>
<td>Y,TI</td>
<td>TI -</td>
</tr>
<tr>
<td>Griffin</td>
<td>n=32 LDC</td>
<td>1962-64 OLS</td>
<td>S CAD</td>
<td>CAD -</td>
</tr>
<tr>
<td>1970</td>
<td>1962-64</td>
<td>S</td>
<td>CAD</td>
<td>CAD -</td>
</tr>
<tr>
<td>G&amp;E</td>
<td>n=12 LA</td>
<td>1957-64 OLS</td>
<td>Y A*</td>
<td>A* -</td>
</tr>
<tr>
<td>1970</td>
<td>1957-64</td>
<td>Y</td>
<td>A*</td>
<td>A* -</td>
</tr>
<tr>
<td>Weisskopf</td>
<td>n=44 LDC</td>
<td>1954-65 TS</td>
<td>S TI</td>
<td>TI -</td>
</tr>
<tr>
<td>1972</td>
<td>1954-65</td>
<td>S</td>
<td>TI</td>
<td>TI -</td>
</tr>
<tr>
<td>Papanek</td>
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<td>1955-65 OLS</td>
<td>Y S,A1,I,01</td>
<td>All +</td>
</tr>
<tr>
<td>1973</td>
<td>1955-65</td>
<td>Y</td>
<td>S,A1,I,01</td>
<td>All +</td>
</tr>
<tr>
<td>Over</td>
<td>n=32 LDC</td>
<td>1962-64 TSL</td>
<td>A* (S+A*)</td>
<td>A* +</td>
</tr>
<tr>
<td>1975</td>
<td>1962-64</td>
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<td>A* +</td>
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<td>n=188</td>
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<tr>
<td>1975</td>
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<td>Y</td>
<td>A*,S,I,IS</td>
<td>IS -</td>
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<tr>
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<td>1970-77 TSL</td>
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<tr>
<td>1983</td>
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<td></td>
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TABLE 1 (continued)

PREVIOUS STUDIES OF FOREIGN CAPITAL AND ECONOMIC GROWTH

<table>
<thead>
<tr>
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<th>Sample</th>
<th>Design DV</th>
<th>IV</th>
<th>Variables of Significance</th>
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<td>Y</td>
<td>A, S, I, L, E</td>
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<td>1960-83</td>
<td>A</td>
<td>Z, M, D</td>
<td>--&gt; A</td>
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<td>R&amp;D</td>
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<td>Y</td>
<td>A, S, I, E, W --&gt; I, W</td>
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<td>1965-82</td>
<td>S</td>
<td>A, I, E, Z, Y --&gt; Z</td>
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<td>n=60</td>
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<td>Y</td>
<td>A, Z, P, Y2, Sc, G</td>
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<tr>
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<td>1960-1985</td>
<td>OLS</td>
<td>Y</td>
<td>A, S, I, E, L, A, S, +</td>
</tr>
<tr>
<td>Mosley</td>
<td>n=71</td>
<td>OLS</td>
<td>Y</td>
<td>A, S, I, E, L, A, S, +</td>
</tr>
<tr>
<td>1992</td>
<td>1980-88</td>
<td>PO</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

S=savings; Y=GNP growth; T1=total capital inflow; CAD=current account deficit; λ*=unknown aid measure; I=foreign investment; Al=net transfers received plus long term borrowing; O1=other inflows; IS=investment stock; L=per cap GNP; WCODA; L=literacy; E=exports; H=mortality; M2=mortality change; M=labour force; PO= policy; P=population; Y2= world GNP growth; G=government expenditures.
CHAPTER III:

METHODOLOGY, DATA SOURCES, AND ESTIMATION METHODS

INTRODUCTION AND RESEARCH QUESTIONS

Previous studies which have attempted to determine the nature of the relationship between economic growth and foreign aid brought together strands of literature which originated in the fields of economics, sociology, and political science. Typically, multiple regression has been used to relate economic growth to variables brought forth from theory and from previous empirical research. Aid was then added to the list of independent variables. The effectiveness of aid in contributing to economic growth has been measured by the significance and sign of the aid coefficient, as well as by the amount of explained variance in economic growth. The aid-growth effect being tested, however, was only the 'direct' effects (Casetti, 1991, pg 1054).

The 'indirect' effect of aid on economic growth has largely been untested. That is, many previous studies have implicitly assumed that aid levels do not impact economic growth through effects on other variables that in turn affect economic growth (namely, savings, investment, and trade). An appropriate test of the aid-growth relationship should
investigate both the 'direct' and 'indirect' aid-growth relationships. (The terms 'direct' and 'indirect' effect used here are not synonymous with 'direct and indirect contribution' terminology used in Path Analysis, which has a meaning and method for measurement which is specific to the technique). Therefore, this dissertation explores three key research questions.

Research Question 1:
What is the direct relationship between foreign economic aid and economic growth?

Research Question 2:
What is the indirect relationship between foreign economic aid and economic growth?

Research Question 3:
What is the overall relationship between foreign economic aid and economic growth?

These direct and indirect relationships between aid and economic growth (separately and simultaneously) are investigated here by utilization of the expansion method (Casetti, 1972, 1982, 1986; Casetti and Jones III, 1987, 1992).
Expansion methodology is both a research technique for modifying models and a research philosophy. The technique will be detailed below. As a philosophy, "(It) carries within itself the suggestion that important theoretically grounded relationships should be regarded as building blocks of more complex theoretical structures encompassing both them and their contexts or environments...The variation of relationships across contexts should be presumed, investigated, tested for, and theorized" (Casetti and Jones, 1992, pg 3).

Previous studies on determinants of economic growth have tended to assume the stability of parameters (i.e., parametrically stable). The expansion methodology questions the stability of parameters by investigating the extent of their 'drift' across 'contextual space.'

METHODOLOGY

The theory that economic growth is generated by domestic savings, foreign investment, and trade can be represented by the mathematical structure, \( Y = S + I + T \). Because it is a substantively interpreted mathematical structure, it is also a model. In this case, it may be classified as a "Special Status Model" (Casetti, 1994), because it represents, to some extent, the endpoint of a collective body of knowledge. The relationships between economic growth and savings, investment and trade have been studied repeatedly. The expansion
methodology allows the researcher to study how these relationships vary across a context by modifying the model. As a technique for modifying a model, the expansion methodology involves the following steps:

(1) The 'initial' model is selected.
(2) The parameters of the initial model are redefined by 'expansion equations' into functions of expansion variables.
(3) A 'terminal' model is generated by replacing the expanded parameters into the initial model.

Generally speaking, the initial model represents an important relationship which has been taken from theoretical literature and empirical studies. The expansion equations model a possible contextual variation of the initial model. And the terminal model embodies the relationship and its contextual variations.

As implied earlier, the initial model expresses that economic growth may be explained by domestic savings, foreign investment, and trade (exports):

\[ Y = a_0 + a_1 S + a_2 I + a_3 E \]  \hspace{1cm} (2.1)

where \( Y \) denotes the real annual growth rate of GNP; \( S \), annual domestic savings as a percent of GNP; \( I \), annual foreign investment (foreign capital inflows) as a percent of GNP; and \( E \), annual growth rate of exports. The parameters \( a_0, a_1, a_2, \) and \( a_3 \) of the initial equation in (2.1) are then expanded as functions of aid levels:
\begin{align*}
    a_0 &= c_{00} + c_{10}A \\
    a_1 &= c_{01} + c_{11}A \\
    a_2 &= c_{02} + c_{22}A \\
    a_3 &= c_{03} + c_{33}A
\end{align*}

(2.2) \quad (2.3) \quad (2.4) \quad (2.5)

where $A$ is annual official development assistance (aid) as a percent of GNP. The expansion equations are replaced back into the initial equation in (2.1) producing the following terminal equation:

\begin{align*}
    Y &= c_{00} + c_{10}A + c_{01}S + c_{11}S.A + c_{02}I + c_{22}I.A + \nonumber \\
    &+ c_{03}E + c_{33}E.A
\end{align*}

(2.6)

A period between two variables indicates an interaction term.

Thus, the initial equation formulates the relationship between economic growth and savings, investment and exports. The expansion equations model the potential variation of the relationship between economic growth and its determinants in response to levels of economic aid.

THE DATA AND ESTIMATION OF VARIABLES

The data for use in the regressions are from the OECD's "Geographical Distribution of Financial Flows to Developing Countries: 1970 - 1990" (on diskette), and the World Bank's "World Tables: 1950 - 1988" (on magnetic tape). The number of less developed countries for the sample is sixty-seven. The time period is 1970 - 1988.
GNP Growth (Y):

The variable (Y) began as the World Bank's "constant 1980 price gross national product in local currency". It was then converted to U.S. dollars using the World Bank's annual average exchange rate. To estimate the average real GNP growth rate over 19 years, the logged GNP of 1970 was subtracted from the logged GNP of 1988, and the difference was divided by 19.

Aid (A):

Previous studies of the aid-growth relationship have operationalized foreign aid in many ways. This may, in part, explain the differences in their findings. Previous studies have at times included military assistance; excluded all donors but the United States; included non-concessionary transactions; etc.

Here, the variable (A) began as the OECD's "net disbursements of concessional assistance by DAC countries." According to OECD data consultant, Jean-Louis Grolleau, the term "concessional assistance" is synonymous with "official development assistance." "Official development assistance" as the measure of aid restricts the measure to only those foreign capital flows which contain concessionary elements and truly are donated for the expressed purpose of promoting the development of the recipient country. The OECD uses the terms aid, assistance, and official development assistance synonymously, meaning: "grants or loans (1) undertaken by the
official sector, (2) with promotion of economic development or welfare as main objectives, (3) at concessional financial terms (if a loan, at least 25 per cent grant element)" (OECD, 1992, pg A-99).

OECD data was expressed in US dollars at current average exchange rates. To compute aid as a percent of GNP, the OECD data was divided by the World Bank’s "current price gross national product in local currency," which had been converted to US dollars using the World Bank’s annual average exchange rate.

**Domestic Savings (S):**

From the World Bank, "current prices gross domestic savings in local currency" was used and divided by the Bank’s "current prices gross national product in local currency" to produce the variable (S), domestic savings as a percent of GNP.

**Foreign Capital Inflows (Investment) (I):**

From the OECD, "net disbursements of concessional assistance by DAC countries" was subtracted from "total net disbursements of financial flows by DAC countries." The difference consists of (1) private flows, including direct investment, portfolio investment, and private export credit; and (2) official flows, including public export credit and long term capital which is not concessional. The data was expressed in current prices, US dollars. It was then divided by the World Bank’s "current price gross national product in
local currency," which had been converted to US dollars using the World Bank's annual average exchange rate. The results is, I, foreign inflow (or investment) as a percent of GNP.

Trade (Exports) ($):

From the World Tables, "constant price exports, fob, in 1980 US dollars" was used. The difference between each year's export value and the previous year's value was divided by the previous year's value, to determine the year's annual growth rate.
CHAPTER IV:
RESULTS OF DATA ANALYSIS

Regression Specifications

The following notations will be used in the regression equations:

\[ \begin{align*}
Y & = \text{GNP growth rate} \\
A & = \text{official development assistance (aid) as a percent of GNP} \\
S & = \text{domestic savings as a percent of GNP} \\
I & = \text{foreign capital inflows (other than aid) as a percent of GNP} \\
E & = \text{growth rate of exports}
\end{align*} \]

All variables are averages for the time period 1970-1988 and were calculated in constant 1980 US dollars. Aid flows include flows from members of the OECD's DAC (Development Assistance Committee) only. Members of the DAC include: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the U.S.

The initial results presented refer to the equations below. A period between two variables indicates an
interaction term.

\[
Y = a_0 + a_1S + a_2I + a_3E + \epsilon \\
\text{(Eq 4.1.0)}
\]

\[
a_0 = c_{00} + c_{10}A \\
\text{(Eq 4.2.1)}
\]

\[
a_1 = c_{31} + c_{11}A \\
\text{(Eq 4.2.2)}
\]

\[
a_2 = c_{02} + c_{22}A \\
\text{(Eq 4.2.3)}
\]

\[
a_3 = c_{03} + c_{33}A \\
\text{(Eq 4.2.4)}
\]

\[
Y = c_{00} + c_{10}A + a_1S + a_2I + a_3E + \epsilon \\
\text{(Eq 4.3.0)}
\]

\[
Y = a_0 + c_{01}S + c_{31}S.A + c_{02}I + c_{22}I.A + c_{03}E + c_{33}E.A + \epsilon \\
\text{(Eq 4.4.0)}
\]

\[
Y = c_{00} + c_{10}A + c_{01}S + c_{11}S.A + c_{02}I + c_{22}I.A + c_{03}E + c_{33}E.A + \epsilon \\
\text{(Eq 4.5.0)}
\]

where \( \epsilon \) is an error term and the usual assumptions apply; namely, \( E(\epsilon_i) = 0 \), \( E(\epsilon_i^2) = \sigma^2 \), and \( E(\epsilon_i \epsilon_j) = 0 \).

Equation 4.1 is the initial model, which was taken from the traditional economic theory of growth (whereby growth is explained by domestic Savings, foreign capital Inflows, and Exports). Equations 4.2.1 through 4.2.4 are expansion equations which allow the intercept and slopes of the initial model to be expanded for consideration of direct and indirect effects of Aid on the initial model. Equation 4.3 is the initial model with expansion of the intercept only, to allow consideration of the direct effect of Aid on the initial model; that is, is Aid related to economic Growth directly? Equation 4.4, on the other hand, is the initial model with expansion of the slopes only, to allow consideration of only
the indirect effect of Aid on the initial model; that is, how does Aid modify the operation of other variables which are related to economic Growth (Savings, Investment inflows, and Exports); e.g., how does Aid enhance or lessen the relationship between Savings, Investment or Exports and economic Growth? Finally, equation 4.5 is the terminal model which reflects the expansion of both intercept and slopes of the initial equation; it allows consideration of direct and indirect effects of Aid simultaneously.

**Data Sample**

From an original data set containing ninety-seven less developed countries (as of 1970): sixteen were removed due to missing data; four were removed because of negative average economic growth over eighteen years (a reflection not of the ordinary processes of an economy but of extraordinary conditions); ten were removed which were outliers in every regression analysis, producing significant distortions in the parameter estimates; leaving a remaining sample of sixty seven less developed countries. Appendix (A) contains a list of countries in the sample and values for the dependent and independent variables.

**Heteroscedasticity**

Several tests for heteroscedasticity were performed on the residuals, on the basis of the Breusch-Pagan, Harvey, and Glejser tests, using the 'diagnos' command in SHAZAM. In
doing so, the null hypothesis that there is no heteroscedasticity, was tested. A rejection of the null hypothesis would indicate heteroscedasticity. In this case, the null hypothesis was not rejected, so there were no grounds for presuming heteroscedasticity.

Results

Table 2 provides a summary of the regression results.
### TABLE 2

**Regression Results for Total Sample**

<table>
<thead>
<tr>
<th>Equation</th>
<th>Regression Equation</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eq 4.1</strong></td>
<td>( Y = 0.032 + 0.010 S + 0.014 I + 0.041 E )</td>
<td>0.234</td>
</tr>
<tr>
<td></td>
<td>( (0.682) \ (0.258) \ (4.24)^* )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Backward Selection-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( Y = 0.034 + 0.039 E )</td>
<td>0.226</td>
</tr>
<tr>
<td></td>
<td>( (4.25)^* )</td>
<td></td>
</tr>
<tr>
<td><strong>Eq 4.3</strong></td>
<td>( Y = 0.035 - 0.065 A + 0.0002 S + 0.021 I + 0.039 E )</td>
<td>0.248</td>
</tr>
<tr>
<td></td>
<td>( (-1.04) \ (0.015) \ (3.70) \ (3.99)^* )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Backward Selection-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( Y = 0.034 + 0.039 E )</td>
<td>0.226</td>
</tr>
<tr>
<td></td>
<td>( (4.25)^* )</td>
<td></td>
</tr>
<tr>
<td><strong>Eq 4.4</strong></td>
<td>( Y = 0.029 + 0.044 S - 1.079A + 0.016 I - 0.061IA + 0.028 E + 0.489EA )</td>
<td>0.325</td>
</tr>
<tr>
<td></td>
<td>( (2.12)^* \ (2.40)^* \ (2.62) \ (-0.030) \ (1.16) \ (0.614) )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Backward Selection-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( Y = 0.030 + 0.036 S - 0.914 SA + 0.042 E )</td>
<td>0.317</td>
</tr>
<tr>
<td></td>
<td>( (2.24)^* \ (-2.71)^* \ (4.63)^* )</td>
<td></td>
</tr>
<tr>
<td><strong>Eq 4.5</strong></td>
<td>( Y = 0.025 + 0.074A + 0.056S - 1.24SA + 0.018I - 0.035IA + 0.041E + 0.125EA )</td>
<td>0.331</td>
</tr>
<tr>
<td></td>
<td>( (0.713) \ (2.10)^* \ (-2.44)^* \ (0.294) \ (-0.017) \ (1.35) \ (0.132) )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Backward Selection-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( Y = 0.030 + 0.036 S - 0.914 SA + 0.042 E )</td>
<td>0.317</td>
</tr>
<tr>
<td></td>
<td>( (2.24)^* \ (-2.71)^* \ (4.63)^* )</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** t-values are in parentheses

* Significant at the 5 percent level or better
Results from the initial model (Eq 4.1) indicate that of the variables Savings, Investment, and Export growth, only Export growth is significantly (and positively) related to economic Growth. The direct relationship between Aid and economic Growth (Eq 4.3) is found to be negative, but not significant. Of the other variables in the equation, Export growth alone is again positive and significant. From Equation 4.4, Aid does, however, significantly and negatively modify the relationship between Savings and Growth. The direct relationship between Savings and Growth also becomes significant, while Exports are significant only after backward selection. Finally, the terminal model (Eq 4.5) results in a significantly positive association between domestic Savings with economic Growth, and a significantly negative association between the interaction of Savings and Aid with economic Growth. Again, the positive association of Exports with Growth becomes significant after backwards selection.

The results provide the basis for several interpretations of the relationships between economic Growth and the variables Aid, Savings, Investment and Exports. First, the simple addition of Aid as an independent variable (Eq 4.1), which is the typical approach to investigating the aid-growth relationship, finds the effect of aid to be not significant. However, when considering Aid as a context across which the initial model varies, Aid does significantly modify the initial model.
Second, domestic Savings is positively associated with economic Growth. The association is also significant when an interaction between Savings and Aid is included. The interaction is negative and significant in its relationship with economic Growth. This may be interpreted in at least two ways: (1) There is a selection effect, whereby aid flows were distributed to the lowest savers; or (2) Aid had a negative effect on savings, which has been suggested by earlier literature on economic theories and studies of growth. The result is consistent with previous studies which found that aid did not become a net addition to domestic savings. Instead, much of it went to increase consumption, having a negative effect on savings for two reasons: (a) Governments shifted money away from investment toward social programs or to lower taxes; and (b) Although the Chenery-Strout model indicated that the capital-output ratio is constant, it actually fell because donor governments insisted on monumental projects, rather than productivity investment (or because of tied aid which brought in donor goods at above market prices and left a need for spare parts or other goods from the donor) (Griffin 1970; Griffin & Enos (1970)).

Third, Export growth is positively associated with economic growth. Unlike Savings, however, Exports loses its significance when the indirect effect of Aid is included. Also, while the interaction of Exports and Aid is positively associated with Growth, the association is not significant.
Finally, it would appear from the results, that while other foreign capital inflows are positively associated with economic growth, the association is not significant. The interaction of Aid and Investment is negative. Although the interaction is not significant in its relationship with growth, it does warrant some interpretation. Two logical interpretations include: (1) A selection effect, whereby aid flows went to countries with low levels of foreign investment but did not lead to significant levels of investment over time; or (2) Aid had a negative effect on foreign investment.

In sum, the terminal model found Savings and Export growth (after backward selection) to be significantly positive in their relationship with Growth, and found the interaction of Savings and Aid to be significantly negative in its relationship with Growth.

**Sensitivity Analysis**

The question of how much confidence may be placed on the conclusions of cross-country growth regressions was addressed by Ross Levine and David Renelt in a 1992 American Economic Review article, "A Sensitivity Analysis of Cross-Country Growth Regressions." In their article a variant of Edward E. Leamer's (1983) extreme-bounds analysis (EBA) was used to test the robustness of coefficient estimates to alterations in the conditioning set of information. "Many candidate regressions have equal theoretical status, but the estimated coefficients
on the variables of interest in these regressions may depend importantly on the conditioning set of information" (Levine and Renelt, pg 942).

The EBA here uses equations of the form:

\[ Y = \beta_1 K + \beta_A A + \beta_Z Z \]

where \( Y \) is the dependent variable; \( K \) is a set of independent variables always included in the regression; \( A \) is the variable of interest; and \( Z \) is a subset of variables chosen from a pool of variables identified by past studies as potentially important explanatory variables. The EBA involves varying the subset of \( Z \)-variables included in the regression to find the widest range of coefficient estimates on the variable of interest, \( A \), that standard hypothesis tests do not reject.

Levine and Renelt determined maximum and minimum coefficient values to examine if levels of significance and signs remain consistent for the variable of interest. If the coefficient remains significant and of the same sign at the extreme bounds, it is "robust." If not, it is "fragile." Here the variable of interest is Aid and its interaction terms. \( Z \)-variables include a subset of variables from the terminal model (Eq 5.0). There are no \( K \)-variables in this example.

Results from the sensitivity analysis are shown below in Tables 3 through 6.
### TABLE 3

**VARIABLE OF INTEREST: AID (A)**

<table>
<thead>
<tr>
<th>Sign of A Coefficient</th>
<th>Significant at 5% or better</th>
<th>t-value</th>
<th>Other Variables in the Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-1.569</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-1.127</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-1.271</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-1.038</td>
<td>S, I, E</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-1.597</td>
<td>S, I</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-1.011</td>
<td>S, E</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-1.253</td>
<td>I, E</td>
<td></td>
</tr>
<tr>
<td>+</td>
<td>.713</td>
<td>S, SA, I, IA, E, EA</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-.237</td>
<td>S, SA</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-.646</td>
<td>I, IA</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-.918</td>
<td>E, EA</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 4

**VARIABLE OF INTEREST: SAVINGS x AID (SA)**

<table>
<thead>
<tr>
<th>Sign of SA Coefficient</th>
<th>Significant at 5% or better</th>
<th>t-value</th>
<th>Other Variables in the Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>*</td>
<td>-2.147</td>
<td>S</td>
</tr>
<tr>
<td>-</td>
<td>-1.445</td>
<td>A, S</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>6.6</td>
<td>-1.871</td>
<td>S, I, IA</td>
</tr>
<tr>
<td>-</td>
<td>-1.476</td>
<td>A, S, I, IA</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>*</td>
<td>-2.740</td>
<td>S, E, EA</td>
</tr>
<tr>
<td>-</td>
<td>*</td>
<td>-2.696</td>
<td>A, S, E, EA</td>
</tr>
<tr>
<td>-</td>
<td>*</td>
<td>-2.404</td>
<td>S, I, IA, E, EA</td>
</tr>
<tr>
<td>-</td>
<td>*</td>
<td>-2.438</td>
<td>A, S, I, IA, E, EA</td>
</tr>
</tbody>
</table>
### TABLE 5
**VARIABLE OF INTEREST: INVESTMENT x AID (IA)**

<table>
<thead>
<tr>
<th>Sign of IA</th>
<th>Significant at 5% or better t-value</th>
<th>Other Variables in the Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-1.038</td>
<td>I</td>
</tr>
<tr>
<td>-</td>
<td>-.521</td>
<td>A, I</td>
</tr>
<tr>
<td>+</td>
<td>.321</td>
<td>I, S, SA</td>
</tr>
<tr>
<td>+</td>
<td>.417</td>
<td>A, I, S, SA</td>
</tr>
<tr>
<td>-</td>
<td>-.973</td>
<td>I, E, EA</td>
</tr>
<tr>
<td>-</td>
<td>-.924</td>
<td>A, I, E, EA</td>
</tr>
<tr>
<td>-</td>
<td>-.030</td>
<td>I, S, SA, E, EA</td>
</tr>
<tr>
<td>-</td>
<td>-.017</td>
<td>A, I, S, SA, E, EA</td>
</tr>
</tbody>
</table>

### TABLE 6
**VARIABLE OF INTEREST: EXPORTS x AID (EA)**

<table>
<thead>
<tr>
<th>Sign of EA</th>
<th>Significant at 5% or better t-value</th>
<th>Other Variables in the Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-.876</td>
<td>E</td>
</tr>
<tr>
<td>+</td>
<td>.141</td>
<td>A, E</td>
</tr>
<tr>
<td>+</td>
<td>.817</td>
<td>E, S, SA</td>
</tr>
<tr>
<td>+</td>
<td>.217</td>
<td>A, E, S, SA</td>
</tr>
<tr>
<td>-</td>
<td>-.057</td>
<td>E, I, IA</td>
</tr>
<tr>
<td>+</td>
<td>.467</td>
<td>A, E, I, IA</td>
</tr>
<tr>
<td>+</td>
<td>.614</td>
<td>E, S, SA, I, IA</td>
</tr>
<tr>
<td>+</td>
<td>.132</td>
<td>A, E, S, SA, I, IA</td>
</tr>
</tbody>
</table>

It is clear from the tables above that calculation of an EBA for any of the variables of interest could only yield "fragile" results, with the exception of the variable SA. The EBA on SA yields a nearly "robust" result. It can not be considered wholly robust because it is not significant at one of the "extreme bounds." 'Nearly robust,' however, seems a reasonable conclusion because EBA does result in a consistent coefficient sign, and significance in most cases. Beyond
these two findings, the tables help to clarify and reinforce the results of regressions shown in Table 2. First, Table 3 highlights the fact that Aid is always associated negatively with Growth, except in the terminal model. Thus, traditional approaches which examine Aid as a single independent variable, where only a direct effect is examined, would appear to be incomplete. Here the negative effect between Aid and Growth is indirect, through the Aid-Savings relationship.

Second, as mentioned earlier, the manner in which Savings and Aid interact to negatively associate with Growth is a nearly "robust" result. In other words, considerable confidence may be placed on this conclusion. Unfortunately, the analysis used here does not allow determination of whether the result is due to some type of selection effect (whereby aid is distributed to the lowest savers) or if there is a direct effect on saving rates from aid (as suggested by previous literature).

Third, although the result is not significant, Aid seems to weaken the impact of investment on Growth. Again, it can not be determined here as to whether aid is 'selected' for low investment sites, or if aid negatively affects foreign investment directly.

The lack of robustness found here is not surprising, as it is common to many studies of not only aid, but other explanatory variables of economic growth as well. "Many popular cross-country growth findings are sensitive to the
conditioning information set. More fundamentally, they (the results) illustrate that it is very difficult to isolate a strong empirical relationship between any particular macroeconomic-policy indicator and long-run growth" (Levine and Renelt, pg. 949).

Returning to the results in Table 2, the positive relationship between Savings and Exports with Growth is well supported by theoretical and empirical literature. Results on the primary variable of interest, however, warrant further consideration. That is, further explanation of the significance of the Savings-Aid interaction and lack of significance for the direct Aid-Growth relationship is needed.

Further Investigation

1. Negative Correlations Between Savings and Aid:

The Harrod-Domar growth model used in the 1950s and 1960s predicted that aid would have a positive effect on savings because it would cause investment to increase, which would raise domestic savings. In the 1970s, Griffin and Enos, as well as others, discovered through empirical work that the correlation between aid and savings was often negative, not positive. As mentioned in the "Results" section above, two logical explanations of the significantly negative association between the Savings-Aid interaction and Growth come to mind: (1) Aid has a negative effect on Savings; (2) More Aid goes to countries with low Savings.
Donald Snyder (1990) referred to interpretations of the first type as "revisionist." Rahman (1968), Weisskopf (1972), Chenery and Eckstein (1970), and others supported this interpretation, proposing that aid-receiving countries increase government consumption and lower tax collection efforts (called "aid-switching"). Stewart (1971) and Papanek (1972) were among the critics of the revisionist hypothesis who proposed instead that aid is distributed by need (savings levels) and/or that omitted variables are responsible for the negative correlation. Snyder summarized the two camps as follows:

The Revisionist Case: Causation runs from aid to domestic savings; aid is exogenously determined according to the political preferences and self-interest of donors, with no regard for recipient need; aid is substituted for domestic savings.

The Revisionist Critics Case: No causation from aid to domestic savings; aid is given in response to recipient need, as measured by per capita income and (possibly) the savings ratio (Snyder, pg 176).

Snyder offered a model to analyze the specific effect of foreign aid \( (A) \) on savings \( (S) \), with explicit controls for the correlated effects of per capita income \( (Z) \). The model is as follows:

\[
S = a_0 + a_2Z + a_2A
\]  \hspace{1cm} (4.6.1)

\[
A = b_0 + b_1Z + b_2S
\] \hspace{1cm} (4.6.2)

"Thus, domestic savings is a function of per capita income and foreign aid; and foreign aid is determined by need (donors are assumed to use low per capita income and/or low saving as indices of need)" (pg 176).
Snyder used ordinary least squares regression on fifty less developed countries for the period from 1960 to the early 1980s. In addition to the two equations shown above, he ran a bivariate regression with Savings as the dependent variable and Aid the independent variable. His results may be summarized as follows: (1) From the bivariate regression, Aid was negatively significant; (2) From equation 4.6.1, per capita income was positively significant and Aid was negative and not significant; (3) From equation 4.6.2, per capita income was negatively significant and Savings was negative and not significant. Snyder concluded that while the negative Savings-Aid correlation that Griffin and Enos reported for the 1960s had persisted through the 1980s, "the highly significant coefficients for per capita income in both equations and the nonsignificance for the coefficients for (aid) and (savings)...supports the Stewart variant of the model as opposed to the revisionist position" (pg 177). Snyder would not, however, totally reject the revisionist position and conceded that "there may be a moderate tendency toward aid-switching by some countries" because the aid coefficient was consistently negative.

To help lend support to either the "revisionist camp" or its critics, Snyder's model will be tested here. The results are in Table 7 below.
TABLE 7

<table>
<thead>
<tr>
<th>Equation</th>
<th>Coefficients</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eq 4.6.0</td>
<td>S = -2.03 A (-4.66)*</td>
<td>.259</td>
</tr>
<tr>
<td>Eq 4.6.1</td>
<td>S = .038 Z - 1.64 A (2.24)* (-2.97)*</td>
<td>.316</td>
</tr>
<tr>
<td>Eq 4.6.2</td>
<td>A = -.012 Z - .086 S (-3.04)* (-2.97)*</td>
<td>.357</td>
</tr>
</tbody>
</table>

* Significant at 5.0 % level or better

Within the framework of Snyder's model, the results may be interpreted as follows: (1) The strong negative correlation between Aid and Savings is reconfirmed, for the 1970-1988 time period; (2) Savings is a function of per capita Income (positively) and Aid (negatively) (which according to Snyder would mean that Aid does indeed lower Savings); and (3) Aid is a function of per capita Income and Savings (both negatively) (which according to Snyder would mean that aid is given according to recipient need as indicated by a relatively low per capita income and low domestic savings).

It appears from the results above, that there is more than a "moderate tendency" toward aid switching. Snyder warned against the validity of other studies because often foreign capital inflow was used as a proxy for foreign aid, or
net transfers received by governments plus official long-term borrowing was used, or sample sizes were small, etc. Those concerns do not apply here. The results strongly support both hypotheses as conclusively as is possible within the design of Snyder's model.

The design of Snyder's model, however, does not simultaneously address both hypotheses regarding the savings-aid relationship which are being debated. A different approach analyzes both sides of the debate more directly. One hypothesis is that aid is primarily in response to recipient need, as indicated by low savings and per capita income levels (Eq 4.6.3). The other view is that aid is determined exogenously, and causes the savings rates of recipients to fall due to aid 'switching' (as might foreign investment if it 'crowds out' domestic investment and hence savings) (Eq 4.6.4). Here, two stage least squares regression method (2SLS) is applied to the following system of equations:

\[ A = \alpha_0 + \alpha_1 S + \alpha_2 Z + \epsilon_1 \]  \hspace{1cm} (4.6.3)
\[ S = T_0 + T_1 A + T_2 I + \epsilon_2 \]  \hspace{1cm} (4.6.4)

where A is foreign aid as a percent of GNP; S is the domestic savings rate; Z is logged per capita income; and I is foreign investment. Variables in parentheses are exogenous to the system, while A and S are endogenous. The results of the 2SLS method are as follows:
\[ A = 0.200 + 0.173S - 0.029Z \quad (4.6.3) \]
\[ (0.484) \quad (-1.07) \]

\[ S = 0.284 - 4.42A + 0.794I \quad (4.6.4) \]
\[ (-4.30)^* \quad (1.42) \quad n = 68 \]

The results offer only mixed support for critics of the 'revisionist' hypothesis but strong support for 'revisionists.' From equation 4.6.3, aid is given in response to recipient need, but not as measured by low savings rates, rather by low per capita income. In fact, there is a faint suggestion that among aid recipients with low per capita incomes, more aid goes to those with slightly better savings rates, rather than worse savings rates. Secondly, from equation 4.6.4, there is clear evidence that aid is affecting savings rates negatively, presumably due to 'aid-switching.' However, foreign investment enhances domestic savings, rather than crowding it out.

Referring back to the terminal model (4.5), the most appropriate interpretation of the significantly negative association between the Savings-Aid interaction and economic Growth, is that (1) aid was given according to recipient need, as indicated by low per capita income; but (2) domestic savings rates have been significantly reduced in aid-receiving countries as a result of 'aid-switching.'
2. Lack of Significance for the Direct Aid-Growth Relationship

It is also important to investigate further the predominately negative but non-significant result for the direct Aid-Growth relationship. Non-significance for a direct aid-growth relationship is not an uncommon finding of previous studies. The simplest interpretation may be that aid flows are not large enough to have a significant effect on economic growth or are used in such a way that economic growth is unaffected (e.g., aid-switching). However, it has also been suggested that aid flows are more or less effective at generating economic growth at different levels of economic development (Mosley 1980). That is, the relationship between aid and growth should be considered within the framework of a country's level of development.

Recall that the initial model of economic growth (Eq 4.1) proposed that economic growth can be explained by domestic savings, foreign capital inflows, and exports. Only exports, however, were found to be significant, which leads to suspicion of the model itself. An alternative model to explain economic growth is the parabolic relation between per capita income and economic growth.

Casetti (1992) reviewed in detail the origins of this thesis and the empirical work which has supported it. The tendency for countries at an intermediate development level to grow faster can be supported by several perspectives. Rostow
(1960) and Kahn (1976), for instance, might explain it as the onset of the transition from pre-modern stagnation to modern exponential growth. Gershenkron (1962) proposed that latecomers to development have an advantage over their predecessors such that the more delayed the industrial development of a country, the greater the 'spurt' of its industrialization because they have the benefit of learning from their predecessors. Others (Mattews 1982; Olson 1982) explain the parabolic phenomenon in terms of retardation of economic growth in mature economies.

As summarized by Casetti, three frames of reference are used to explain the parabolic relationship. The first is the rate of application of the existing stock of scientific and technological knowledge. The least-developed countries lack the capital, socio-economic structure, or laborpower to apply much of the world's stock of knowledge and technology. The ability to use technology increases as they develop. The developed countries, with a dwindling stock of unused technologies, become dependent upon creation of new knowledge and technology for growth (Kristensen 1974; Casetti 1992). This would produce a parabolic relationship between level of development and growth rate.

The second frame of reference involves the dynamics of capital formation and investments. Least-developed countries tend to have low savings rates and low capital-to-output ratios. Both begin to rise as a country develops, producing
a phase of accelerated economic growth. Developed countries, on the other hand, tend to have a stronger preference for leisure and may divert savings toward consumption and welfare expenditures. Thus growth is slower at low and high ends of the scale.

The final frame of reference is the change in scale economies, whereby the mechanisms of increasing returns to scale and external economies which come with development, then decreasing returns to scale and external diseconomies, account for higher growth rates at intermediate development levels (Casetti, 1992, pg 25-7).

The proposed income-growth relationship may be represented by following equation: \( Y = Z + Z^2 \), where \( Y \) is average annual GNP growth and \( Z \) is the logged per capita income level of the midpoint year for the time period in question.

To investigate further the aid-growth relationship, the parabolic model will be used here as an initial equation (4.7). Expansion equations will allow for consideration of the direct relationship between Aid and growth, when per capita income has been controlled for (4.9); and consideration of the indirect relationship between Aid and growth when the interaction of Aid and income level is included (4.10); then the terminal model (4.11) will allow consideration of the direct and indirect aid-growth relationships simultaneously. The regression equations are given below:
\[ Y = a_0 + a_1 Z + a_2 Z^2 + \epsilon \]  
\( \text{(Eq 4.7.0)} \)

\[ a_0 = c_{00} + c_{10} A \]  
\( \text{(Eq 4.8.1)} \)

\[ a_1 = c_{01} + c_{11} A \]  
\( \text{(Eq 4.8.2)} \)

\[ a_2 = c_{02} + c_{22} A \]  
\( \text{(Eq 4.8.3)} \)

\[ Y = c_{00} + c_{10} A + a_1 Z + a_2 Z^2 + \epsilon \]  
\( \text{(Eq 4.9.0)} \)

\[ Y = a_0 + c_{01} Z + c_{11} Z A + c_{02} Z^2 + c_{22} Z^2 A + \epsilon \]  
\( \text{(Eq 4.10)} \)

\[ Y = c_{00} + c_{10} A + c_{01} Z + c_{11} Z A + c_{02} Z + c_{22} Z^2 A + \epsilon \]  
\( \text{(Eq 4.11.0)} \)

The sample and time period are the same as in the first regression analysis. Tests for heteroscedasticity were again performed on the basis of the Breusch-Pagan, Harvey, and Glejser tests, using the 'diagnos' command in SHAZAM. And again the null hypothesis of homoscedasticity was not rejected. The results are provided in Table 8.
TABLE 8

---------------------------------------------
Regression Results
---------------------------------------------

Eq 4.7
\[ Y = -0.116 + 0.047 Z - 0.004 Z^2 \]
\[ (1.96)^* \quad (-2.00)^* \]  \[ R^2 = 0.062 \]

Eq 4.9
\[ Y = -0.105 - 0.098 A + 0.046 Z - 0.004 Z^2 \]
\[ (-1.43) \quad (1.94)^* \quad (-2.05)^* \]  \[ R^2 = 0.092 \]

Eq 4.10
\[ Y = -0.049 + 0.033 Z - 0.177 ZA - 0.003 Z^2 + 0.026 Z^2A \]
\[ (1.32) \quad (-2.00)^* \quad (-1.60)^* \quad (1.85)^* \]  \[ R^2 = 0.134 \]

-Backward Selection-
\[ Y = 0.063 - 0.215 ZA - 0.0005 Z^2 + 0.032 Z^2A \]
\[ (-2.55)^* \quad (-2.43)^* \quad (2.41)^* \]  \[ R^2 = 0.110 \]

Eq 4.11
\[ Y = -0.040 - 0.523 A + 0.030 Z - 0.003 Z^2 + 0.011 Z^2A \]
\[ (1.80)^* \quad (1.16) \quad (-1.42) \quad (1.51) \]  \[ R^2 = 0.124 \]

-Backward Selection-
\[ Y = 0.063 - 0.658 A - 0.0005 Z^2 + 0.014 Z^2A \]
\[ (-2.48)^* \quad (-2.38)^* \quad (2.17)^* \]  \[ R^2 = 0.105 \]

Note: t-values are in parentheses
* Significant at the 5.0% level or better
## Significant at the 10.0% level or better

The ZA interaction term was removed from the terminal model as
a result of multiple regression because the minimum tolerance
level of .0001 was reached.
The results may be summarized as follows: (a) From the initial model (4.7), the parabolic relation between per capita income ($Z$) and economic growth ($Y$) is significant, indicating economic growth is positively associated with per capita income up to a point, after which time growth slows as per capita income continues to rise; (b) The direct relationship between aid ($A$) and growth, when per capita income has been controlled for (4.9) is negative and strong, but not quite significant. Note that the direct aid-growth relationship examined within the first initial model (4.1) was also negative and not significant (within an initial model which largely lacked significance); (c) The interaction terms from Equation 4.10 indicate that aid also has a significant indirect relationship with growth, through its modification of the initial model (4.7); and (d) From the terminal model (Eq 4.11) and from backward selection, direct and indirect effects of aid on growth, and the parabolic relationship between income and growth are significant.

Interpretation of the results include: (1) There is a strong parabolic relationship between economic growth and per capita income; (2) Aid is strongly and negatively associated with economic growth; (3) The Aid-Income interaction is significantly and negatively correlated with growth up to a point (refer to significance of $ZA$), after which the relationship is significantly positive (significance of $Z^2A$); and (4) When the left-hand side of the parabola is removed,
the direct and indirect aid-growth relationships continue to be significant within a single model.

Thus, further investigation of the nonsignificance found initially for the aid-growth relationship yields important results. The parabolic relationship between income level and growth appears to be a normal pattern, at least for the less developed countries in this study. Aid flows, however, alter the pattern of growth through levels of income. A particularly intriguing interpretation comes to mind; until per capita income reaches a certain threshold level, the aid-growth relationship is significantly negative (ZA from Eq 4.10). From investigation of the negative savings-aid correlation and previous literature, this may be due to significant aid-switching and inappropriate aid utilization within the poorest recipient countries and/or because during pre-takeoff stages, preparation for take-off may actually lessen economic growth for some time.

After the threshold is reached, however, aid becomes a measurably positive contributor to growth as income rises (although growth rates tend to slow as income rises) (Z²A from Equations 4.10 and 4.11).

The regression results also allow estimation of the threshold level of per capita income where the aid-growth relationship moves from negative to positive. The derivative indicates which value of per capita incomes are associated with negative and positive aid-growth
relationships:

\[
\begin{align*}
\frac{dY}{dA} &= -0.523 + 0.011 Z^2 \\
Z &= 6.895 \\
Y &= 987.64
\end{align*}
\]

where \( Z = \ln(y) \) and \( y \) is GNP per capita.

Thus, the relationship between aid and economic growth is negative where per capita income is lower than $987, and positive for countries with a higher per capita income. This may be illustrated graphically as well. From the terminal model (Eq 4.11) four graphs were generated which represent the aid-growth relationship at various levels of per capita income. Specifically, the illustrations reflect the impact of aid flows on the income-growth relationship (Figure 1) and the aid-growth relationship below the $987 threshold (Figure 2), above the threshold (Figure 3), then below, at, and above the threshold level simultaneously (Figure 4).

In Figure 1, two parabolas represent the income-growth relationship with and without aid. Growth levels are higher for countries without aid, where their income is below the threshold level; but higher with aid where income levels are above threshold level. In Figure 2, the aid-growth relationship (below threshold) is clearly negative but becomes weaker as per capita income rises. In Figure 3, the aid-growth relationship (above the threshold) is clearly positive, and becomes stronger as per capita income rises. Figure 4 shows how dramatically different the aid-growth relationship appears on different sides of the $987 threshold. The
significant difference in growth rates for countries at the same one percent level of aid, but with incomes below and above the threshold, is a result of the parabolic relationship between income and growth tested in Equation 4.7.

A summary of all results from this study and the conclusions which may be drawn from them are presented in the following chapter.
Figure 1: Income-Growth Relationship
FIGURE 2: Aid-Growth Relationship Below Threshold Income Level
Aid-Growth Relationship
Above Threshold Income Level

FIGURE 3: Aid-Growth Relationship Above Threshold Income Level
FIGURE 4: Aid-Growth Relationship by Income Level
CHAPTER V:
SUMMARY AND CONCLUSIONS

INTRODUCTION

Despite more than forty years and $700 billion dollars of foreign aid, surprisingly little is known about the impact of aid on economic growth in recipient countries. Whether reviewing theoretical literature, or previous empirical research, the aid-growth relationship remains controversial.

No single theory or model adequately explains the role of foreign and domestic capital in the growth of less developed economies. However, three 'standard explanatory variables' are found in many studies. These are foreign aid, domestic savings, and foreign investment. More recently, export growth has been added to the list of standard determinants of economic growth in less developed countries. The origins of these variables can be traced to the Harrod-Domar and Chenery-Strout models.

Studies which have focused specifically on the role of aid in economic growth most frequently test the aid-growth relationship by treating aid as an independent variable along with savings, foreign investment, and exports and employing ordinary least squares regression. The results have been
mixed, with as many non-significant results as significant results. This may be due to differences in samples, time periods, variable measures, etc., or may be due to inadequacy of the model being tested.

A basic premise of this study is that aid is not adequately tested by the 'standard' model which investigates it only as a separate independent variable, and ignores its relationship with other determinants of economic growth. The Expansion Methodology allows more effective investigation of the direct and indirect relationships between aid and economic growth by taking the 'initial' model and expanding its parameters as functions of aid levels to generate a 'terminal' model which includes both direct and indirect aid-growth relationships. In other words, the 'terminal' model generated by the Expansion Methodology, investigates not only the 'standard' direct relationships, but also investigates the indirect aid-growth relationship, vis-a-vis aid interaction with other determinants of growth.

This study was conducted on a sample of sixty-seven less developed countries, with data averaged over a nineteen year period (1970-88).

SUMMARY OF RESULTS

The results from the 'initial' model were consistent with previous studies: the direct aid-growth relationship was not significant, nor were most of the other direct relationships
in the model. Expansion of the 'initial' model, however, uncovered an indirect aid-growth relationship, via its interaction with domestic savings, which was significant and negative.

A sensitivity analysis of the result found it to be quite strong (nearly 'robust'), and reflective of either a selection effect (whereby low savings rates led to high aid levels, but not to economic growth) and/or a causal aid-savings relationship (whereby aid caused savings rates to fall due to aid-switching).

To determine the most appropriate explanation, two-stage least squares regression analysis was applied to a system of equations modeling the aid-savings relationship. The results found low per capita income, rather than low savings rates, to lead to high aid levels. Evidence that aid was affecting savings rates negatively (presumably due to aid-switching) was also found.

Thus by expanding the standard 'initial' model to consider aid interactions with other independent variables, aid was found to not be significantly associated with economic growth directly; however, aid was found to have substituted for domestic savings within aid receiving countries.

Further investigation of the aid-growth relationship was conducted by replacing the first model of economic growth with an alternative model exploring economic growth rates by level of development. This model, which originated from both
theoretical and empirical literature, proposed that countries at an intermediate development level grow faster than countries below or above that level. Previous studies have found the parabolic relationship between income level and growth to be a typical pattern. Expansion Methodology allowed investigation of whether or not aid flows altered this pattern of growth by level of income for the sample and time period covered by this study.

The results confirmed the parabolic income-growth relationship whereby economic growth is positively associated with per capita income up to a point, after which growth slows as income continues to rise. It was also found that the pattern of growth was significantly altered by aid flows. In sum, prior to the peak of the income-growth parabola (below some threshold level of income), the aid-growth relationship was negative; past the peak of the parabola (above threshold level) the aid-growth relationship was positive. The threshold level of income was found to be approximately $1,000.

Thus an additional explanation for the initially non-significant aid-growth result of this and other studies may be proposed. The aid-growth relationship varies across level of development. Therefore, investigations of a linear aid-growth relationship for all income levels find a non-significant result because, in essence, negative and positive relationships at different income levels "cancel" each other
Another important question, which was not addressed here, is if and how growth in national production translates, or fails to translate, into human development. The first "Human Development Report" by the United Nations Development Program (1990) provided a measure of human development which included three components: longevity, knowledge and living standard (measured by life expectancy, literacy rate, and the log of real GDP per capita based on purchasing power parities). Incorporation of the human development index (HDI) or other measures of important consequences from economic growth in future research are vitally important to increasing our understanding of the development process and the potential role foreign aid may play in it.

CONCLUSIONS

This study suggests the following conclusions: (1) Aid has been given in response to recipient need, proxied by per capita income level; (2) In countries with a per capita of income of less than approximately $1,000 (roughly 55% of the sample), aid has been substituted (or 'switched') for domestic savings, to the detriment of economic growth; (2) In countries with per capita income above $1,000, aid has been positively associated with growth, either because 'switching' behavior by recipient governments was reduced as income rose (allowing aid to act as a supplement to domestic capital formation rather
than a substitute), or because the effectiveness of other determinants of growth increased with level of development. It must be emphasized, however, that the results suggest these conclusions, and do not prove them.

It seems reasonable that the role of domestic policies, which may cause or prevent the substitution of aid for domestic savings is particularly important and should be investigated more specifically. This study leads to important questions which should be addressed by future research: Do domestic policies, which cause aid-switching, differ significantly with level of income? If so, can they be modified such that savings levels are maintained in the face of aid flows? At what cost, and if so, would aid (as a supplement to savings) significantly contribute to economic growth, even at low per capita income levels, or would other (perhaps yet unidentified) factors continue to constrain growth?

TRENDS IN AID FLOWS


Global aid volume did not grow substantially during the 1960s, then doubled between the early 1970s and the mid 1980s
(primarily from the DAC and the emergence of Arab donors). Aid volumes from nearly all sources, however, fell dramatically during the mid 1980s. Since then, annual aid donations have grown consistently but at a slower rate than in earlier years. Aid from Central and Eastern Europe and from the former Soviet Union have almost vanished but have been replaced to some degree by emerging developing country donors.

The United States was the primary aid donor at the beginning of the 1960s, followed by France, the UK and Germany. Japan became a major donor by 1970, along with Canada and the Netherlands. Since then, the US, France and the UK have all lowered their ODA/GNP ratios significantly. The ratios of Australia, Canada, Denmark, the Netherlands, Norway and Sweden have increased. Japan’s has remained stable. Overall, the DAC ODA/GNP ratio has remained almost constant at 0.35 percent, from 1970 to 1990.

Most of the aid has been bilateral (between seventy-five and eighty-four percent between 1970 and 1990). Multilateral aid had expanded significantly during the early and mid 1970s, but fell off in the 1980s, particularly from the US, Japan and Italy. Nordic countries and Canada have continually led DAC members in terms of the share of their aid which goes to multilateral sources.

In terms of distribution, a much larger proportion of aid went to Sub-Saharan Africa and to the Middle East (including Egypt) over the past two decades. Aid shares fell in South
Asia (especially India) and the Mediterranean, and increased only slightly in Central America. Much of the Sub-Saharan African aid came from the European Community, Nordic countries, and Canada. The US supplied much of its aid to Israel and Egypt, as well as to Africa and Central America. Japan concentrated on Asia, but also increased shares to Africa. Australia and New Zealand distributed their largest shares to Oceania and the Far East. In terms of income levels, roughly fifteen percent of DAC ODA goes to upper middle-income countries; half to low-income countries; and the remainder to the least-developed countries.

ODA now accounts for more than half of total net resource flows to developing countries. Private flows account for roughly forty percent, half of which is in the form of foreign direct investment. Sub-Saharan Africa, however, is almost totally dependent on financial assistance with one of the highest ODA/per capita ratios in the world. Yet projections of official finance requirements (to reach a target growth rate of zero) for the region in the 1990s continue to grow.

Studies which investigate and/or determine capital requirements for target growth rates in less developed countries have changed significantly since the 1960s. The models used have included the savings-gap model, the trade-gap model, and the two-gap model. Recent studies have become more sophisticated, taking interest payments on external debt into account, desegregating capital requirements by region, and
distinguishing between official and private funds. Target per capita growth rates are set to zero for low-income Africa.

A review of various projections of finance requirements for the 1990s (conducted by the World Bank, the UN, the IMF and others) was provided by Lensink and Van Bergeijk (1991). They provide an important reminder of the increasing demand for economic assistance. The projected aid requirements for the 1990s for Sub-Saharan Africa, as an example, varied around $2.5 billion annually. According to Lensink and Van Bergeijk, however, the projections are optimistic. They found that approximately $12 billion of additional official funds (roughly a doubling of ODA levels) would be necessary to halt economic decline in Sub-Saharan Africa.

"If a fundamental objective in the 21st century is to create a co-operative, sustainable world order, then development assistance will be a key tool. Aid, aid agencies, and the aid policy dialogue can play an important role in contributing to the solution of global problems..." (OECD, 1992, pg 48).

Yet, as annual aid flows continue to rise and projections for official finance requirements rise even faster, serious concerns regarding the effectiveness and importance of aid (relative to other factors) persist. "Despite the political and social energy invested in it, aid has, in itself, been a relatively unimportant direct input into the development process. Both the historical record, and a quick survey across the developing world at the present time, supports this
generalization" (Hayden, 1987, pg 3).

Without restating the historical debate over the role and impact of aid in developing countries, it is important to remain cognizant of the extent to which the debate remains unresolved. It appears as critical now as ever before to investigate carefully if and how aid may be of some substantial use to its recipients. Is the factor which most constrains aid effectiveness its quantity, its quality, the domestic policies which direct its use, or its inherent nature as an arm of foreign governments and interests? This particular study points to domestic policies as a promising avenue for investigation.

"Since the 1950s our understanding of the development process has made major advances. But we can never fully understand the consequences of any assistance activity or of intervention into complex and interdependent social systems. Our limited knowledge about how to give and use aid to contribute most effectively to development does not, however, protect us from an obligation to assess the consequences of our strategic or development assistance and to advance our capacity to understand the role of external assistance in the development process." (Ruttan, 1989, pg 421)
## APPENDIX A

<table>
<thead>
<tr>
<th>Country</th>
<th>Average Growth</th>
<th>Average Aid</th>
<th>Average Savings</th>
<th>Average Investment</th>
<th>Average Export Growth</th>
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<td>.00041</td>
<td>.62403</td>
<td>.00830</td>
<td>.03277</td>
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1971. *Change and Development* (library look up)


