THE UNIVERSITY OF CALGARY

THE EFFECTS OF EXPORT EARNINGS INSTABILITY ON DEVELOPMENT IN LESS DEVELOPED COUNTRIES

BY

JEAN ST-GERMAIN

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF ARTS

DEPARTMENT OF ECONOMICS

CALGARY, ALBERTA

MAY, 1990

THE UNIVERSITY OF CALGARY

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled, "The Effects of Export Earnings Instability on Development in Less Developed Countries", submitted by Jean St-Germain, in partial fulfillment of the requirements for the degree of Master of Arts.

P K Mitra

Supervisor, Dr. P. K. Mitra
Department of Economics

S N Alam

Dr. S. N. Alam
Department of Economics

W K D Davies

Dr. W. K. D. Davies
Department of Geography

Date May 17, 1990

ABSTRACT

Export instability has long been an issue of great concern to the Less Developed Countries, as is evidenced by its recurrent emergence in international circles. LDCs' claim that export instability has detrimental effects on their economic performance is not unanimously shared, however. Some even claim that it may have positive effects. The empirical evidence collected to date, by the two main opposing groups, leads to conflicting conclusions. The conflicting results may be mostly due to different empirical procedures. The approach followed here aims at reducing the procedures to a comparable basis.

Following a survey of the causes and effects of instability, a simple model is proposed that accommodates testing of both views, and allows direct comparison of the results obtained by adopting either approach. Empirical results seem to indicate (very) weak negative effects of export revenue instability on economic performance.

A critical assessment of the approaches here and in literature elsewhere leads to the conclusion that very little confidence may be placed in the empirical results. Nevertheless, the arguments in support of the pessimistic

view, and the lack of evidence to the contrary, suggest that a pragmatic attitude towards LDCs' instability problems may be desirable.

ACKNOWLEDGMENTS

I wish to express my profound gratitude to Dr. P.K. Mitra for his careful and perceptive guidance. His careful comments have been most valuable throughout the preparation of this dissertation.

CONTENTS

List of Tables

CHAPTER ONE

INTRODUCTION

An examination of the developing countries' economic characteristics and position in international primary commodity markets, inevitably suggests that, for most of them, even small variations in their exports earnings would reflect significantly on their economic performance. Given a lack of economic diversification, or more specifically the concentration of their economic activity in the production of primary products, the low level of sophistication of their fiscal and monetary instruments, and their great dependence on the exports of (very few) primary commodities for their foreign exchange earnings, it is clear that Less Developed Countries (LDCs) may have little flexibility to adjust to disturbances in their export sector.

It has often been alleged that instabilities in the international primary commodity markets have a detrimental impact on developing countries. Negative effects arise because of

> "...public and private problems of planning under uncertainty, risk aversion, and asymmetrical responses, all of which means that short-run transmissions of instabilities to

> developing producing countries may have high costs in terms of short- and long-run economic goal attainment".[1]

It has also been hypothesized that export instabilities may have positive effects on LDCs by inducing risk-averse economic agents to increase their savings, as a precaution against unexpected occurrences, thereby allowing higher investment and economic growth. The latter approach, directly derived from the permanent-income hypothesis, challenges the a priori arguments and findings of the conventional approach. The "conventional approach" generally refers to those writings based on a priori arguments predicting negative effects of export earnings instability on a variety of (socio-) economic indicators of development.

The empirical literature on these assumed (negative or positive) effects of export instability on the economic performance of LDCs is remarkable for the diversity of its approaches and conclusions. The diversity of approaches is illustrated, on the one hand, by the particular choice of dependent variables (economic growth, savings, investment, income...) selected to construct the hypotheses, and, on the other hand, by different methods (measures of

---

[1] Adams et al., 1981: p. 48. Negative effects also arise from a deterioration of the terms of trade. This latter aspect will not be treated here.

instability and statistical treatment)[1] adopted to test these hypotheses. This heterogeneity in methods, together with different sets of data (choice of countries, time-periods, etc.) used by each study, are major obstacles to an accurate evaluation of the relative worth of the results, and make a definitive conclusion venturesome. Moreover, some have argued that the reason for this diversity of results lies primarily in the widespread use of cross-country regression analysis (which is seen as inappropriate in this case), and that the analysis should be "shifted to a time-series basis at the level of individual countries".[2] Thus, despite a great deal of research, no unequivocal conclusion has been reached yet.

More than a decade ago, three studies have explicitly compared the conventional and permanent-income approaches.[3] These three studies, however, suffered from serious

---

[1] e.g. Some have used correlation analysis, while others have adopted a regression approach.

[2] Love, 1985; 1989b. The present trend in studying instability is increasingly towards such time-series analysis, although studies at the individual level have been done long ago, although mainly of a descriptive character at first, and only later including statistical analysis.

[3] Knudsen and Yotopoulos, 1976; Yotopoulos and Nugent, 1976; and, Knudsen and Parnes, 1975.

weaknesses in their use of instability measures.[1] The main goal of this study will be to overcome these weaknesses. To do so, an empirical investigation of the effects of export earnings instability on "development" will be conducted. This investigation will critically compare the conventional and permanent-income approaches to the study of instability, for a sample of twenty-seven LDCs over the period 1961-1983.

Although the present study is primarily interested in the potential (positive and/or negative) effects of export earnings instability on development, more precisely in investigating the relative merit of the two competing approaches, for the sake of analytic completeness and a proper evaluation of policy implications, a survey of the potential causes of export instability will also be conducted, since:

> "...before any conclusion can be drawn about the importance of export instability and the extent to which it could, or should, be controlled or stimulated, it is necessary to identify the factors responsible for instability".[2]

---

[1] See Chapter Four, Section III, for a discussion of the construction and statistical use of instability indices.

[2] Yotopoulos and Nugent, 1976, p. 338.

Chapter Two will examine the major probable causes of export instability.[1] Chapter Three will critically explore, on the one hand, the theoretical underpinnings differentiating the two main streams of arguments, and, on the other hand, the available empirical materials supporting each approach. Chapter Four will expound the method followed in my empirical investigation, the results of which will be found in Chapter Five. Finally, Chapter Six will review the major findings of this empirical endeavor, and discuss the limitations of the present study and its major policy implications.

---

[1] Unless otherwise specified, "export instability", or simply "instability", will refer to "export earnings instability".

CHAPTER TWO

THE CAUSES OF EXPORT EARNINGS INSTABILITY

The degree of instability experienced by a country has traditionally been measured by some index consisting essentially of a statistic summarizing the deviations of export proceeds from a time trend over some period.[1] In order to determine the dominant sources of instability, and to evaluate their relative importance, the usual approach has been to compute an appropriate measure of statistical association between such an index of instability and certain measurable explanatory variable(s).[2] In one of the most comprehensive studies of trade instability, and certainly the first one of such scope,[3] thirty-seven such potential causes (explanatory variables) were indentified and investigated. These can be classified in one of the following categories: the size, growth, and importance of foreign trade; the direction of exports; the composition of

---

[1] See Chapter Four, Section III, for a description of the most commonly used instability indices.

[2] For example, the t-statistic and the coefficient of determination (adjusted for the degrees of freedom) obtained from regressing an instability index on some explanatory variables.

[3] Coppock, 1962.

exports; the size of the national economy; the income level of the country; and price and monetary factors.

Although a path-breaking undertaking, Coppock's study suffered from some serious weaknesses, the most severe of which concerns his measure of instability. Indeed, Coppock's "logarithmic variance index of instability" is based on a trend removal term that depends exclusively on the first and last observations. The choice of the period of inquiry is therefore highly critical for the measurement of instability, which may be drastically affected by a minor extension or shortening of the period under analysis.[1] Other problems with Coppock's study relate to characteristics of the period (1946-58) he investigated: "for this period is riddled with factors extraneous to the sort of hypothesis he is testing".[2] These distinctive features are: the differing impact on each country of the world-wide devaluation against the American dollar in 1949; the Korean War (1950-53); and the dollar shortage of the 1950's (till 1957) and the existence of trade preferences along historical associations of countries. These problems obviously cast serious doubts on the universality of

---

[1] "Coppock's instability index (...) is an almost random estimate of instability", Glezakos, 1973: p. 671.

[2] Ady, 1969: p. 31.

Coppock's results, and on the findings of other researchers who have used Coppock's data,[1] or the log-variance index of instability.[2]

Whatever the defects, Coppock's study has stimulated a proliferation of studies on the (potential) causes (and effects) of export instability, a proliferation characterized by an extension and refinement of instability indices, and their application in an evergrowing population of studies aimed at a chosen country sample and time period(s), with a combination of explanatory variables, and data sources. This great diversity has, without doubt, greatly contributed to the conflicting (and confusing) nature of the results. Indeed, the only point about which all researchers seem to agree is that a greater degree of instability is manifested by LDCs' exports than by DCs'.[3]

---

[1] MacBean, 1966.

[2] MacBean, 1966; Leith, 1970; Erb and Schiavo-Campo, 1969; Knudsen and Parnes, 1975; Murray, 1978a; among others. It must be noted, however, that these authors have used the log-variance index, together with one or several other indexes, mainly to maintain comparability with Coppock's results.

[3] The average instability index of LDCs is consistently higher than that of DCs: Coppock, 1962: p. 138; Massell, 1964: p. 61; MacBean, 1966: p. 36; Erb and Schiavo-Campo, 1969: p. 268; Glezakos, 1973: p. 673; Naya, 1973: pp. 631-2; Mathieson, 1974: p. 319; Knudsen and Parnes, 1975: p. 64; Stein, 1977: pp. 282-3; Murray, 1978b: p. 64; Savvides, 1984: p. 608; Lancieri, 1978: p. 142.

But this is as far as the consensus goes. The moment researchers attempt to identify the most significant causes of instability, and more particularly when they try to identify why LDCs experience, on average, more instability than DCs, unanimity quickly fades away.

The remainder of this chapter will examine some of the most likely causes of instability; i.e. those that have received at least a minimum of empirical[1] and/or strong theoretical support. For each of these possible causes, a brief outline of the theoretical reasoning justifying their potential causality will be provided, together with the relevant evidence supplied by the empirical literature. I shall proceed from the most general, starting with price/quantity and supply/demand relationships, to the more specific determinants of trade instability.

---

[1] i.e. statistical significance in at least one empirical study.

I. Demand and Supply

In general terms, the degree of export earnings instability of a country is determined by supply and demand relationships. That is, the particular characteristics of the supply and demand functions associated with a country's traded goods will determine the nature and extent of fluctuations in prices and quantities, which in turn will determine whether a nation will experience relatively large or small (or virtually no) variations in export earnings. The specific nature of these supply and demand functions depend on the products traded and the economic agents involved. These economic agents, at the most aggregated level (and for our purpose), are the LDCs and the DCs,[1] and the products exported by LDCs are mainly primary products.[2]

---

[1] In 1985, low-income economies directed, on average, 52% of their total merchandise exports to industrial market economies and 41% to other developing countries; the corresponding magnitudes for middle-income economies were: 66% and 28%; and for market developed economies: 71% and 24%, respectively. World Bank, 1987: pp. 226-227.

[2] Although the percentage share of primary commodity exports in total merchandise exports has declined from 79 to 50% between 1950 to 1981 for low-income countries, and from 89 to 57% for middle-income countries, on average the export of primary products has been an important source of foreign exchange for developing countries during the sixties and seventies: World Bank, 1984: pp. 236-7.

Thus, the reason(s) for the greater degree of instability experienced by LDCs may lie in either specific characteristics of these countries (supply-side factors) or in factors related to DCs (demand-side factors), or in the nature of the products that LDCs export (demand- and/or supply-side factors). In this respect, traditionally, the basis for identifying explanatory variables has been the distinction between external and domestic causes of instability. This categorization, however, is not always unambiguous, as some explanatory variables may have influence from both the domestic and external sides, such as the "commodity concentration of exports",[1] while some explanatory variables from both the supply and demand sides may be interrelated in a way that makes attribution of causality to either domestic or external factors difficult, if not impossible.[2] Bearing these shortcomings in mind, the classification here adopted will observe the accepted

---

[1] Some shifts in the demand for LDCs' exports have been attributed to DCs substituting away from raw materials and towards synthetics, on the one hand, and, on the other hand, raw materials have been held responsible for supply fluctuations, on the basis of their vulnerability to natural contingencies such as pest, disease, and weather variability.

[2] This problem of proper specification of variables is well illustrated by commodity and geographic concentrations of export earnings occurring at the same time for a given country. This problem is most serious in the case of cross-sectional analysis of instability. See Love, 1985: pp. 245-6.

practice of distinguishing explanatory variables on the basis of structural trade characteristics.

Before proceeding to the study of the structural trade relationships that have been held responsible for export earning instability, it may be appropriate, at this point, to introduce the results of a study[1] whose purpose was to examine "the relative importance of supply and demand fluctuations in determining earnings instability",[2] and the association of earnings instability with price and quantity instability. In this study, Murray's results indicate that, for the majority of both developed and developing countries of his sample, the dominant source of export earnings instability originated from quantity fluctuations rather than price fluctuations. Noting that price and quantity variations in the same direction are caused by demand shifts, and that supply shifts cause price and quantity to fluctuate in opposite direction, Murray goes a step further and, using covariance analysis, concludes that, for a majority of LDCs, supply fluctuations contributed more to export earnings instability than demand fluctuations. As for the developed countries, his results suggest that export instability has passed from being

---

[1] Murray, 1978b.

[2] Murray, 1978b: p. 61.

supply-dominated in the earlier period (1952-1961), to be equally supply and demand determined in the later period (1962-1971).

The validity of these results, however, has been challenged by Behrman[1] on the basis that Murray's procedure was faulty. According to Behrman, only under extremely strong assumptions may Murray's results hold.[2] By relaxing these assumptions, Behrman finds that Murray's "...appropriate deduction (should be) that *demand* fluctuations dominate in almost every case".[3] Considering the seriousness of such divergence in results for policy prescriptions,[4] Behrman concludes that in order to properly determine the relative significance of demand versus supply fluctuations in earnings instability, structural relations

---

[1] Behrman, 1984.

[2] Murray implicitly assumes that the absolute values of the demand and supply slopes are identical. Behrman's analysis of the implications of this assumption is based on Porter (1970).

[3] Behrman, 1984: p. 169. Italics in original.

[4] e.g. If demand is the source of instability, price stabilization will stabilize export revenue only if demand is price-inelastic, while if supply is the source of instability, both demand and supply must be price-inelastic to obtain the same result. Brook et al., 1978: p. 81; Radetzki, 1970: pp. 6-9.

must be estimated.[1] The principal structural determinants of trade instability will now be examined.

II. Structural Determinants of Trade Instability

A. Commodity Composition

A seemingly obvious and very popular candidate for explaining the greater instability experienced by LDCs, the commodity composition hypothesis is founded on the large percentage share of primary products in developing countries' exports.[2] It is generally accepted that the prices of primary commodities are substantially more volatile than the prices of manufactures. LDCs' representatives' incessant calls for the implementation of price stabilization schemes lend support to this belief. Theoretical considerations also attribute the greater instability of export earnings to the relatively larger fluctuations of primary prices, from both the demand and supply sides.

On the output side, it is usually recognized that the supply of most primary products is more inelastic, in the short run, than that of manufactured goods, and that

---

[1] Behrman, 1984: p. 169.

[2] See note 2, page 10.

changes in supply are also more frequent, due to their greater vulnerability to pest, disease, and weather variability. Demand for primary products is known to be more price-inelastic than demand for manufactures, and shifts in demand (whether due to development of synthetics, technological change in production, competition of other suppliers, or changes in tastes and income in developed countries), have been argued to be more severe for primary commodities.[1]

> "In brief, low price elasticities combined with uncontrolled variability in demand, supply, or both provide an entirely credible explanation for sharp instability in both prices and proceeds of primary products".[2]

The evidence, however, is rather conflicting. The ratio of primary products to total exports has been found to be both positively correlated to export instability,[3] and statistically insignificant.[4] The breakdown of the primary products category into components indicates that: non-agricultural materials and export earnings instability

---

[1] Love, 1985: p. 245-6.

[2] MacBean, 1966: p. 25.

[3] Massell, 1964: pp. 59-60.

[4] Massell, 1970: p. 628; Naya, 1973: p. 639.

have been found to be both positively associated[1] and non-correlated;[2] non-food agricultural products have appeared both positively[3] and non-correlated[4] to export instability; and, finally, food products have been found to have either no effect or a negative effect on instability.[5] Thus, the tendency seems to be for food products to be the stabilizing element among primary products, which could be explained, at least partially, by the lower income elasticity of demand for foodstuffs in developed countries. Several reasons, however, have been advanced to explain the rather unexpectedly weak association between instability and the share of primary products in total exports.

One possible reason is that the largely unrelated character of supply and demand factors has resulted in their effects offsetting each other. It can also be argued that the dampening effects of institutional arrangements[6]

---

[1] Lawson and Thanassoulas, 1981: p. 204; MacBean, 1966: p. 39; Brundell et al., 1981: p. 305.

[2] Charette, 1985: p. 18.

[3] Lawson and Thanassoulas, 1981: p. 204.

[4] Charette, 1985: p. 18; MacBean, 1966: p. 39.

[5] MacBean, 1966: p. 39; Brundell et al., 1981: p. 205. Massell, 1970: pp. 626-7.

[6] e.g. Between 1960 and 1985, at least six commodities have been subject, at one time or another, of some form of control: sugar, tin, wheat, coffee, cocoa and rubber.

have been captured in the statistical findings. More importantly, however, it has recently been advanced that studies have failed to show a greater contribution of primary products than manufactures to instability in LDCs because the manufactured goods exported by LDCs are, on average, more unstable than manufactures exported by DCs.

Characteristics typical of LDCs' economies provide support to this point of view. The most important of these are, on the one hand, the "periodic shortages of raw materials, spare parts and skilled labour", and, on the other hand, the sale of "products, of which they have little experience, to markets with which they are largely unfamiliar".[1] Thus, rather than saying that primary products have not contributed more than manufactures to instability, a more accurate conclusion should be that both primary products *and* manufactures have contributed to the greater instability in export earnings of LDCs.

This view has received empirical support in the framework of the product-cycle theory of comparative advantage,[2] according to which the role of LDCs as residual

---

[1] Love, 1983: p. 788.

[2] Mullor-Sebastian, 1988.

suppliers of growth products,[1] in which they have a relative disadvantage, is responsible for the greater instability of LDCs' manufactures exports relatively to DCs' manufactured goods exports.

The low explanatory power of the commodity composition hypothesis may also be because it is only one of numerous other potential causes of instability. Another closely related, but nonetheless distinct, hypothesis, is that of commodity concentration.

---

[1] "Growth products are in the early stages of their life cycles, and their characteristics include the following: the technology used in their manufacture is relatively complex and changes frequently, product differentiation is high and protected by patents, research is important in their development, their income elasticity of demand is high, and their markets are oligopolistic. Opposite features characterize mature products." Mullor-Sebastian, 1988: p. 235, note 1.

B. Commodity Concentration

The commodity concentration hypothesis postulates that a low level of diversification, i.e. a reliance on a single commodity, or no more than a few commodities for export earnings, makes developing countries highly vulnerable to instability. Export diversification will reduce export proceeds fluctuations, since it increases the probability that variations in different directions, of each component of exports, offset each other, and that more commodities will dampen overall instability.

Verification of this hypothesis is usually conducted by testing for statistical association between an index of instability[1] and a measure of the degree of commodity concentration. The most widely used index of commodity concentration is the Gini-Hirschman coefficient (GH), which is the square root of the sum of the squares of the percentage share of export earnings provided by each commodity, or:

$$(1) \qquad GH=(\Sigma(c_i/c)^2)^{1/2}$$

where c_i is the value of exports of commodity i (defined according to one of the Standard International Trade

---

[1] See Chapter Four, Section III.

Classification levels of aggregation), in some specified year, and $c=\Sigma c_i$. The higher the degree of commodity concentration, the higher GH will be (the highest possible value is one, which occurs when a country exports a single commodity).

Empirical studies testing for (positive) correlation between concentration and instability have obtained mixed results. The degree of correlation varies from highly[1] or moderately[2] significant to "very insignificant".[3] Others have found low levels of correlation.[4]

Although the results do seem to indicate a tendency towards a positive association between commodity concentration and instability, conflicting conclusions have nevertheless been reached. Several explanations have been proposed to account for the absence of correlation found by certain studies. It has been argued that this lack of association may be due to the stabilization effect of institutional arrangements or arises because the

---

[1] Knudsen and Parnes, 1975: p. 70.

[2] Love, 1986b: pp. 245-6; Love, 1979: pp. 65-68; Massell, 1970: p. 626; Brundell et al., 1981: p. 325.

[3] Naya, 1973: p. 639; Massell, 1964: p. 55; Lawson and Thanassoulas, 1981: p. 205.

[4] Coppock, 1962: p. 104; MacBean, 1966: p. 41.

concentration is in stable commodities. Export diversification in commodities having highly correlated proceeds would also lead to an under-estimation of the degree of association between commodity concentration and instability.[1]

The use of the Gini-Hirschman index has also been blamed for the inconclusiveness of the results. Two important criticisms have been expressed. Firstly, the GH coefficient is calculated for a single year, while the instability index, with which a statistical association is tested for, is a summary statistic covering a period of at least 10 to 12 years. It has been argued that the selection of a particular year may have important consequences for the results.[2] Secondly, it has been shown that the GH coefficient is highly sensitive to the degree of aggregation of trade data,[3] which may be another important reason for the different conclusions reached.

Moreover, as Yotopoulos and Nugent have noted, it is

> "...difficult to reach unambiguous interpretations, because all such measures combine the influences of so many different factors. They include influences on the supply and demand

---

[1] Lawson and Thanassoulas, 1981: p. 201.

[2] Love, 1979: p. 63.

[3] Tuong and Yeats, 1976: p. 301.

> sides, some of domestic origin and others imposed externally".[1]

This assessment may also characterize another potential cause of instability: the geographic concentration of exports.

C. Geographic Concentration

An argument analogous to that underlying the plausible connection between commodity concentration and instability has been applied to the destination of exports.[2] That is, it has been assumed that directing exports to a small number of countries makes them more vulnerable; or that, by diversifying export destinations, changes in import demands from certain countries could be offset by variations in demand from other countries, thereby stabilizing export proceeds. There have been counterarguments suggesting potentially stabilizing effects of geographical concentration, or destabilizing effects associated with diversification.

Geographic concentration may be stabilizing if it is characterized by bilateral commodity arrangements,[3]

---

1 Yotopoulos and Nugent, 1976: p. 339.

2 MacBean, 1966; Naya, 1973.

3 Charette, 1985; Massell, 1970.

"subsidiary-parent transactions, or the existence of trade preferences".[1] Similarly, diversification may not bring about greater stability if the export earnings of different traded commodities are positively correlated[2] or if fluctuations are due to economic conditions affecting all DCs, which are the main importers of primary products.[3]

Thus, there seems to be "...no evident a priori indication as to the relation between regional concentration of exports and instability of export proceeds".[4] The measurement of geographic concentration has customarily been done using the Gini-Hirschman coefficient (GH), as given by equation 1 above,[5] where c_i now stands for the value of exports to country i. This coefficient is then tested for statistical association with an index of instability. The statistical analysis has failed to give support to expectations of either positive or negative correlation between geographic concentration and export instability. Empirical results indicate no statistically significant association. It may be

---

1 Charette, 1985: p. 15.

2 Yotopoulos and Nugent, 1976: p. 339.

3 Charette, 1985: p. 15.

4 Coppock, 1962: p. 95.

5 p. 19.

interesting to note, however, that only one study[1] has found a positive (insignificant) correlation, while all others[2] have found a negative (albeit equally insignificant) correlation between geographic concentration and export earnings instability. This "evidence" suggests that most LDCs do not suffer from directing their exports to only a few countries. As indicated in the previous sections, difficulties related to the use of the Gini-Hirschman coefficient and cross-section analysis, however, cast doubts on the reliability of the results.

Other probable causes of instability have been proposed, although they have not attracted as much attention as the ones just discussed. For the sake of completeness, however, I shall give a brief description of some of them.

D. Other Explanatory Variables

Plausible a priori arguments can be advanced to support a positive and a negative correlation between instability and the degree of openness, as measured, for example, by the ratio of exports to GDP. A larger export

---

1 Massell, 1970: p. 627.

2 Massell, 1964: p. 60; MacBean, 1962: p. 44; Naya, 1973: p. 639; Coppock, 1962: p. 98; Charette, 1985: p. 20; and Brundell, 1981: p. 308.

sector increases the possibilities of external disruptions and may make domestic stabilization policies less effective. Conversely, "participation in wider markets (may) contribute to stability".[1] The empirical evidence[2] seems to indicate that a higher degree of openness leads to stabilization of export earnings.

The size of exports has also been found to be negatively correlated with instability.[3] It has been suggested that the greater the value of exports, the lower would be their degree of commodity and geographic concentration, which in turn is assumed to decrease instability.[4] Similarly, an increase in the absolute level of exports would be accompanied by a greater number of producers/exporters, thereby decreasing the chances of supply instability.[5] This last argument, however, rests on shaky (theoretical and empirical) grounds.[6] On the one hand, production and exports are often highly concentrated

---

1 Coppock, 1962: p. 86.

2 Coppock, 1962: p. 86; Brundell et al., 1981: p. 306; Charette, 1985: p. 19.

3 Massell, 1970: p. 626; Naya, 1973: p. 639; Lawson, 1974: p. 62; Brundell et al., 1981: pp. 306-7.

4 Naya, 1973: p. 635; Lawson, 1974: p. 62.

5 Brundell, 1981: p. 303.

6 Glezakos and Nugent, 1983: pp. 380-81.

in LDCs, especially in mining countries; on the other hand, the negative correlation between size of exports and instability may show a spurious relationship, since the size of exports acts as "a proxy measure for economic size", which would be expected to decrease instability. Moreover, causality may run the other way, greater instability tending to reduce the size of exports.

Contrary to the size of exports, the market share hypothesis has received divergent empirical support. It has been found to both increase[1] and decrease[2] instability. Although seemingly conflicting, these results may indicate that some studies have measured demand variations while others have measured supply fluctuations. This would indeed be the case if a larger market share corresponded to a significantly steeper demand curve. The results would thus indicate that the relative importance of demand and supply fluctuations has varied across country samples and/or periods.

A variety of additional explanatory variables have been advanced to "explain" export instability. However, because of their tenuous theoretical basis, and a lack of

---

[1] Brundell et al., 1981; p. 307.

[2] Massell, 1970: pp. 626-7; Charette, 1985: p. 20.

adequate empirical specification, or simply because of their relative non-importance, they will merely be mentioned here.

One of these variables is the domestic consumption of exportable goods, which appears to exert a positive influence on instability,[1] fluctuations in domestic demand giving rise to variations in the net export supply curve. Instability has also been found to be positively associated with inflation and national economic instability.[2] The direction of causality, however, is uncertain. Per capita income shows a slight tendency to be negatively associated with instability,[3] suggesting that "...the greater instability of LDCs is apparently not a result of their lower per capita income",[4] given the weakness of this tendency. Finally, mention should be made of DCs' and LDCs' trade (and other) policies. Although certainly important, these are not easily quantifiable, which partially explains the little interest they have aroused in empirical studies of the causes of instability.

---

[1] Massell, 1970: pp. 622-24; Charette, 1985: pp. 20-21.

[2] Coppock, 1962: pp. 107-112.

[3] Coppock, 1962: p. 108; MacBean, 1966: pp. 34-36; Brundell et al., 1981: pp. 306-308.

[4] Massell, 1970: p. 628.

III. Summary and Conclusion

Total export revenue represents the proceeds from sale of products with heterogeneous characteristics in terms of supply, demand, and market structure. Changes in products, supply, demand and market conditions give rise to variations in export earnings. These changes originate from domestic and/or external economic, natural and other forces. Although not always reliably measurable, various structural determinants of export variability have been examined in cross-country analyses attempting to circumscribe the causes for (greater) instability in LDCs.

Bearing in mind that the results of these analyses are influenced by the particular set of countries surveyed, and by the period over which various indices are calculated, "it is not surprising that virtually no one factor has been isolated as being of fundamental importance in determining instability".[1] The relative importance of each cause is likely to vary among countries, as could be expected of the effects of instability on development, which is the subject matter of the next chapter.

---

[1] Stein, 1977: p. 286.

CHAPTER THREE

THE EFFECTS OF EXPORT INSTABILITY

In the preceding chapter, it was seen that concerns about export instability have led to an extensive body of literature on the probable causes of export instability, a literature characterized by the conflicting nature of its conclusions. The literature on the effects of export instability on development, although not quite as large as the one on the causes, also demonstrates a high degree of ambiguity in its conclusions. Moreover, contrary to the literature on causes, which is largely consensual insofar as the hypothesized causes are concerned, writings on the effects of export instability have emphasized both negative and positive consequences for development (as measured, for example, by economic growth and growth-related variables), adding to the confused state of the empirical findings.

Despite their high degree of diversity, writings that hypothesize negative effects will be grouped under the appellation "Conventional Approach" (hereafter CA). Although not all writings predicting positive effects are related to Friedman's Permanent-Income Hypothesis (hereafter PIH), only those that are will be considered in

details under PIH, primarily because of their greater formalization conducive to empirical testing, thereby making them amenable to direct (empirical) comparison with the conventional approach's results.

The greater popularity that the conventional approach has attracted seems to justify a more extensive treatment of this approach than that of the PIH. The CA has also touched upon many more economic variables, more or less closely related to development, whereas the PIH has almost exclusively studied the (potential) effects of export instability on economic growth (through its assumed effects on consumption, savings, and investment).

I. The Conventional Approach

The Conventional Approach (CA) has primarily proceeded in an exploratory manner, attempting to find which structural relationships act as transmission mechanisms of the hypothesized negative influences of instability on some specified aspect of development.[1] The relative importance assigned to each of the multiple aspects (or goals) of

---

[1] "While it has generally been assumed that export instability is harmful to growth, such assumptions have largely been based on appeals to intuition whereby the absence of models postulating relations and structures between variables is uncannily widespread, considering the importance attached to this model"; Stein, 1977: p. 286.

development has varied widely among authors (as it also certainly does among countries). It is safe to say, however, that the growth goal[1] has been perceived as the most important by the vast majority of, if not all, the development economists who have studied instability, and that it has received the most attention in the literature. No one would dispute that any classification and/or ranking of all aspects of economic development (or goals) is necessarily arbitrary. For the purpose of the following discussion dealing with the assumed negative effects of instability on development, Adams and Behrman's classification seems most appropriate.

These authors[2] identify, in addition to economic growth, four general economic goals of developing countries. These are: (a) domestic distribution of income, wealth and economic power; (b) utilization of production capacity and cyclical stability in real output; (c) price (or nominal) stability; and (d) international economic position. It is important to note that none of these goals is totally independent of one another. That is, an amelioration in any of these goals must be expected

---

1 i.e. The growth of per capita income.

2 Adams and Behrman, 1982: pp. 19-30; also Behrman, 1987: p. 559.

to have positive and/or negative effects on some or all of the other goals, with the ultimate impact on growth depending on the offsetting and reinforcing nature of these effects. Taken separately, each of these goals may be directly and/or indirectly affected by export instability.

A. Income Distribution

The direct ways in which instability in export earnings will affect income distribution depend essentially on the ownership of the (physical) factors of production. Because in LDCs the ownership of the factors is often highly concentrated, and the large majority almost always owns either very little or nothing, it is widely hypothesized that instability increases inequality: in good times, rents accrue to the owners of the factors of production, in bad times, labor is laid off and the poorest segment is the most affected (especially in view that social programs are primitive, or simply non-existent). Export instability may also indirectly influence the distribution of income by affecting the returns to factors in other sectors closely linked to the export sector.

Although income distribution is often perceived as the second most important development goal (after the growth goal), no study of the potentially negative effects of

export instability on income distribution seems to have been undertaken.[1] Income distribution has been used, however, as an explanatory variable, together with an instability index, to 'explain' savings.[2] It was found that both instability and an uneven income distribution were associated with higher savings, and thereby possibly also higher growth, assuming efficient financial intermediaries. Thus, if instability affects income distribution negatively and savings positively, then there may be trade-offs between the growth and equality goals.[3]

---

1 The lack of reliable data is certainly largely responsible for this absence.

2 Lim, 1980.

3 Lim's results, however, may not be reliable, for his instability index is calculated over a period of only five years, which is usually seen as too short a period. It must be noted, however, that savings and uneven income distribution have previously been found to be positively associated. See, for example, Williamson, 1968.

B. International Economic Position

The most important dimension of this goal is the external debt. The external debt contributes to the great dependence of the LDCs on the developed countries. Servicing the debt requires foreign exchange, which LDCs acquire by exporting (mainly) primary commodities. Variations in export earnings will directly affect their ability to meet their debt obligations and increase the degree of their dependence on the rest of the world. Indeed, instability has been found to be positively associated with external financing:

> "...export instability acts especially as a factor of external *indebtedness*".[1]

This seems especially true of the 1970s, maybe because of the high degree of international liquidity,[2] and/or because of the important changes that the international financial markets have undergone during that period.[3]

---

1 Guillaumont, 1987: p. 635. Italics in original.

2 Ibid., p. 635.

3 "Both the access of a greater number of countries to financial markets (particularly less developed nations), and the larger volume of funds available in the second period, may have given them an extra degree of freedom to cope with fluctuations in revenues". Moran, 1983: p. 216.

C. Price Stability

The inclusion of price stability among the major economic goals of LDCs is justified, not for price stability in itself, but because of the effects that inflation may have on the pursuit of the other development goals. For example, for a given money wage, inflation will negatively affect income distribution, which in turn will be "recessive in terms of aggregate demand if the marginal propensity to consume is higher out of wages than out of nonwages".[1] Inflation may also affect income growth through its negative effect on investment.[2]

Three causes of inflation have been of particular importance to LDCs: excess aggregate-demand, cost-push factors, and structural bottlenecks. All three types of inflationary pressures are susceptible to (primary commodity) export fluctuations. For example, a boom may add to cost-push wage and aggregate-demand inflationary pressures, or "reduce cost-push or structural 'devaluation inflation' by increasing the availability of foreign exchange".[3] The net result will necessarily depend on the

---

1 Adams and Behrman, 1982: p. 28.

2 Lim, 1976: p. 314.

3 Adams and Behrman, 1982: p. 28.

particular economic structure of the LDC and the policy responses. The little evidence that is available[1] indicates that there is a positive relationship between inflation and instability.

D. Capacity Utilization

Full capacity utilization is necessary to maximize production and income, and to improve the distribution of income. If accumulation of large inventories is not possible, export instability would seemingly affect the capacity utilization in the primary commodity producing sector directly, and would also affect the overall capacity utilization indirectly. A downward movement in the export sector (e.g. lower demand):

> "...may cause closings of firms and farms and labor layoffs with regressive distribution implications that would not occur with less cyclical fluctuations".[2]

Lower overall capacity utilization may in turn reduce government revenues (taxable returns of factors being diminished) and foreign exchange availability, which in turn make development planning difficult and disrupt (often essential) capital goods imports, with ultimate negative

---

1 Coppock, 1962: pp. 112-113; MacBean, 1966: p. 117.

2 Adams and Behrman, 1982: p. 25.

effects on growth. It appears that no study has tested for the relationships between instability and capacity utilization.

E. Economic Growth

Export instability has been widely perceived to be detrimental to attaining the growth goals. Its manifold influences on economic growth necessarily manifest themselves through intermediary variables. These may be found in three "sectors": the government sector, the foreign sector, and, finally, the domestic sector.[1] Certain effects may be felt directly through only one sector. Most often, however, the transmission mechanism[2] will run through a (sometimes very) complex itinerary of interrelations between the three sectors. Thus, some variables must be expected to serve as an intermediate link in more than one transmission mechanism. The most important transmission mechanisms operating in each sector will now be briefly discussed.

---

1 It must be noted that this classification is only a rough categorization of intermediary variables, the purpose of which is primarily heuristic, aimed at simplifying the exposition.

2 "Transmission mechanism" is here defined as a system of influences among a group of intermediary and (more or less) interdependent variables transmitting the effects of instability on economic growth (and/or on some other variables).

1. Government Sector

Export instability has been hypothesized to affect growth through the public sector in two ways: by inducing government revenue instability and by diverting public resources away from the growth goal.

a. Revenue Instability

To the extent that government revenues in LDCs are often highly dependent on taxes on foreign trade, such as the commonly used ad valorem export tax,[1] public revenues are seen to be subject to fluctuations along with export earnings variations.[2] Government expenditures instability is then expected to result, with negative effects on both public and private investment, the latter's rate of return being diminished due to precautionary discounting in the face of uncertain complementary public facilities.[3] The ultimate effect on growth would certainly be negative, especially in LDCs where the state is the principal agent in the development effort.

---

1 Karunasekera, 1984.

2 Helleiner, 1972: pp. 85-86; Maizels, 1968: p. 93; Lim, 1976: p. 314; Lim, 1981: p. 46; Lim, 1987: p. 318; Adams and Behrman, 1982: p. 21; Stein, 1977: p. 287.

3 Lim, 1987: p. 318.

There is some empirical evidence supporting this strand of arguments. Lim (1981) found that "export instability had only a relatively small influence on the domestic incomes and government revenues" of a group of 45 LDCs, over the period 1965-1973.[1] In a second study, over a different sample and a different time-period,[2] Lim found that export instability did produce government revenue instability, which in turn brought about expenditures fluctuations. This is, however, as far as the chain of events went, no effect being felt on investment, or on economic growth.[3] In a more recent study, Love (1989a) found that these "effects of export instability appear to be reflected slightly more in government capital expenditure than in recurrent expenditure".[4]

b. Diversion of Public Resources

The second argument concerns the diversion of public resources away from the growth (and other) goal(s) in order to cope with problems that arise from fluctuations in exports. For example, resources must be reallocated

---

1 Lim, 1981: p. 51.

2 Lim, 1987.

3 Ibid., p. 322.

4 Love, 1989a: p. 26.

towards the administration of import controls and balance of payments problems. Opportunity costs are also involved in maintaining additional reserves (and/or buffer stock schemes) "to cushion swings in exports".[1] No attempt at measuring these opportunity costs and their effects on growth seems to have been carried out.

2. Foreign Sector

There are two main channels in the foreign sector through which export instability may affect growth. These are: the fluctuations in the foreign exchange reserves and the growth of exports.

a. Fluctuations in Foreign Exchange Reserves

Apart from the administration and opportunity costs that they occasion,[2] fluctuations in foreign exchange reserves are said to affect growth adversely by causing import instability.[3] In the presence of a binding foreign exchange constraint, LDCs experiencing instability in

---

1 Wilson, 1983: p. 41. Also, Stein, 1977: p. 287; Lim, 1976: p. 314; Adams and Behrman, 1982: p. 21; Yotopoulos and Nugent, 1976: p. 330; Helleiner, 1972: p. 84.

2 See above, Section 1.b, page 40.

3 MacBean, 1966: p. 69; Yotopoulos and Nugent, 1976: pp. 329-330; Love, 1989: pp. 183-184; Helleiner, 1972: p. 86; Lim, 1976: p. 314; Voivodas, 1974: p. 410; Behrman, 1987: p. 564.

export earnings, "the principal determinant of the capacity of import",[1] will also have to cope with disruptions in imports. Assuming that imports of non-essential goods are at a minimum, import difficulties will translate in a discontinuous inflow of "noncompetitive"[2] intermediate and capital goods. This irregularity in the availability of necessary imports may in turn affect growth (and other goals) in multiple ways.

Import instability will be detrimental to growth, for example, by bringing about a lower capacity utilization and cyclical unemployment,[3] these aggregate supply fluctuations may in turn increase risk-aversion costs,[4] adversely affecting growth by discouraging investment. Investment may also be discouraged because of "cost-push inflation produced by import constraints on downswings",[5] which may create uncertainty and fear of devaluation.[6]

---

1 Love, 1989b: p. 184.

2 i.e. not, or little, produced domestically.

3 Yotopoulos and Nugent, 1976: pp. 339-340; Helleiner, 1972: p. 86.

4 Behrman, 1987: p. 564.

5 Helleiner, 1972: p. 88.

6 Love, 1989b: p. 183.

Although seemingly convincing, these arguments are not unequivocally supported by empirical studies. Voivodas, for example, found that his results:

> "...(do) not support the popular proposition that export or foreign exchange instability is detrimental to economic growth by way of the instability it imparts on the imports of capital, essential to investment".[1]

It has also been found, however, that export instability and import fluctuations are positively correlated, and that capital goods imports and investment are also positively associated, findings which may run counter to Voivodas's results, inasmuch as investment instability may be detrimental to growth.[2]

b. Export Growth

Export instability is said to lower export growth because the greater the uncertainty associated with export earnings, "the lower the incentive to allocate resources in the export sector".[3] The argument that export instability may be detrimental to economic growth by affecting export growth negatively is also related to Maizels' treatment of the Chenery-Strout two-gap model. His contention is that

---

1 Voivodas, 1974: p. 411.

2 MacBean, 1966: pp. 72-79; Love, 1989b: p. 190.

3 Yotopoulos and Nugent, 1976: p. 338.

the propensity to save may be greater in the export sector than elsewhere.[1] If so,[2] then a rise in the projected rate of export growth would reduce the ex ante savings gap as well as reducing the ex ante trade gap, which are major barriers to development. Thus, if export instability affects export growth adversely, then the ultimate effect on income growth would certainly be harmful.

It seems intuitively just as appealing, however, to 'blame' export growth for export instability, high average growth rates possibly being responsible for bottlenecks and cyclical imbalances, thus reversing both the direction of causation and the direction of association. The empirical evidence, unfortunately, is of no help in settling this question, since export growth and export instability have been found to be positively-,[3] negatively-,[4] and non-correlated.[5]

---

[1] Maizels, 1968: p. 58.

[2] For empirical evidence, see: Maizels, 1968: p. 97; Lee, 1971: p. 347; Laumas, 1982: p. 839.

[3] Savvides, 1984: p. 609; Coppock, 1962: p. 93.

[4] Glezakos, 1973: pp. 74-75.

[5] Tan, 1983: p. 222; Lancieri, 1978: p. 148.

3. Domestic Sector

In the domestic sector, export earnings instability has been hypothesized to affect economic growth primarily through its assumed negative effects on the quality and quantity of investment. These negative effects derive from "several possible reactions that follow the higher levels of uncertainty induced by export fluctuations".[1]

a. The Quality of Investment

At the microlevel, it is assumed that risk-averse behavior would discourage investors and other decision-makers from shifting away from low productivity activities and into more profitable, but riskier, ventures. For example, subsistence farmers may shy away from growing (and maybe specializing in) higher yield and more remunerative, but risky (unstable) crops.[2] This risk-averse attitude may in turn prevent, at the macrolevel, specialization "according to the principle of Comparative Advantage".[3] In the presence of instability,

---

[1] Knudsen and Parnes, 1975: p. 32.

[2] "...the possibility of starvation in a year of low receipts has an unacceptable finality to it". Brainard and Cooper, 1968: p. 259.

[3] Wilson, 1983: p. 41. Also, MacBean, 1966: p. 124; Yotopoulos and Nugent, 1976: p. 329.

producers may also wish to hold larger inventories, in order to meet unexpected demand and/or shortages, than they would otherwise. In this case, although total investment may not be reduced by export instability, it would, however, be less productive, thus preventing higher growth rates. Export instability may also deter more productive investment in other sectors of the economy if, as advanced by the CA, instability (uncertainty) in the export sector is transmitted to the rest of the economy through the multiplier and accelerator effects.[1]

b. The Quantity of Investment

The uncertainty associated with instability is also said to keep investment at a lower level than it would otherwise be in the absence of export fluctuations. Instability in the export sector, by increasing the risk of investment, also increases "risk premia on loan rates of interest and thus raises costs of capital projects",[2] thereby discouraging investment in the export sector.[3] Inasmuch as uncertainty is propagated to the rest of the economy through the multiplier effect, the cost of

---

[1] Lim, 1981: p. 46; Behrman, 1987: p. 563; Helleiner, 1972: p. 86.

[2] MacBean, 1966: p. 114.

[3] Lim, 1980: p. 360; Behrman, 1987: p. 563.

investment would be everywhere higher than without export instability, and the negative effects on capital formation would also be felt throughout the economy. This higher cost of investment may also translate in lower savings, since "savers, deprived of an important reason for abstaining from consumption, will accordingly save less", ceteris paribus.[1]

c. Empirical Evidence

The assumed negative effects of instability on growth through the domestic sector would thus result (mainly) from instability (uncertainty) bringing about less productive investment, and lower levels of investment and savings. The first relationship, that between instability and productivity, would be very difficult to test reliably, due mainly to inaccuracy or lack of data. MacBean[2] has attempted such a test and found no significant association.[3]

Concerning the relationship between instability and the level of investment, the empirical evidence suggests

---

[1] Lim, 1980: p. 360.

[2] MacBean, 1966: pp. 121-123.

[3] He warned, however, that "the data is probably subject to such serious inaccuracies that no great weight should be put on this evidence". Ibid., p. 123.

that the latter is adversely affected by export variability,[1] although there is indication that the results may be sensitive to the time-period, the effect being felt more in the long-run than in the short-run, and more during the 1960s and 1970s than in the 1950s.[2]

This time-period sensitivity also characterizes the relationship between export instability and savings, and is even more pronounced in this case, somewhat dampening the negative association between instability and the savings rate. That is, the relationship now seems to be stronger in the short-run rather than in the long-run. The results are also conflicting, Guillaumont[3] finding a negative association during the 1970s but no association during the 1960s, while Moran found the exact opposite.[4] Thus no clear conclusion can be drawn.

---

[1] Love, 1989b: p. 190; Caceres, 1979: p. 150; Kenen and Voivodas, 1972: p. 801. It is true that the proponents of the PIH have found a positive association between investment and export fluctuations. Their measurement of instability, however, is somewhat different. See below, pp. 69-70.

[2] Kenen and Voivodas (1972: p. 801) found a negative association for the periods 1950-1966 and 1956-1967, and a positive, although insignificant, correlation for the period 1950-1958.

[3] Guillaumont, 1987: p. 635.

[4] Moran, 1983: pp. 204: 215. Lim (1980) found a positive association between savings and instability, but his results may not be reliable: see note 3, page 34.

4. Overall Effects of Instability on Growth

Because interests in development have usually found their expression in concerns about growth, more specifically about per capita economic growth (probably the most popular measure of development), the relationship between export instability and economic growth has attracted the most attention and generated the most empirical studies. As was the case for the other variables, tests for association between export instability and growth have mainly used reduced-form correlation and/or (bivariate and/or multivariate) regression analysis. But the relations between instability and growth are necessarily indirect and multidimensional, and probably more so than the relations between instability and any other economic variable. Thus the empirical studies can only capture the end product of a series of offsetting and/or reinforcing influences of instability (which is only one among a multitude of influences), through the government, foreign, and domestic sectors. Moreover, this net result tells little, if anything, about the *causal* relations and interrelations between instability, economic growth and the intermediate links.

Nevertheless, in the final analysis, the evidence suggests that there is a pronounced tendency towards a

negative association between instability and economic growth. This assessment, however, is subject to qualification, as the results seem to be somewhat period sensitive,[1] and also probably sample sensitive. In any case, the majority of studies have found either a negative or insignificant association between instability and growth. Only two studies have found a positive association: Tan (1983) and Savvides (1984).

Tan found a positive association for the period 1961-1974. However, by excluding the years 1973 and 1974, "years of unusually high exports,"[2] the relation becomes negative and insignificant. Savvides, for his part, has been criticized by Glezakos[3] for using data in current terms instead of constant terms. Glezakos, using the same sample and the same period (1967-1977), but 'constant data', could not replicate Savvides's findings, but, rather, found a negative association between growth and instability. Thus these two studies do not seem to weaken the negative association between instability and growth.

---

1 See Chapter Five, Section V.

2 Tan, 1983: p. 222.

3 Glezakos, 1984.

It must also be noted that the PIH proponents, once again, have found a positive association. What they have measured, however, may not be directly comparable with what the CA approach measured. This will be explained in more details in the next section and in the next chapter.

II. The Permanent-Income Hypothesis

The preceding section has shown that the widespread belief in the negative effects of instability on development has received some (although not unambiguous) support. Almost from the outset, however, there have been some advancing the position that instability may not matter much, or may even have a positive effect on development.[1] Export instability may not be consequential either because of Keynesian leakages, especially if foreign ownership is significant, or because stabilization costs are low. It may have positive effects on growth if upswings generate more investment than is discouraged on the downswings, or if more savings are stimulated by instability (uncertainty). Only this last argument, as formulated by the PIH, will retain our attention in this section, for, as mentioned previously, it is based on respected theoretical grounds (at least in certain circles); it has been empirically tested; it is directly comparable to the CA; and it is the one that has been the most influential among the counterposition approaches.

---

[1] Caine, 1954; Bieri and Schmitz, 1973; Hueth and Schmitz, 1972; Knudsen and Parnes, 1975; Yotopoulos and Nugent, 1976; Knudsen and Yotopoulos, 1976.

a. Theoretical Arguments

The PIH defines the permanent income as the amount that can be consumed while maintaining wealth intact,[1] and transitory income as temporary and/or unexpected income. Current consumption, in turn, also consists of two components. One is the planned consumption component: this proportion of permanent income is dependent on the interest rate, "the relative importance of property and nonproperty income",[2] the utility function and the level of uncertainty. The other component is transitory consumption and consists of a proportion of transitory income. Under the extreme PIH, the transitory component of current consumption is assumed to be zero (or very close to zero).[3] Transitory income, however, affects permanent consumption indirectly, by affecting the propensity to consume (out of permanent income), since the latter is a function of uncertainty. "Higher variance in transitory income necessitates higher reserves and hence lowers the

---

1 Friedman, 1957: p. 10.

2 Ibid., p. 26.

3 "... any transitory changes in income lead to additions to assets or to the use of previously accumulated balances rather than to corresponding changes in consumption". Ibid,. p. 28.

propensity to consume".[1] If savings are the major source of investment, then greater variability in transitory income would lead to increased (savings and) capital formation and thereby to higher levels of economic growth. Incomes, however, come from different sources, each potentially contributing a different proportion to permanent consumption.

The permanent income approach to export instability thus distinguishes between two sources of income: income from domestic sales and income from export sales. Inasmuch as the degree of revenue instability is greater in the export sector, then "the marginal propensity to consume out of income from exports tend to differ from the propensity to consume out of income from domestic sales".[2] More specifically, the propensity to consume out of export earnings would be lower because, under greater uncertainty, higher savings are required as reserves for unexpected occurrences. By the same token, countries experiencing greater export proceeds variability would be expected to have a higher savings rate, together with higher investment and economic growth. Export instability would thus appear to be beneficial to LDCs, inasmuch as they have been found

---

1 Knudsen and Parnes, 1975: p. 84.

2 Ibid., p. 91.

to experience greater variations in export earnings than DCs, and stabilization policies would therefore be detrimental.

This stream of arguments, however, rests on "the primary assumption (...) that the permanent income hypothesis of consumption is applicable to the underdeveloped countries".[1] The permanent income hypothesis, however, has been subject to much debate, and empirical studies have reached ambiguous conclusions.[2] Assuming that the PIH is applicable to LDCs, it is still not clear why the average propensity to save, over the long-run, should be higher since, as the theory suggests, higher savings out of positive transitory income should be matched by dissavings when transitory income is negative.[3] This criticism alone is sufficient to greatly lower confidence in the theoretical underpinnings of the permanent income approach to export instability. To settle

---

1 Knudsen and Parnes, 1976: p. 87.

2 MacBean, 1976: p. 118. Caceres (1979) reports that, in an earlier study, he found that the PIH of consumption "could be valid only in three countries" (p. 143) of the 16 Latin American countries he investigated: Costa Rica, Nicaragua and El Salvador.

3 Lim, 1980: pp. 360-361; MacBean, 1976: p. 119; Friedman, 1957: p. 28. See note 3, page 53.

this question, it may be best to resort to empirical verification.

b. Empirical Evidence

As mentioned in the "Conventional Approach" section, some studies have found a positive association between instability and savings,[1] and between instability and growth.[2] These results, however, were shown to be unreliable, and, in any case, were not derived in the PIH framework. What distinguishes the latter, as far as empirical testing is concerned, is their measurement of instability. "Export instability is measured in terms of transitory income, or that part of income that is unpredictable or temporary and does not enter consumption decisions".[3] This transitory income index of export instability (TIIXI) is then used, like the CA indices, as an explanatory variable in regression analysis. Yotopoulos and Nugent, following this procedure, found that export instability (as measured by the TIIXI), has a positive but insignificant effect on investment, and a positive and

---

1 Lim, 1980: p. 362.

2 Tan, 1983: p. 222; Savvides, 1984: p. 608.

3 Knudsen and Parnes, 1975: p. 93. Yotopoulos and Nugent (1976: p. 333) use a similar index. See Chapter Four, pp. 69-72, for the mathematical derivation.

significant effect on GDP growth, growth of GDP per capita, and export growth. Only by using a transitory index of domestic income (TIIDI) or an average instability index (AVGI)[1] do they find a significant positive association with the investment rate. On the basis of these results they conclude that:

> "...investment is not deterred by instability in income but is in fact stimulated by it. The lower propensities to consume measured under higher levels of instability have resulted in increased aggregate investment".[2]

This conclusion is rather surprising since they have not tested for association between instability and savings. Moreover, other similar tests they conducted, with a CA index this time, indicate that, in all cases, the association was negative and nonsignificant.

Knudsen and Parnes[3] also found a nonsignificant positive association between TIIXI and the investment rate. Only when the investment rate is regressed on both AVGI and GNP per capita is there a positive significant association. Similarly, only AVGI seems to affect the GNP growth rate

---

1 Defined as the weighted sum of TIIXI and TIIDI, where the weights are the ratio of export to GDP and the ratio of "domestic income" to GDP, respectively.

2 Yotopoulos and Nugent, 1976: p. 336.

3 Knudsen and Parnes, 1975: pp. 120-126.

and the GNP growth rate per capita significantly and positively. The two authors also tested for association between the marginal propensity to consume out of permanent export income and TIIXI, and found it negative but significant at only the 10 percent level in a one-sided t test. On the basis of these (rather weak) results, they conclude that export instability leads to lower propensities to consume and, thereby, to higher aggregate savings and investment, and higher economic growth.[1]

Such strong conclusions seem somewhat unwarranted, especially in the light of other criticisms that have been addressed to the above two studies. For example, Knudsen and Parnes' sample has been said to be biased for including New Zealand and Puerto Rico,[2] and for the overrepresentation by Latin American countries.[3] More importantly, however, both of the above studies have neglected to use export growth as a qualifying variable in their regression equations. This raises the presumption that the tendency of export instability to be correlated

---

1 Knudsen and Parnes, 1975: p. 121.

2 MacBean, 1976: p. 120.

3 16 Latin American countries out of a total of 28 countries. Sundrum, 1976: p. 898.

with the rates of growth of exports[1] might be responsible for the positive association found between instability, on the one hand, and investment and economic growth, on the other hand.[2]

III. Summary and Conclusions

The approach to the study of the effects of export instability on development may be classified into two broad categories, according to whether they predict positive or negative effects. The first category is best represented by the PIH, based on Friedman's theory of consumption, while the second, referred to as the Conventional Approach, encompasses an ensemble of heterogeneous studies trying to identify the significant link(s) acting as transmission mechanism(s) of the assumed negative effects of instability on development (mainly growth).

The PIH proceeds essentially on the assumption that higher savings, required to meet temporary and/or

---

[1] Smith (1978) has found that the measure of instability used by Knudsen and Parnes and the growth rate of exports were significantly correlated "...at the 5 percent level for the sample of 28 countries, (and) at the 1 percent level if Paraguay is excluded" (p. 184, note 68).

[2] MacBean, 1976: p. 119; Sundrum, 1976: p. 899; Caceres, 1979: p. 151, note 6; Adams and Behrman, 1982: p. 49.

unexpected declines in income, find their way into higher investment and thereby in higher output growth. Typically, empirical studies based on the PIH find a negative association between instability and the marginal propensity to consume, and a positive association between instability and the investment rate. The intermediate relation, that between instability and savings, however, has never been tested in the PIH framework, thereby implicitly disregarding the possibility that the lower propensity to consume might not be associated with higher savings.[1] The PIH has also paid very little attention to the potentially negative effects on growth of a great variety of other structural variables affected by export instability.

On the contrary, the CA has devoted a great deal of energy trying to isolate the determinant factor(s) negatively affecting investment and/or output growth, studying and testing a multitude of (potentially) explanatory variables, savings being only one of them, although the CA has somewhat neglected the effects of instability on savings. The exploratory character of the

---

[1] "...higher savings may take the form of financial investments in foreign assets, e.g., foreign exchange." Smith, 1978: p. 184, note 67. "It is (...) possible (...) that in an open economy the uncertainty-induced savings end up in safe bank deposits or investments abroad." Caceres, 1979: p. 143.

CA has thus led to more hypothesised relationships being tested, relations linking instability with, for example, imports, government revenues and expenditures, and export growth. These investigations have demonstrated the complex multidimensionality of the problem, and particularly the virtual impossibility of capturing all the dimensions of the problem with reduced-form regression analysis, thereby indicating the need for an integrated approach, since:

> "... the possibility that (the) indirect effects may be substantial calls for an analysis with a model of the overall economy".[1]

The goal of the empirical study to be undertaken in the next two chapters is not to elaborate such a model. Such an enterprise is clearly beyond the scope of this thesis. Rather, the goal will be limited to conducting a *meaningful* comparison of the CA and PIH by overcoming the above noted weaknesses of the previous attempts,[2] while acknowledging the limitations of reduced-form regression analysis in a cross-country study.

---

1 Adams and Behrman, 1982: p. 24.

2 Knudsen and Parnes, 1975; Yotopoulos and Nugent, 1976; Knudsen and Yotopoulos, 1976.

CHAPTER FOUR

METHODOLOGY

I. Sample and Time-Period

The sample consists of 27 countries[1] classified as "less-developed" by the source material.[2] These countries were selected on the basis of the availability of the most recent reliable data for as long a period of time as possible. The period 1961-1983 resulted from this selection process.

Inspection of this time-period reveals that it can be conveniently divided in (two) sub-periods. Indeed, in contrast to the 1960s, which are generally perceived as a period of relative stability, the 1970s have been a period of greater economic instability, characterized by the oil price shocks of 1973 and 1978-1979, followed by the recession of the early 1980s, the (greater) exchange rate instability following the breakdown of the Bretton Woods

---

[1] Ethiopia, Ghana, Malawi, Mauritius, Morocco, Nigeria, South Africa, Tunisia, India, Korea, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemela, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru.

[2] IMF, 1987.

par value system,[1] and high inflation (especially in Latin America). In view of the evidence suggesting that the results may be (highly) period sensitive, it seems therefore appropriate to investigate the (potential) effects of instability under periods of different degrees of general economic instability. Accordingly, the full period has been divided in two periods of equal length closely approximating the two periods of different degrees of instability.[2] This breakdown of the time-period should allow to determine if the CA and the PIH perform differently: i) under different degrees of instability; and, ii) in the short-run versus the long-run.

II. Data

All the time-series, obtained from a single source,[3] cover the 1961-1983 period. For each of the 27 countries in the sample, data were gathered for Gross Domestic Product (GDP), (private and government) consumption, investment (gross capital formation), exports and imports,

---

1 1973.

2 1961-1972 and 1972-1983. The choice of 1972 as the dividing year was partly dictated by the need to have long enough time-series to compute the instability indices. The minimum number of years needed is generally perceived as being 10 to 12. See Murray, 1978a: p. 97; Massell, 1970: p. 619.

3 IMF, 1987.

population, the GDP deflator and the SDR[1] exchange rate. The volume of Gross Domestic Savings (GDS) was then derived as a residual after deducting (private and government) consumption from GDP. Finally, average growth rates (r) were obtained from the equation $\log \beta = \alpha + rt + u_t$, where β is either GDP, GDP per capita, or export earnings, and t stands for time, expressed in annual increments, α is a constant, and u_t is an error term assumed to be normally distributed. All the relevant variables were deflated by the GDP deflator of the respective country and further transformed to be finally expressed in constant 1980 SDRs.

The rationale for using SDR data is twofold: firstly, it probably gives a reasonably accurate estimate of an important part of a country's ability to import;[2] secondly, it has been argued that the measurement of instability may be highly sensitive to the choice of numeraire currency.[3] Although "an export-weighted effective exchange rate index

---

1 Special Drawing Rights.

2 To express the capacity to import of exports, it would probably have been best to deflate exports by the appropriate import price deflator, but this would have meant a reduction in the sample and/or length of time-period due to lack of data for some countries.

3 Brodsky, 1983.

may be the appropriate numeraire, (...) empirical results indicate that the SDR (...) is an acceptable proxy".[1]

III. Measurement of Instability

A. The Conventional Approach

In the CA framework, export instability has usually been measured as short-term (or annual) fluctuations of export earnings around the growth trend of exports.[2] Detrending is important, for otherwise countries experiencing higher growth rates would have their instability biased upward, and vice versa for others. To remove the trend, three forms of correction have been particularly popular: linear, exponential, and moving-average. The linear and exponential forms have been associated with the least squares approach, while the moving-average has been popularised by MacBean with his instability index.[3] Although some authors have found that the results are "insensitive to alternative ways of

---

1 Brodsky, 1983: p. 296.

2 Kenen and Voivodas, 1972: pp. 793-794; Massell, 1964: p. 48, 1970: p. 619; Lancieri, 1978: p. 140; Lawson, 1974: p. 56; Love, 1985: p. 246; Naya, 1973: p. 630.

3 MacBean, 1966: p. 34.

measuring fluctuations",[1] there is also ample evidence to the contrary.[2] Thus the practice has often been to use instability indices that correct for the trend that "gives the best fit".[3] Using the ordinary least squares method to find the trend, either linear or exponential,[4] the goodness of fit is determined by the coefficient of determination of the regression of either export earnings on time:

$$(1) \qquad x_t = a + bt + u_t$$

in the case of the linear index, I^{lin}, or the log of export earnings on time,

$$(2) \qquad \log x_t = a + bt + u_t$$

in the case of the logarithmic index, I^{log}.

The linear index of export instability is then defined as the standard error of estimate (SEE) of the regression

---

1 Moran, 1983: p. 197. See also MacBean, 1966: p. 34; Knudsen and Parnes, 1975: p. 64; Kenen and Voivodas, 1972: p. 801.

2 Murray, 1978a: p. 88; Lawson, 1974: p. 56; Leith, 1970: p. 267; Love, 1977: p. 357; Massell, 1970: p. 619.

3 Glezakos, 1982: p. 460, 1984: pp. 616-617; Glezakos and Nugent, 1983: p. 382, note 6; Lim, 1987: p. 321; Guillaumont, 1987: p. 634; Lancieri, 1978: p. 141; Mullor-Sebastian, 1988: p. 223; Charette, 1985: p. 16.

4 The Cochrane-Orcutt correction was applied whenever there was evidence or possibility of serial correlation, as indicated by the Durbin-Watson test.

of exports on time (eq. 1), normalised by the mean, x^m, in order to correct for scale. The exponential index of instability is similarly derived, using equation 2. Thus:

$$(3) \qquad I^{lin} = SEE/x^m$$

where $SEE = \Sigma (x - x^f)/(n - k)$, x^f = fitted value, x^m = mean value of exports, n = number of annual observations, and k = number of explanatory variables, including the intercept term; and

$$(4) \qquad I^{log} = SEE/(\log x)^m$$

where $SEE = \Sigma (\log x - (\log x)^f)/(n - k)$, $(\log x)^f$ = fitted value, $(\log x)^m$ = average of the logarithm of the value of exports, and n and k are as above.

I^{lin} and I^{log}, however, are not directly comparable as defined above, since different "methods of removing trends generate different sets of residuals, and therefore different instability measurements".[1] This problem is easily overcome by multiplying I^{log} by the "corrective factor" (CF) devised by Cuddy and Della Valle.[2] They define this corrective factor as:

---

[1] Stein, 1977: p. 282. See also Lawson, 1974: p. 56; Naya, 1973: p. 630, note 7.

[2] Cuddy and Della Valle, 1978; Della Valle, 1979.

$$(5) \qquad CF = [(1-R_a^2)/(1-R^2)]^{1/2}$$

where R^2 is the coefficient of multiple determination obtained from the linear regression (eq. 1), and R_a^2 is obtained from the log-linear model (eq. 2). I^{log} thus becomes:

$$(6) \qquad I^{logl} = (SEE/(\log x)^m)[(1-R_a^2)/(1-R^2)]^{1/2}$$

This new definition of I^{log} "corrects (...) for the ratio of the unexplained variance between the linear and non-linear trends".[1]

For purposes of comparability with other studies, MacBean' s index of instability (MBI) has also been computed. The MBI is "measured as the average percentage deviation of the dollar value of export proceeds from their five-year moving-average centred on the mid-year".[2] Formally:

$$(7) \qquad MBI = [\Sigma_{t=3}^{n-2}(|x_t - 5MA_t|/5MA_t)]/(n-4)$$

where x_t = value of exports in year t, $5MA_t$ = five-year moving-average of x_t centred on year t, and n = number of annual observations.

---

1 Della Valle, 1979: p. 248.

2 MacBean, 1966: p. 34.

Contrarily to the least squares approach, the moving-average allows variations in the trend. The use of a *five*-year moving-average, however, is somewhat arbitrary as it implies a cycle of this duration. If the cycle is longer than five years, the five-year moving-average will include too many short-term fluctuations in exports, and the MBI will understate instability, and vice versa if the cycle is less than five years.[1]

B. The PIH

Like the conventional measures of export earnings instability, the PIH approach to measuring instability is based on deviations of actual export proceeds from projected values. These projected values of export earnings, in the PIH framework, are equivalent to the permanent export income, the computation of which is largely based on the trend of past values.

The previous studies of instability in the PIH framework have used maximum likelihood estimation techniques to derive permanent income.[2] It has been found, however, that a definition of permanent income "based on a

---

[1] Murray, 1978a: p.89; Ady, 1969: p. 31; Kenen and Voivodas, 1972: p. 73; Knudsen and Parnes, 1975: p. 11.

[2] Yotopoulos and Nugent, 1976: p. 333; Knudsen and Parnes, 1975: pp. 99-101.

three-year moving-average (...) gave results at least as good as the more complicated definitions".[1] For the present investigation, two definitions of permanent export income (x^p) are used, both based on a three-year moving-average, and different only in the weights given to each year. The first measure of x^p gives equal weight to the current and the two preceding years. Thus:

$$(8) \qquad x^p = (x_{t-2} + x_{t-1} + x_t)/3$$

where x_t is actual export revenue in year t, and similarly for x_{t-1} and x_{t-2}. The second measure of permanent export income is based on the IMF approach,[2] and weights the current year's export earnings by .5 and the two previous years' export earnings by .25. Thus:

$$(9) \qquad x^p_{imf} = (.25*x_{t-2} + .25*x_{t-1} + .5*x_t)$$

The PIH index of export instability (PIHXI) is then defined as:

$$(10) \qquad PIHXI = \Sigma^n_{t=1}[(x_t - x^p)/x^p]^2$$

---

1 Gupta, 1970b: p. 580. Several other authors have also used the three-year moving-average method. For example, Williamson, 1968; Friend and Taubman, 1966.

2 "Compensatory Financing of Export Fluctuations", IMF, Washington, D.C., 1966, in Knudsen and Parnes, 1976: p. 11.

where x_t = actual value of exports in year t, x^p = permanent export income, and n = number of annual observations. In effect, this index is a measure of the normalised variance of transitory export income.

An index of "domestic instability" (PIHDI) is similarly defined:[1]

$$(11) \qquad PIHDI = \Sigma_{t=1}^{n}[(d_t - d^p)/d^p]^2$$

where d_t = actual "domestic income", defined as GDP minus the value of exports, d^p = permanent domestic income, and n = number of annual observations. These two indices are then combined to give a measure of average instability (PIHYI).[2] Thus:

$$(12) \qquad PIHYI = a*PIHXI + (1-a)*PIHDI$$

where a = average export-GDP ratio. These three indices were also computed using x^p_{imf} in place of x^p. They are, respectively: $PIHXI^{imf}$, $PIHDI^{imf}$ and $PIHYI^{imf}$.

---

1 Knudsen and Parnes, 1975: p. 94; Yotopoulos and Nugent, 1976: p. 333.

2 Knudsen and Parnes' rationale for using an average instability index is that to "determine the effect of instability on investment, comparison of levels of investment must be made with an aggregate instability index since measures of investment out of each source of income are not available". Ibid., p. 122.

IV. The Model

Traditionally, growth has been used as a proxy of economic development in the study of the effects of export instability on development in LDCs. In the previous chapter, it was seen that instability can affect growth through the domestic, foreign and government sectors. The economic literature suggests that the most important transmission mechanisms operate through the domestic and foreign sectors, instability affecting investment (and thereby growth) by affecting (negatively and/or positively) the savings rate, export growth, and the capacity to import.[1] Testing for these relations will be conducted in a Harrod-Domar framework, as has been done, either implicitly or explicitly, by several authors before.[2]

---

[1] The transmission mechanisms through the government sector are certainly also (relatively) important. Lack of long enough series for government revenues and expenditures, for our sample and time-period, however, prohibits testing for the "governmental links".

[2] e.g. Voivodas, 1974; Lim, 1987; Lim, 1976; Love, 1989b.

The Harrod-Domar growth equation is:

$$(13) \qquad Y_g = (1/k)(I/Y)$$

where Y_g = real per capita GDP growth rate, k = incremental capital-output ratio, and I/Y = domestic investment expenditures-GDP ratio. I/Y is then made to vary positively with the savings rate (S/Y) and the growth rate of exports (X_g), and negatively with the instability in imports (I^m).[1] The positive association between investment and savings assumes adequate (financial) intermediaries, so that the resources released through a higher savings rate are made available for investment. Export growth, in turn, is assumed to have a positive effect on investment both qualitatively, by inducing a better allocation of resources, and quantitatively, by increasing investment opportunities. The negative effect of import instability on investment derives from the assumption that the greater the variability in imports, more specifically, the greater the uncertainty in the supply of imported capital and intermediate goods, the less will risk-averse entrepreneurs

---

[1] Thus I/Y is not necessarily equal to S/Y, as in the common Harrod-Domar model. We are in fact using a "two-gap model" variation of the Harrod-Domar growth model, where "if the largest gap is the foreign exchange gap, growth is said to be trade-limited and domestic saving may go unused despite a 'shortage' ". Thirlwall, 1977: p. 251.

be willing to invest (this applying in both the domestic and export sectors). Thus, formally:

$$(14) \qquad I/Y = \alpha(S/Y) + \beta(X_g) - \gamma(I^m)$$

In turn, I^m,[1] X_g and S/Y are made to vary with export instability. Export fluctuations are said to affect the growth rate of export negatively by discouraging investment in the export sector consequently to the higher uncertainty in the flow of export revenues. Instabilities in exports and imports are assumed to move in unison, export earnings fluctuations bringing about foreign exchange fluctuations, which translate in imports variations. Thus I^m is intended to capture the extent to which export instability affects the capacity to import of a country. The effect of instability on the savings rate is made to vary either negatively or positively, according to whether reference is made to the CA or the PIH. In the CA framework, the higher cost of investment generated by instability is a disincentive to refrain from consumption, and therefore an incitement to save less. In the PIH framework, the greater the instability (uncertainty) in export earnings, the

---

1 I^m is defined as the SEE of the regression (of the time-series) of the log of the value of imports on time, normalised by the mean.

greater is the incentive to hold reserves. These relationships are expressed thus:

$$X_g = \delta - \epsilon(I^X) \quad (15)$$

$$I^m = \zeta + \eta(I^X) \quad (16)$$

$$S/Y = \theta \mp \iota(I^X) \quad (17)$$

where I^X stands for the relevant instability indices, i.e. as defined in the CA or PIH frameworks; δ, ζ and θ are intercept terms, and ϵ, η and ι are regression coefficients.

Substituting equations 15, 16 and 17 in equation 14, and rearranging, yields:

$$I/Y = \kappa + \lambda(I^X) \quad (18)$$

where $\kappa = (a\theta + \beta\delta - \gamma\zeta)$ and $\lambda = (-\beta\epsilon - \gamma\eta \mp a\iota)$.

Further substituting equation 18 in equation 13 yields:

$$Y_g = \mu + \nu(I^X) \quad (19)$$

where

$$\mu = \kappa/k = (a\theta + \beta\delta - \gamma\zeta)/k \quad (20)$$

$$\nu = \lambda/k = (-\beta\epsilon - \gamma\eta \mp a\iota)/k \quad (21)$$

$$a, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta, \lambda, \nu > 0 \quad (22)$$

(23) $\iota > 0$ by PIH

(24) $\iota < 0$ by CA

It can be easily seen that the sign of the coefficient of I^X in equations 18 and 19 depends critically on the value of ι in equation 17. If ι is negative, as assumed by the CA, then λ and ν are necessarily negative and I^X is said to have a detrimental effect on I/Y and Y_g. If, however, ι is positive, as assumed by the PIH, then the signs of λ and ν depend on the relative weights of $\alpha\iota$ and $\beta\epsilon + \gamma\eta$. The PIH implicitly assumes that $\alpha\iota > \beta\epsilon + \gamma\eta$, in which case λ and ν are both positive and instability has a beneficial effect on I/Y and Y_g.

Equations 18 and 19, together with the structural equations 15, 16 and 17, were tested for statistical association, by the ordinary least squares method, using both the CA and PIH instability indices as defined in Section III. The results are reported and analysed in the next chapter.

CHAPTER FIVE

THE RESULTS

As indicated in the previous chapter, tests for association were conducted for equations 15, 16, 17, 18 and 19:

$$(15) \qquad X_g = \delta - \epsilon(I^x)$$

$$(16) \qquad I^m = \zeta + \eta(I^x)$$

$$(17) \qquad S/Y = \theta \mp \iota(I^x)$$

$$(18) \qquad I/Y = \kappa + \lambda(I^x)$$

$$(19) \qquad Y_g = \mu + \nu(I^x)$$

using eight different instability indices,[1] over three time-periods.[2] For convenience of presentation, the results for the whole period will be reported in details. Only the significant changes due to varying the time-period will be included.

---

1 Six export instability indices: I^{lin}, I^{log}, I^{logl}, MBI, PIHXI, $PIHXI^{imf}$; and two indices of aggregate instability: PIHYI and $PIHYI^{imf}$.

2 1961-1983; 1961-1972; and 1972-1983.

I. Savings and Instability

As expounded in Chapter Three, proponents of the CA expect export instability to have a negative effect on the savings ratio (S/Y), while advocates of the PIH maintain that instability would affect S/Y positively. Expressed in terms of the model derived in the previous chapter, support for either of these two approaches would be evidenced by either a negative or positive coefficient for I^X, respectively, in equation 17:

$$(17) \qquad S/Y = \theta \mp \iota(I^X)$$

i.e., $\iota<0$ would lend support to the CA, while $\iota>0$ would lend support to the PIH. The results of the regression analysis, using the CA export instability indices ($I^X = I^{lin}$, I^{log}, I^{logl} or MBI) and the PIH instability indices (I^X = PIHXI, $PIHXI^{imf}$, PIHYI or $PIHYI^{imf}$), are presented in Tables 1 and 2, respectively.

A. The CA Results

The results reported in Table 1 indicate that the countries which have experienced higher export instability, during the period 1961-1983, have demonstrated, on average, a lower savings to GDP ratio. Only when export instability

Table 1

Regression Results
Savings and Export Instability (eq. 17)
(Conventional Indices. 27 countries: 1961-1983)

Dep. Var.	C	I^{lin}	I^{log}	I^{logl}	MBI	X_g	R^2	F-ratio
S/Y								
1.	.184 [3] (6.56)	-.13 (-.64)					-.02	.415
2.	.178 [3] (6.05)	-.09 (-.46)				.052 (.790)	-.04	.517
3.	.228 [3] (8.15)		-3.4 [2] (-2.3)				.142	5.29 [2]
4.	.224 [3] (7.58)		-3.2 [1] (-2.1)			.031 (.507)	.115	2.70
5.	.211 [3] (8.49)			-2.8 [1] (-1.9)			.092	3.64 [1]
6.	.207 [3] (8.07)			-2.2 [1] (-1.8)		.043 (.704)	.073	2.03
7.	.203 [3] (6.42)				-.54 (-1.2)		.016	1.41
8.	.197 [3] (5.92)				-.47 (.998)	.044 (.679)	-.01	.921

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively. R^2 = coefficient of determination adjusted for degrees of freedom; X_g = export growth rate. 8 equations.)

is measured by an exponential index,[1] however, is the association between S/Y and instability statistically significant. When use is made of the linear index[2] or the MacBean index[3] of instability, the regression coefficient is still negative ($\iota<0$), but not statistically different from zero (as indicated by the t-values). These results thus give some support, although weak, to the conventional approach, inasmuch as the relationship between instability and S/Y is concerned. They also indicate, however, that the results are sensitive to the way of measuring instability. There is also evidence of a certain period-sensitivity of the results. Indeed, the coefficients of I^{lin} and MBI become significant (and stay negative) if only the first sub-period is considered. On the other hand, I^{log} and I^{logl} become insignificant during this period, while over the second period, all regression coefficients are negative and statistically insignificant.

Following several authors,[4] the above regressions were also run with the export growth rate (X_g) included as a

---

1 I^{log} or I^{logl} in regressions 3 and 5, in Table 1, respectively.

2 I^{lin} in regression 1.

3 MBI in regression 7.

4 MacBean, 1976: p. 119; Sundrum, 1976: pp. 898-899. See also above, pp. 58-59.

qualifying explanatory variable in the regression equations. In all four cases,[1] the regression coefficient of X_g is positive, although insignificant in every instance. More importantly, the inclusion of X_g decreases the explanatory power, as measured by R^2, of the equation in all four cases, and (marginally) decreases the significance of the regression coefficients of the instability indices, thereby suggesting that export instability (as measured in the CA framework), and export growth are negatively associated, as assumed by the CA.[2]

Finally, it may be worth noting that no regression equation "explains" more than 15% of the variation in S/Y, the highest R^2 being that of regression 3, where R^2 = .142. This is to be expected, as savings are also determined by several other factors, apart from export instability.

B. The PIH Results

The results of regression analysis using the PIH export instability indices (PIHXI and $PIHXI^{imf}$)[3] and the

---

1 Regression equations 2,4,6 and 8, in Table 1.

2 This relationship will be confirmed below, section II. A, page 85. See also above, page 43.

3 PX and PX^{imf} in Table 2, respectively.

PIH "aggregate instability indices"[1] (PIHYI and $PIHYI^{imf}$), are reported in Table 2. These results are critical for the PIH. Indeed, the hypothesis that export instability would incite risk-averse economic agents to hold larger reserves is an essential element in the theoretical construct of the permanent-income approach to export instability.[2]

As indicated by the results reported in Table 2, the present empirical investigation of the relationship between export instability and the savings rate does not lend support to the PIH. Indeed, not only are the regression coefficients of all the PIH instability indices statistically insignificant, indicating that instability, as measured by the PIH, has no effect on S/Y, but they even suggest that a tendency of instability to decrease S/Y may be present, as manifested by the negative sign of the coefficients.[3] Inclusion of the growth rate of exports as a qualifying variable negligibly alters the results,

---

1 See above, page 71, note 2.

2 In the words of MacBean, PIH proponents such as "Professors Knudsen and Parnes pin their faith entirely to the last-mentioned hypothesis". MacBean, 1976: p. 118.

3 This tendency is reinforced in the 1961-1972 period, during which the negative coefficient of PX becomes significant (at the 10 % level) and stays negative.

Table 2

Regression Results
Savings and Export Instability (eq. 17)
(PIH Indices. 27 countries: 1961-1983)

Dep. Var.	C	PX	PX^{imf}	PY	PY^{imf}	X_g	R^2	F-ratio
S/Y								
1.	.176 [3]	-.03					-.02	.388
	(10.0)	(-.62)						
2.	.177 [3]	-.04				.070	-.02	.778
	(10.1)	(-.85)				(1.08)		
3.	.179 [3]		-.06				-.01	.871
	(11.3)		(-.93)					
4.	.180 [3]		-.08			.076	.011	1.14
	(11.5)		(-1.2)			(1.18)		
5.	.166 [3]			-.01			.035	1.96
	(17.8)			(-1.4)				
6.	.165 [3]			-.01		.053	.024	1.32
	(17.0)			(1.33)		(.843)		
7.	.165 [3]				-.00		.038	2.03
	(17.4)				(-1.4)			
8.	.163 [3]				-.00	.049	.022	1.30
	(16.7)				(-1.3)	(.775)		

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively. PX = PIHXI, PX^{imf} = $PIHXI^{imf}$, PY = PIHYI, PY^{imf} = $PIHYI^{imf}$, R^2 = coefficient of determination adjusted for degrees of freedom; X_g = export growth rate. 8 equations.)

and, as previously, a higher X_g seems to increase S/Y, although no great significance can be attached to these results since none of these coefficients is statistically different from zero. Finally, it may be worth noting that no R^2 is greater than .04.

II. Export Growth and Instability

It is generally perceived, by the CA advocates, that export instability would be a disincentive to investment in the export sector. Inasmuch as higher investment in the export sector is a primary condition for higher export growth rates, LDCs experiencing higher export instability should also be experiencing, ceteris paribus, lower export growth rates. In order to verify this hypothesis, equation 15:

$$(15) \qquad X_g = \delta - \epsilon(I^X)$$

was estimated. A negative sign for ϵ would lend support to the CA. Although the PIH proponents have been rather mute on the relationship between instability and export growth, the PIH indices were also used in estimating equation 15. It may be suspected that, had the PIH proponents explicitly speculated on this relationship, they would have predicted a positive association , arguing that instability would lead to higher export growth rates through the assumed

beneficial effects of instability on savings and, thereby, on investment in the export sector (just as in the domestic sector). In the previous section, however, it was seen that the PIH instability indices were negatively (although insignificantly) associated with savings. Thus, according to the above reasoning, one would expect export instability, as measured by the PIH, to be negatively related to X_g, that is, the sign of ϵ should be negative, just as in the CA case.

A. The CA Results

The results reported in Table 3 indicate that export instability, as measured by the CA, had no significant effect on export growth for our sample of LDCs during the period 1961-1983, since no regression coefficient is statistically significant at even the 10% level of significance. All the regression coefficients, however, have a negative sign, suggesting a (weak) tendency of export instability to lower the export growth rate.[1] These results may be misleading, however.

---

[1] The weakness of this tendency can be judged by the very low values of the R^2 and the F-ratio.

Table 3

Regression Results
Export Growth Rate and Export Instability (eq. 15)
(Conventional Indices. 27 countries: 1961-1983)

Dep. Var.	C	I^{lin}	I^{log}	I^{logl}	MBI	R^2	F-ratio
X_g							
1.	.121 (1.41)	-.65 (-1.1)				.005	1.13
2.	.133 (1.42)		-5.4 (-1.1)			.008	1.21
3.	.089 (1.08)			-2.8 (-.70)		-.02	.491
4.	.141 (1.43)				-1.6 (-1.1)	.010	1.27

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively: R^2 = coefficient of determination adjusted for degrees of freedom; 4 equations.)

Indeed, if, as was suggested above, causality runs (also) the other way, i.e., if higher export growth rates are partly responsible for export instability, then the regression coefficients reported in Table 3 may underestimate the effects of instability on export growth. If this were the case, then the negative sign of the regression coefficients may be indicative that the negative effect of instability on export growth was greater than the positive effect of export growth on instability. It may also simply be, however, that instability had no significant effect on export growth, insofar as the 1961-1983 period is concerned. During the second sub-period, the negative relation between instability and X_g is much greater, since all the CA instability indices but the MBI are significantly associated (at the 5% level or better) with X_g.[1]

B. The PIH Results

The results of regression analysis, obtained using the PIH indices of (export and aggregate) instability, are given in Table 4. As in the CA case, none of these results bear any statistical significance (as witnessed by the t-statistics for the regression coefficients, or by the

---

[1] During the 1961-1972 period, the association is negative but insignificant in all cases.

Table 4

Regression Results
Export Growth Rate and Export Instability (eq. 15)
(PIH Indices. 27 countries: 1961-1983)

Dep. Var.	C	PX	PX^{imf}	PY	PY^{imf}	R^2	F-ratio
X_g							
1.	-.02	.149				.011	1.28
	(-.30)	(1.13)					
2.	-.01		.232			.017	1.45
	(-.23)		(1.20)				
3.	.035			-.005		-.04	.113
	(1.16)			(-.34)			
4.	.325				-.003	-.03	.341
	(1.07)				(-.58)		

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively. PX = PIHXI, PX^{imf} = $PIHXI^{imf}$, PY = PIHYI, PY^{imf} = $PIHYI^{imf}$, R^2 = coefficient of determination adjusted for degrees of freedom; 4 equations.)

F-ratio for the overall significance of the equations). The tendency, however, is now in the opposite direction (insofar as *export* instability is concerned). Indeed, the coefficients of the PIH export instability indices (PX and PX^{imf}) are positive, suggesting that export instability, as measured by the PIH, leads to higher export growth rates.

These results would be consistent with the permanent-income approach, were it not for the fact that export instability, as measured by the PIH, tends to lower the savings rate, as the results reported previously have shown and contrarily to the PIH expectations. As already discussed, consistency with the previous results would call for PIH export instability to lower X_g, contrarily to the present findings.

These incongruities in the PIH framework may plausibly find their explanation in the way the PIH measures instability, in conjunction with the possibility that higher export growth rates may 'cause' higher export instability. Indeed, if higher export growth rates lead to higher export instability, and if this effect is felt with a lag, then the PIH export instability indices would capture this effect more than the CA indices would, since the measurement of the formers is based on the moving-average of the value of exports during the current

and two preceding years. Several authors[1] have conjectured that this positive relationship between X_g and export instability may be responsible for the positive association that the PIH proponents have found between the investment ratio and the per capita GDP growth rate, on the one hand, and instability, on the other. The above comments apply also to the first sub-period, during which the association between export instability and X_g is also positive, and even significant (at the 10% level) in the case of PX. During the 1972-1983 period, however, both PIH export instability indices are *negatively* and *significantly*[2] related to X_g. The latter results confirm the findings reported in the previous section, where three of the four CA indices were found significantly and negatively associated with X_g during the 1972-1983 period.

III. Import Instability and Export Instability

Whereas the PIH has emphasized the assumed positive effects of instability on savings as the important transmission channel of the assumed positive effects of instability on investment and growth, the CA, for its part, has stressed the hypothesized disruptive effects of

---

1 MacBean, 1976: p. 119; Sundrum, 1976: p. 899; Caceres, 1979: p. 151, note 6; Adams and Behrman, 1982: p. 49.

2 At the 1% level of significance.

instability on the capacity to import as the important intermediary variable transmitting the detrimental effects of instability on investment and growth. As a proxy of import capacity disruption, a measure (index) of import instability (I^m) is used. To evaluate the effects of export instability on import capacity, this index of import instability is then regressed on the different export instability indices, using equation 16:

$$(16) \qquad I^m = \zeta + \eta(I^x)$$

A positive regression coefficient for I^x (i.e. $\eta>0$, where I^x is any of the export instability indices), would lend support to the conventional approach, without conflicting with the PIH, however. Indeed, the PIH does not dispute that export instability may have deleterious effects on investment and growth through its assumed negative effects on imports. It asserts, however, that the (positive) effect of instability on the investment rate and the income growth rate, through higher savings, is greater than the (negative) effect through imports variability, the net effect on growth thereby being positive. As seen previously,[1] instability, as measured by the PIH, was found to have no significant effect on savings. A positive

---

[1] See above, pp. 81-84.

(significant) regression coefficient for the PIH instability indices would thus lend further support to the CA results.

A. The CA Results

As indicated by the results reported in Table 5, for the 1961-1983 period, there is a strong (positive and significant) association between export instability and import instability.[1] Indeed, this association is significant at the 1% level (or better) in three cases (I^{lin}, I^{log}, and MBI) out of four. Assuming causality running (primarily) from export instability to import instability,[2] through fluctuations in the availability of the foreign exchange necessary for imports, these results would lend considerable support to the CA. It must be pointed out, however, that although the regression coefficients of all the CA instability indices are statistically different from zero, their (algebraic) value

---

1 The results for the two sub-periods are very similar to those of the 1961-1983 period.

2 Causality may also run the other way. That is, import instability, caused, for example, by business cycles in the Developed Countries, may bring about fluctuations in the availability of intermediate and capital goods used by the export sector, thereby causing export instability.

Table 5

Regression Results
Import Instability and Export Instability (eq. 16)
(Conventional Indices. 27 countries: 1961-1983)

Dep. Var. I^m	C	I^{lin}	I^{log}	I^{logl}	MBI	X_g	R^2	F-ratio
1.	.010 [2] (2.73)	.075 [2] (2.69)					.193	7.22 [2]
2.	.011 [2] (2.64)	.074 [2] (2.53)				-.002 (-.22)	.161	3.50 [1]
3.	.004 (1.18)		.933 [3] (5.23)				.504	27.4 [3]
4.	.004 (1.08)		.009 [3] (5.04)			.001 (.127)	.483	13.2 [3]
5.	.006 [2] (2.13)			.774 [3] (5.85)			.561	34.3 [3]
6.	.006 [2] (2.09)			.769 [3] (5.65)		-.002 (-.25)	.544	16.5 [3]
7.	.008 [1] (1.79)				.194 [3] (3.10)		.248	9.59 [3]
8.	.008 [1] (1.72)				.192 [3] (2.93)	-.001 (-.13)	.217	4.61 [2]

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively; R^2 = coefficient of determination adjusted for degrees of freedom; X_g = export growth rate. 8 equations.)

varies considerably, ranging from .075 for the linear index (I^{lin}, regression 1 in Table 5), to .933 for I^{log} (regression 3 in Table 5). The exponential indices (I^{log} and I^{logl}, regressions 3 and 5, respectively) also perform better, "explaining" more than 50% of the variation in import instability (as indicated by the R^2), compared with 25% and 19% for the MacBean and linear indices, respectively. Thus, once again, the results suggest that the choice of index to measure instability may (perhaps considerably) affect the outcome of regression analysis.

Nonetheless, an important fact remains: no matter how instability is measured, *all* the results indicate that higher export instability leads to higher import instability (this being true of the PIH results as well, as will be seen in the next section). Finally, inclusion of X_g as a qualifying variable does not affect the results significantly, indicating that export instability affects import instability about equally at all levels of X_g.

B. The PIH Results

The results reported in Table 6 corroborate the conclusions drawn in the CA framework concerning the relation between export instability and import instability. More precisely, the results obtained using the PIH export

Table 6

Regression Results
Import Instability and Export Instability (eq. 16)
(PIH Indices. 27 countries: 1961-1983)

Dep. Var.	C	PX	PX^{imf}	PY	PY^{imf}	X_g	R^2	F-ratio
I^m								
1.	.013[3] (6.21)	.024[3] (4.78)					.457	22.8[3]
2.	.012[3] (6.54)	.026[3] (5.50)				-.02[2] (-2.2)	.530	15.6[3]
3.	.013[3] (7.75)		.037[3] (5.52)				.531	30.4[3]
4.	.013[3] (8.50)		.041[3] (6.60)			-.02[3] (-2.7)	.622	22.4[3]
5.	.021[3] (14.3)			.001 (1.73)			.071	2.99[1]
6.	.021[3] (13.9)			.001 (1.66)		-.01 (-.61)	.047	1.64
7.	.021[3] (14.0)				.000 (1.41)		.040	1.98
8.	.021[3] (13.9)				.001 (1.66)	-.01 (-.61)	-.05	1.64

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively. PX = PIHXI, PX^{imf} = $PIHXI^{imf}$, PY = PIHYI, PY^{imf} = $PIHYI^{imf}$, R^2 = coefficient of determination adjusted for degrees of freedom; X_g = export growth rate. 8 equations.)

instability indices (PX and PX^{imf} in Table 6) in regression analysis lead one to conclude, as previously, that the countries of our sample that have experienced higher export instability, during the period 1961-1983, have also experienced higher import instability.[1] Unfortunately, these results cannot be compared with previous PIH studies, since the latter have not tested for this association between export instability and import instability. As mentioned before, the PIH proponents have concentrated their energy on the hypothesized uncertainty-induced saving response of (assumed risk-averse) economic agents to instability, neglecting the relation between exports and imports, in fact presuming the latter relationship relatively unimportant. Table 6 contains other results, however, that may be related to previous PIH studies. These results concern the use of 'aggregate instability indices'.[2]

Indeed, the results of regressions 5 and 7, in Table 6, cast doubts on the pertinence of using 'aggregate

---

[1] As in the previous section, the results for the two sub-periods are very similar to those of the 1961-1983 period. These results are also highly (statistically) significant. i.e. at the 1% level of significance, or better.

[2] These indices are the privileged measure of instability advocated by Knudsen and Parnes. See above, pp. 70-72.

instability indices' to study the effects of export instability. Namely, when regressing the import instability index on the *aggregate* instability indices (PY and PY^{imf}), the regression coefficients are not statistically different from zero, whereas they were highly significant when using *export* instability indices. If anything, these results indicate that it is indeed the export sector that is responsible for the instability of imports. They also suggest that the use of aggregate instability indices may be of little practical relevance when the main point of interest is the empirical determination of the effects of *export* instability.

IV. Investment and Instability

It has been shown, in the preceding sections, that instability, whether measured by the CA or the PIH indices, has manifested, over the 1961-1983 period, a tendency to decrease savings, and to be strongly associated with higher import instability. The association with the export growth rate (X_g), however, was extremely weak, and the tendency was dependent on the way instability was measured, the CA instability indices being (insignificantly) negatively associated with X_g, and the PIH export instability being (insignificantly) positively associated with X_g. According to the (simple) Harrod-Domar model derived in Chapter Four,

these results should translate in countries experiencing higher instability also having a lower investment to GDP ratio, independently of how instability is measured. Thus, all instability indices, even the PIH ones, should be negatively related to the rate of investment (I/Y). Thus the sign of λ in equation 18:

$$(18) \qquad I/Y = \kappa + \lambda(I^X)$$

should be negative. The results of regression analysis can be found in Tables 7 and 8.

A. The CA Results

Over the period 1961-1983, instability, as measured by the CA indices, was found to decrease savings and increase import instability, while the effect on X_g appeared to be negative, although insignificant. Accordingly, under the widely accepted hypotheses that import instability has a detrimental effect on capital formation, and that savings are necessary for investment, export instability should be expected to have a deleterious effect on the investment rate. This is indeed what the results indicate, as can be seen from Table 7.

Table 7

Regression Results
Investment and Export Instability (eq. 18)
(Conventional Indices. 27 countries: 1961-1983)

Dep. Var.	C	I^{lin}	I^{log}	I^{logl}	MBI	X_g	R^2	F-ratio
I/Y								
1.	.203 [3] (8.39)	-.09 (-.55)					-.03	.299
2.	.196 [3] (7.81)	-.06 (-.32)				.058 (1.03)	-.03	.682
3.	.226 [3] (8.88)		-1.9 (-1.5)				.042	2.14
4.	.220 [3] (8.26)		-1.7 (-1.2)			.047 (.864)	.032	1.43
5.	.228 [3] (10.6)			-1.90 [1] (-1.8)			.083	3.35 [1]
6.	-.22 (1.01)			-1.8 (-1.7)		.049 (.940)	.079	2.11
7.	.203 [3] (7.30)				-.19 (-.47)		-.03	.219
8.	.195 [3] (6.75)				-.09 (-.23)	.059 (1.04)	-.03	.655

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively; R^2 = coefficient of determination adjusted for degrees of freedom; X_g = export growth rate. 8 equations.)

Only one regression coefficient (equation 5), however, is significant (at the 10% level). It thus appears that barely any of the detrimental effects of instability on savings and imports have been transmitted to investment. It may be that these effects were too weak, or that they have been 'neutralized'. 'Neutralization' could have occurred, for example, if lower (gross domestic) savings had been 'supplemented' by foreign capital inflow,[1] and/or if fluctuations had taken place mainly in the consumption goods portion of imports, leaving capital goods imports relatively unaffected by variability, hence leaving the investment rate largely unaffected. Whatever the case may be, these results should not be interpreted as saying that export instability has had no detrimental effects on development. That the *quantity* of investment does not seem to have been affected does not mean that the *quality* of investment has not suffered. Unfortunately, our data do not allow to settle this question.

Over the two sub-periods (1961-1972 and 1972-1983), none of the instability regression coefficients is statistically different from zero. This is suggestive of the fact that the effects of instability on investment are felt somewhat more in the long-run than in the short-run,

---

[1] Mikesell and Zinser, 1973: pp. 12-15.

and is consistent with results reported in the literature.[1] Also, the regression coefficients of the exponential indices (I^{log} and I^{logl}) change sign in the first sub-period, becoming positive. It will be recalled that the exponential indices were similarly related to savings. That is, instability, as measured by I^{log} and I^{logl}, has shown a (very weak) tendency to be positively associated with the savings ratio (S/Y) and the investment rate (I/Y) in the 1960s, and inversely, to be negatively associated with both S/Y and I/Y in the 1970s, while only over the long-run (i.e. over the period 1961-1983) is the association significant, instability seemingly having a negative effect on S/Y and I/Y, this effect being much weaker on I/Y than on S/Y.

Finally, the inclusion of the growth rate of the value of exports (X_g) in the regression equations (equations 2, 4, 6 and 8 in Table 7), does not affect the results substantially, for the period 1961-1983. The only notable change is that the only significant previous coefficient[2] is no longer significant (at the 10% level), the value of

---

[1] See above, page 48, note 2.

[2] The coefficient of I^{logl} in equation 5.

the t-statistic passing from -1.831 to -1.678.[1] In the two sub-periods, all the coefficients stay insignificant and keep the same sign after inclusion of X_g. Of greater interest is the differential association between X_g and investment over different periods. Over all three periods, X_g is positively associated with the investment rate (I/Y). Only over the 1972-1983 period, however, is the association significant (at approximately the 1% level of significance). It cannot be determined, however, which way the relation goes; i.e., it is at least as likely that a higher investment rate be responsible for a higher export growth rate, as vice versa.

B. The PIH Results

The results obtained using the PIH *export* instability indices are very similar to those obtained with the CA indices. Although none of the regression coefficients of the instability indices[2] is statistically significant, they both harbor a negative sign (over all three periods), contrarily to the predictions of the PIH proponents. These results are in accord, however, with the results reported above, for it was found that the PIH export instability

---

[1] The critical t-value for a two-tail test with 25 degrees of freedom at the 10% level of significance is ∓1.708.

[2] Equations 1 and 3 in Table 8.

Table 8

Regression Results
Investment and Export Instability (eq. 18)
(PIH Indices. 27 countries: 1961-1983)

Dep. Var.	C	PX	PX^{imf}	PY	PY^{imf}	X_g	R^2	F-ratio
I/Y								
1.	.202[3] (13.4)	-.03 (-.88)					-.01	.773
2.	.203[3] (13.7)	-.04 (-1.2)				.076 (1.38)	.027	1.36
3.	.205[3] (15.3)		-.07 (-1.3)				.027	1.73
4.	.206[3] (15.8)		-.09 (-1.7)			.083 (1.54)	.078	2.10
5.	.190[3] (27.3)			-.01[3] (-3.4)			.283	11.3[3]
6.	.188[3] (26.5)			-.01[3] (-3.3)		.052 (1.13)	.290	6.32[2]
7.	.187[3] (26.5)				-.004[3] (-3.3)		.280	11.1[3]
8.	.186.[3] (25.7)				-.004[3] (-3.2)	.044 (.958)	.279	6.01[2]

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively. PX = PIHXI, PX^{imf} = $PIHXI^{imf}$, PY = PIHYI, PY^{imf} = $PIHYI^{imf}$, R^2 = coefficient of determination adjusted for degrees of freedom; X_g = export growth rate. 8 equations.)

indices were negatively associated with savings, and positively related to import instability. The present results (like the previous ones) tend to lend support to the conventional approach, rather than to the PIH.

As in the CA context (in the previous section), the export growth rate is positively associated with the investment rate (I/Y), and significantly so only over the 1972-1983 period. The inclusion of X_g in the regression equations (equations 2 and 4) changes the sign of the regression coefficients of PX and PX^{imf}, however, these coefficients becoming positive for the 1972-1983 period.[1] This suggests, once again, that the period sensitivity of the results is not only limited to the length of the period,[2] but is also related to the characteristics of the period.[3] The relative weight of the two phenomena (the influence of the length of the time-period as opposed to the influence of its characteristics), is not easily discernible, especially

---

[1] This is also true of the PY and PY^{imf} regression coefficients.

[2] i.e. the short-run versus the long-run.

[3] e.g. the relative stability of the 1960s versus the instability of the 1970s.

when a period such as the 1970s is concerned, period particularly filled with disturbing events for the LDCs.[1]

This period sensitivity is also apparent when regressing I/Y on the PIH *aggregate* instability indices, the sensitivity being much greater in this case. The greater sensitivity is shown by the fact that, over the entire period (1961-1983), aggregate instability (PY and PY^{imf}) is *negatively* and *significantly* associated (at the 1% level) with investment (I/Y), while over the 1972-1983 period, these two variables are *positively* and *significantly* associated (again at the 1% level).[2] These results are (once again) indicative of the risk of generalizing results obtained for a particular period to other periods. The sensitivity of the results to the choice of index is also evident. As the results of table 8 show, the PIH *export* instability indices are not (statistically) associated with the rate of investment,

---

1 Examples of such events are: the oil price shocks, the decrease in demand for primary (and manufactured) products from LDCs due to the 1974-75 recession, the sharp decrease in their terms of trade, the greater exchange rate variability following the collapse of the Bretton Woods system, the high inflation that many LDCs have experienced (especially in Latin America), and the high cost of foreign capital towards the end of the period.

2 The association between aggregate instability and I/Y during the first sub-period is negative and insignificant.

while there is a significant association (at the 1% level) between I/Y and the PIH *aggregate* instability indices. This is highly suggestive that the latter relationship is due (mainly) to the domestic instability component of the aggregate instability indices.

To test for this hypothesis, I/Y has been regressed on the domestic (PIHDI) and export (PIHXI) components of the PIH aggregate instability index.[1] The results, reported in table 9, clearly indicate a greater association between domestic instability and I/Y, than between I/Y and export instability. This association between PIHDI and I/Y is also more pronounced in the 1972-1983 period, which explains the change of sign of the coefficient of the PIH aggregate instability indices from negative, in the 1960s and over the long-run, to positive in the 1970s. The high (statistical) significance of these results puts into question the legitimacy of the PIH proponents' privileged practice of using aggregate instability indices in the study of the effects of export instability, and casts great doubts on the validity of their conclusions. Moreover, the nature of our results, in the light of the findings reported in the previous sections, suggests a positive effect of higher investment rates on domestic instability,

---

[1] See Chapter Four, pp. 70-72..

and a negative effect of export instability on the investment rate. For a proper analysis of these results, however, it is necessary to first introduce the findings concerning the relation between economic growth and instability.

Table 9

Regression Results
Investment and Domestic Instability
(PIH Indices. 27 countries: three periods)

Dep. Var.	C	PIHDI	PIHXI	R^2	F-ratio
I/Y					
1961-1983					
1.	.201 [3] (16.1)	.003 [3] (3.53)	-.045 (-1.5)	.308	6.79 [3]
1961-1972					
2.	.174 [3] (17.2)	.004 [1] (2.05)	-.07 (-.77)	.098	2.42
1972-1983					
3.	.224 [3] (16.8)	.008 [3] (4.06)	-.09 [2] (-2.3)	.405	9.83 [3]

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively. R^2 = coefficient of determination adjusted for degrees of freedom. 3 equations. PIHDI = PIH Domestic instability index, PIHXI = PIH export instability index)

V. Growth and Instability

As explained in Chapter Four, test for association between instability and (per capita) GDP growth rate (Y_g) is conducted in a Harrod-Domar framework, in which Y_g is made a (linear) function of the investment rate (I/Y):

$$(13) \qquad Y_g = (1/k)(I/Y)$$

I/Y, in turn, is made to vary (positively, in the case of the PIH, and negatively, in the CA framework) with instability (I^x):

$$(18) \qquad I/Y = \kappa + \lambda(I^x)$$

Simple substitution (of eq. 18 in eq. 13) yields the following equation:

$$(19) \qquad Y_g = \mu + \nu(I^x)$$

with ν assumed positive by the PIH proponents, and negative by the CA proponents. Thus, in this Harrod-Domar framework, the effect of instability on growth depends directly on the effect of instability on investment. In the previous section, a (weak) negative association was found between investment and instability, whether instability was measured by the PIH or CA indices. In the light of these results, regression analysis should reveal a

(weak) negative association between Y_g and I^x, independently of the way of measuring instability.

A. The CA Results

The results reported in table 10 indicate that instability had no significant effect on the per capita GDP growth rate (Y_g) during the 1961-1983 period.[1] The *tendency*, however, differs depending on how instability is measured. Thus, the tendency appears to be positive when instability is measured by I^{lin} or MBI, and it is negative when instability is measured by an exponential index.[2] In the first sub-period, only the MBI's regression coefficient is positive, while for the 1972-1983 period, all the regression coefficients are negative. This (generally negative) association between instability and economic growth is in line with the findings reported in the previous sections. The inclusion of X_g in the regression equations does not alter these results significantly. The negative association between X_g and Y_g is unexpected, however.

---

1 The same conclusion is reached for the two sub-periods.

2 I^{log} and I^{logl}.

Table 10

Regression Results
Per capita GDP Growth Rate and Export Instability (eq. 19)
(Conventional Indices. 27 countries: 1961-1983)

Dep. Var.	C	I^{lin}	I^{log}	I^{logl}	MBI	X_g	R^2	F-ratio
Y_g								
1.	-.05 (-.77)	.014 (.034)					-.04	.001
2.	-.01 (-.15)	-.18 (-.47)				-.30 (-2.45)	.133	3.01[1]
3.	.002 (.034)		-2.5 (-.76)				-.02	.573
4.	.046 (.786)		-4.3 (-1.42)			-.33 (-2.7)	.193	4.11[1]
5.	-.004 (-.08)			-1.99 (-.77)			-.02	.587
6.	.023 (.466)			-2.9 (-1.2)		-.31 (-2.61)	.175	3.77[1]
7.	-.07 (-1.0)				.378 (.398)		-.03	.158
8.	-.03 (-.42)				-.09 (-.09)	-.29 (-2.4)	.126	2.87

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively; R^2 = coefficient of determination adjusted for degrees of freedom; X_g = export growth rate. 8 equations.)

Indeed, the regression coefficients of X_g[1] indicate a (statistically significant) negative association between Y_g and X_g, contrarily to the generally accepted view that a higher X_g should lead to a higher Y_g. In view of the fact that, for the 1961-1972 period, the relation between X_g and Y_g is positive (and significant at the 1% level), it would appear that the negative association of the 1961-1983 period is in some way determined by a third factor contributing to the high instability of the 1970s.[2] For example, in reaction to the increase in the value of imports following the oil price rises of the 1970s, many LDCs adopted a policy of export promotion (in order to satisfy the now greater need of foreign exchange) accompanied by severe domestic contractionary measures. This practice may have led to a substantial, although insufficient, increase in export earnings, the net result on GDP growth being negative. Unfortunately, our data do not permit testing for this hypothesis.

---

1 In equations 2, 4, 6 and 8, in table 10.

2 The association between X_g and Y_g for the 1972-1983 period is also negative, although insignificant.

B. The PIH Results

The results obtained using the PIH indices, reported in table 11, tend to confirm the (weak) negative association between Y_g and export instability. These results are again sensitive to the choice of index and the period covered. While both export instability indices (PX and PX^{imf}) are negatively associated with Y_g over the 1961-1983 period,[1] over the sub-periods the association between Y_g and PX^{imf} is still negative, while the association between PX and Y_g is positive. In both cases, the association is insignificant. Including X_g in the regression equations only marginally alters the results. As in the previous section, the association between X_g and Y_g is negative in the 1961-1983 and 1972-1983 periods, and positive in the 1961-1972 period.

If the aggregate instability indices are used intead, the association is still negative and significant (at the 10% level) in one instance.[2] Inclusion of X_g increases the significance of this association, while the opposite is

---

1 The only statistically significant association is the one between Y_g and PX^{imf} in equation 3. The level of significance is 10%.

2 PX in regression equation 5, table 11.

Table 11

Regression Results
Per capita GDP Growth Rate and Export Instability (eq. 19)
(PIH Indices. 27 countries: 1961-1983)

Dep. Var.	C	PX	PX^{imf}	PY	PY^{imf}	X_g	R^2	F-ratio
Y_g								
1.	-.002 (.062)	-.13 (-1.5)					.051	2.39
2.	-.002 (-.06)	-.09 (-1.1)				-.26 (-2.2)	.170	3.67[1]
3.	.004 (.127)		-.23 (-1.9)[1]				.091	3.63[1]
4.	.001 (.039)		-1.8 (-1.5)			-.25 (-2.1)	.199	4.23[1]
5.	-.05 (-2.4)[2]			-.16 (-1.8)[1]			.075	3.12[1]
6.	-.03 (-1.9)[1]			-.02 (-2.2)[2]		-.31 (-2.8)	.268	5.77[2]
7.	-.05 (-2.5)[2]				-.005 (-1.5)		.044	2.19
8.	-0.4 (-2.1)[2]				-.006 (-2.0)[1]	-.32 (-2.8)	.249	5.31[2]

(C = constant; t-statistics in parentheses; [1], [2] and [3] indicate significance at the 10, 5 and 1 percent level, respectively. PX = PIHXI, PX^{imf} = $PIHXI^{imf}$, PY = PIHYI, PY^{imf} = $PIHYI^{imf}$, R^2 = coefficient of determination adjusted for degrees of freedom; X_g = export growth rate. 8 equations.)

true when X_g is included in the regression equations using *export* instability indices.

VI. Summary and Conclusion

Our empirical investigation has shown that export instability, whether measured by the CA or the PIH instability indices, has manifested a tendency to decrease savings, and to be strongly associated with import instability. The association with the export growth rate, however, was extremely weak. These relationships, in turn, are translated in export instability being (very weakly) negatively associated with the investment rate and the per capita GDP growth rate. Overall, our results would tend to lend some support to the conventional approach. The significance of these results, especially for policy concerns, cannot be properly assessed, however, without a prior discussion of the limitations of this study. The limitations and policy implications of this investigation will be addressed in the next chapter.

CHAPTER SIX

CONCLUSION

I. Causes and Effects of Instability

The review of the literature on the causes of export earnings instability has revealed a wide variety of assumed responsible factors, none of which, however, has been found to be unambiguous. Indeed, the empirical studies have produced conflicting results. Both demand variations and supply variations have been claimed to be the main source of instability. Similarly, both price fluctuations and quantity fluctuations have been found to be the main contributors to export proceeds variations. There is also conflicting evidence as to whether or not structural trade determinants (such as commodity composition, commodity concentration, geographic concentration and market share) can be held responsible for instability. Only on the influence of the "size of exports" and the "degree of openness" does there seem to be consensus, the findings indicating that these variables lead to lower instability. Ambiguity still persists, however, for the "size of exports" may just be a proxy measure for economic size.

The review of the literature on the effects of export instability on development has shown that neither of the two opposing approaches (the Conventional Approach and the Permanent-Income Hypothesis) to the study of instability could be unequivocally supported. Indeed, some empirical studies have found instability to have positive effects, while others have found that it had negative effects on (important) development goals and/or indicators, such as savings, capital formation and income growth. Mixed results were also obtained on the effects of instability on export growth and on fluctuations in foreign exchange reserves, while no association was found between instability and the quality of investment. The only unchallenged results seem to be for instability to increase indebtedness, inflation and fluctuations in government revenues and expenditures, with no apparent further implications, however.[1] These results must be interpreted with caution, for they have been found to be sensitive to the sample, time-period and particular instability measures used.

This sensitivity of the results was also apparent in our own empirical investigation, which prevents us from

---

[1] No study could be found relating instability to income distribution, capacity utilization or diversion of public resources.

drawing any clear-cut conclusion. Nevertheless, an overall evaluation of the regression results suggests a (very) weak *tendency* for instability to have detrimental effects on savings, investment and per capita income growth, independently of the approach taken (CA or PIH), this tendency being slightly more pronounced when using the CA instability indices. It is also worth noting that the strongest association is the one between export fluctuations and import fluctuations. Indeed, in all regressions of import instability on export instability (whether the latter was measured by the CA or PIH instability indices), the association was found to be positive and (highly) significant, over all three periods. This result, however, may simply be a statistical curiosity due to data peculiarities. This would be but one of the many problems occurring in cross-country analysis, as will be seen in the next section.

II. Limitations of the Study

Before proceeding to a discussion of the policy implications of the results briefly summarized in the previous section, it is important to evaluate the validity of the findings in the light of a critical assessment of the approach adopted. The problems discussed in this section are not intended to form an exhaustive list, but rather to illustrate some of the shortcomings of the method chosen. Several of these problems, which concern the sample, the data, the time-period(s) and the particular model employed, are not exclusive to the present empirical study, but plague most of the cross-sectional studies of the effects of instability on development.

A. The Sample

Examination of the sample reveals that three countries have a relatively low export-income ratio,[1] two countries are commonly considered as Newly Industrialized Economies,[2] and one country is not generally considered as an LDC.[3] Inclusion of these countries may bias the results, inasmuch as the study is primarily concerned with the effects of

---

[1] India: .06; Pakistan: .1; Mexico: .1.

[2] Korea and Singapore.

[3] South Africa.

exports instability on *Less Developed Countries*. Some other important characteristics of the countries of the sample may also bear significantly on the results. For example, some countries[1] have seen the re-establishment of positive real interest rates after the quadrupling of oil prices of 1973-74, while others[2] were still experiencing negative real interest rates.[3] Inasmuch as changes in real interest rates affect domestic savings ratios, these changes have undoubtedly introduced distortions in the results. Distortions may also have been introduced by other determinants of the savings rate: for example, the relative importance of the rural and urban sectors,[4] political instability,[5] etc. Yet other factors may have substantially affected the results, as, for example, participation in an international commodity agreement, monetary, fiscal and trade policies, or the use of

---

1 Korea, Singapore, Thailand, India and Tunisia.

2 Morocco, Jamaica, Nigeria and Peru.

3 Balassa, 1982: pp. 28-29.

4 Gupta (1970a: p. 579) found "the marginal propensity to save of the urban sector (to be) much higher than that of the rural sector".

5 The savings ratio of Jamaica fell from 25% before 1972 to 10% in 1976-77 after the installation of the Manley government in 1972. Similarly, the political and economic uncertainty under General Velasco decreased Peru's savings ratio from 16% in 1970-71 to 11% in 1974-75. Balassa, 1981: p. 21.

compensatory financing facilities. For example, five countries of the sample (Dominican Republic, Jamaica, Ethiopia, Ghana and Malawi) were STABEX members,[1] and all countries of the sample but four (Nigeria, Colombia, Singapore and Mauritius) had recourse to the IMF Compensatory Financing Facility between 1975 and 1983.

B. The Data

At a general level, it has been pointed out that the results of cross-sectional studies based on aggregate data for developing countries must be interpreted with caution. "This is true not only because of unreliability and internal inconsistency of the estimates of the individual countries, but also because of the varying methodology employed in the derivation of the data between countries".[2] More specific to our study, it might have been preferable to use GNP data rather than GDP data, for "GDP includes profits repatriated overseas".[3] Thus if foreign companies allow profits to fluctuate, ceteris paribus, then using GDP may introduce distortions if the degree of foreign

---

1 Hewitt, 1987: p. 621.

2 Mikesell and Zinser, 1973: p. 2.

3 Lim, 1976: p. 313.

ownership varies substantially across LDCs.[1] Questions may also be raised as to whether the use of the official (SDR) exchange rate was appropriate, rather than using the real exchange rate, for many countries have had recourse to frequent changes in the valuation of their exchange rate.[2] These changes may have led to an incorrect measurement of the growth rates and instability indices.[3]

C. The Time-Period

The main problem with respect to the time-period(s) concerns the calculation of the trend(s) of the value of exports and imports, which is an essential part of the construction of the (exports and imports) instability indices. First, tne results obtained using instability indices calculated over long versus short periods may not be directly comparable, because the trend that is removed in the calculation of these indices may fit better in the

---

1 GDP was nevertheless chosen over GNP, due to greater availability of data.

2 Todaro, 1985: p. 305.

3 "The changes in trade values that are recorded from year to year reflect not only changes that are due to price and volume but also changes resulting from fluctuating exchange rates. Thus trade data from 1972 onward are subject to an additional influential factor and should be interpreted with care". IMF, 1988: p. v.

short-run than in the long-run.[1] Thus, the "use of a longer time series seems, therefore, to yield somewhat misleading results as it captures little of the more current levels of export instability".[2] Secondly, inclusion of the 1972-74 period may yield misleading results because the "price boom due to the oil crisis inflated the monetary value of world exports in such a way as to invalidate trend analysis".[3] We may add that this is also intensified by the exchange rate instability that followed the collapse, in the early 1970s, of the Bretton Woods par value system, and by "changes in rates of interest and in the flows of financial resources, including speculative funds, from the commercial capital markets".[4]

D. The Model

The problems discussed above indicate that: on the one hand, the countries of the sample have gone through a great diversity of experiences and that they have certainly adjusted differently to fluctuations; on the other hand, the instability indices surely captured more than just

---

1 Guillaumont, 1985: p. 42.

2 Naya, 1973: p. 632, note 12.

3 Lancieri, 1978: p. 141.

4 Maizels, 1987: p. 538.

export instability. This is suggestive of the fact that the cross-sectional approach "runs into the danger of aggregating the (instability) problem away".[1] The cross-sectional approach has also been criticized for several other reasons. One major criticism concerns the misspecification of most models.[2] More specifically, important explanatory variables are most often omitted (as was illustrated above, page 119, in the case of savings). Thus, the "correlations found may be quite unrelated to causality".[3] This causality is also usually assumed to be unidirectional, for example running from instability to other key variables such as savings, and from savings to growth. But growth may also affect savings,[4] and instability may well be endogenous.[5]

The above few critical observations are surely sufficient to warrant serious skepticism about the statistical results of this empirical investigation and of

---

1 Wilson, 1983: p. 47.

2 Smith, 1978: p. 177; Papanek, 1973: p. 129; Savvides, 1984: p. 611.

3 Papanek, 1973: p. 129.

4 Fry, 1986: p. 29; Lipsey and Kravis, 1987: pp. 47-48.

5 For example, as suggested by Behrman (1987: p. 565), instability may be endogenous because of market power or domestic policies. Also, Savvides, 1984: p. 611.

most of the (CA and PIH) studies of the effects of instability on growth. But this does not necessarily lead one to conclude that instability does not have any effect on development, "since the costs of instability are likely to show up in other ways than in lowered average growth rates".[1] Accordingly, the next section will briefly review the main international stabilization instruments under the assumption that there are costs incurred (in terms of foregone development opportunities), but that the extent of these costs is largely unknown.

III. Policy Implications

Instruments dealing (directly or indirectly) with export instability can be grouped into three broad categories: 1. Domestic macroeconomic policies (e.g. fiscal and monetary policies); 2. National trade policies (e.g. export subsidies, export quotas, national buffer funds and national buffer stocks; 3. International commodity agreements and other international institutions (e.g. international buffer stocks, multilateral contracts, futures markets and compensatory financing). The approach taken having been essentially of a cross-country (international) character, and much of the debate

---

[1] Smith, 1978: p. 177.

surrounding stabilization policies having been concerned mainly with the international stabilization instruments, the discussion here will be limited to these latter instruments.

A. International Buffer Stocks

The purpose of buffer stocks is to reduce the volatility of primary commodity price movements. In order to keep the price of a primary commodity within a chosen range, the buffer stock authority buys (and stockpiles) enough of the commodity to keep the price higher than the floor price, and sells when the price exceeds the ceiling price. Thus profits and capital losses are possible. Two types of costs are involved. The first is the cost of storage, which may be considerable for some commodities. More important is the cost of financing: the higher the degree of price stability desired, the higher the financing costs. The costs will also depend on the size of the shifts in demand and supply, and on the price elasticities of demand and supply.

The benefits of an international buffer stock to LDCs presumably would be its positive effects on the level and stability of export earnings. It has been found that, in the presence of price stabilization, shifts in supply will

increase but destabilize export revenues, while shifts in demand will stabilize but decrease export revenues.[1] Thus the benefits of greater stability would be more or less offset by lower export proceeds (in the case of shifting demand), and the benefits of higher export earnings would be more or less offset by greater instability (in the case of shifting supply). The costs of storage and financing, together with the risk of capital losses and the uncertainty of the gains, may prove to exceed the dubious benefits of price stabilization. This assessment would be modified, however, if LDCs succeeded in using buffer stocks to apply effective pressure on the secular price trend, i.e. raising the terms of trade.

B. Multilateral Contracts

A multilateral contract, probably the most widely used method of commodity control, is a long-term agreement between several producing and consuming countries about the price and/or quantity of a traded commodity. Although arrangements of this type have economic justifications, they often have been politically motivated.[2] While providing LDCs with some assurance against market

---

[1] Nguyen, 1980: pp. 128-9; Radetzki, 1974: p. 18.

[2] Law, 1975: p. 71; Radetzki, 1970: pp. 73-75.

fluctuations, their stabilizing influence is limited by the political whims of importing countries and by the ease of withdrawal of all parties.

Whether LDCs benefit from such arrangements will depend on their relative strengths in the bargaining process with the importing countries, mainly DCs. While both parties are interested in stability of prices and quantities, their interests will conflict with regard to the price level. Unless LDCs have cartelistic potential, they are likely to be in an inferior position relatively to DCs. The cost to LDCs of higher price and quantity stability, therefore, might well be accepting a lower price level, which would translate into export earnings stability at the cost of lower export revenues.

C. Futures Markets

"Futures markets (...), by allowing future supplies and demands to be traded currently, provide a means for traders to exchange uncertainty of future spot prices for certain contractual prices".[1] By reducing the uncertainty caused by short-run market instability, and by providing information on future demand and supply conditions, futures markets may make a positive contribution to facilitating

---

[1] Harris et al., 1978: p. 11.

development in LDCs. Price stability, however, does not guarantee export earnings stability. Moreover, futures markets provide trading facilities for only a short period in the future (rarely more than eighteen months): that is, given that some commodities have long supply lags, the period covered by futures markets will often be too short to provide effective stabilization. Another possible shortfall is that speculation may actually be destabilizing.

D. Compensatory Finance

Compensatory finance schemes may take many forms, and their malleability makes it possible to design them so as to serve specific purposes, such as stabilizing LDCs' export earnings. These are "directly stabilized by compensatory drawing from a stabilization fund that are repaid when export earnings next recover".[1] Compensatory finance schemes are said to be superior to standard international commodity agreements for two main reasons: first, they can (potentially) eliminate all fluctuations in export earnings, allowing LDCs' development activities to progress under much less uncertainty, and, second, they do

---

[1] Hallwood, 1979: p. 81.

not interfere with the market allocation of resources.[1] The major cost to LDCs will be the interest charges to be paid on the loan.[2] Thus, inasmuch as interest payments could be kept low, and in view of the certain costs, uncertain benefits, and dubious future of ICAs,[3] and the limited usefulness of futures markets, it would appear that, given the uncertain effects of instability on development, compensatory financing facilities may be the more appropriate (international) stabilization instruments.

---

1 Despite their considerable flexibility, these schemes, however, have not been free from criticisms. For example, the main institution in this category, the IMF-Compensatory Financing Facility, has been criticized for its provisions concerning: i) its access mechanisms; ii) its method for determining the amplitude of fluctuations; and iii) the extent of its coverage.

2 Compensation may also be on a grant basis, but this system increases the risk of conflict with importing DCs and opens the door to deliberate manipulation of exports in order to maximize compensation.

3 Gilbert, 1987: p. 591.

BIBLIOGRAPHY

Adams, F.G. and J.R. Behrman: *Commodity Exports and Economic Development*, Lexington Books, Lexington, Mass., 1982.

Adams, F.G., J.R. Behrman and M. Lasaga: "Commodity Exports and NIEO Proposals for Buffer Stocks and Compensatory Finance", in *Export Diversification and the New Protectionism*, W. Baer and M. Gillis, Eds., University of Illinois, Cambridge, Mass., 1981.

Ady, P.: "International Commodity Policy", in *Economic Development and Structural Change*, I.G. Stewart, Ed., pp. 26-47, Edinburgh University Press, Edinburgh, 1969.

Askari, H. and G. Weil: "Export Instability: A Rejoinder", *Banca Nazionale del Lavaro Quarterly Review*, vol. 31, pp. 191-192, June 1978.

_____: "Stability of Export Earnings of Developing Nations", *Journal of Development Studies*, vol. 11, pp. 86-90, October 1974.

Balassa, B.: "Structural Adjustment Policies in Developing Economies", *World Development*, vol. 10, pp. 23-38, 1982.

_____: "Policy Experience of Twelve Less Developed Countries, 1973-1978", *World Bank Staff Working Papers*, No. 449, The World Bank, Washington, April 1978.

Behrman, J.R.: "Commodity Price Stability and Economic Goal Attainment in Developing Countries", *World Development*, vol. 15, pp. 559-573, 1987.

_____: "The Importance of Supply and Demand Variations in Earnings Instability: Comment", *Economic Development and Cultural Change*, vol. 33, pp. 167-170, October 1984.

Bergevin, J. and A.P. Thirlwall: "Trends, Cycles and Asymmetries in the Terms of Trade of Primary Commodities from Developed and Less Developed

Countries", *World Development*, vol. 13, pp. 805-817, 1985.

Bieri, J. and A. Schmitz: "Export Instability, Monopoly Power, and Welfare", *Journal of International Economics*, vol. 3, pp. 389-396, 1973.

Bond, M.E.: "An Econometric Study of Primary Commodity Exports from Developing Country Regions to the World", *IMF Staff Papers*, vol. 34, pp. 191-227, June 1987.

Brainard, W.C. and R.N. Cooper: "Uncertainty and Diversification in International Trade", *Food Research Institute Studies in Agricultural Economics, Trade, and Development*, vol. 8, pp. 257-285, 1968.

Brodsky, D.A.: "Exchange Rate Changes and the Measurement of Export Instability", *Oxford Bulletin of Economics and Statistics*, vol. 45, pp. 289-296, August 1983.

_____: "Decomposable Measures of Economic Instability", *Oxford Bulletin of Economics and Statistics*, vol. 42, pp. 361-374, 1980.

Brook, E.E., E. Grilli and J Waellbroeck: "Commodity Price Stabilization and Developing Countries", *Banco Nazionale del Lavaro Quarterly Review*, pp. 79-99, March 1978.

Brown, A: "On Measuring the Instability of Time Series Data: A Comment", *Oxford Bulletin of Economics and Statistics*, vol. 41, pp. 249-250, 1979.

Brundell, P., H. Horn and P. Svedberg: "More on the Causes of Instability in Export Earnings: Reply", *Oxford Bulletin of Economics and Statistics*", vol. 45, pp. 385-8, November 1983.

_____: "On the Causes of Instability in Export Earnings", *Oxford Bulletin of Economics and Statistics*, vol. 43, pp. 301-313, 1981.

Caceres, L.R.: "Economic Integration and Export Instability in Central America: A Portfolio Model", *Journal of Developing Studies*, vol. 15, pp. 141-153, April 1979.

_____: "Consumption Function for Latin America", *Intermountain Economic Review*, vol. IV, pp. 55-63, 1973.

Caine, S.: *Prices for Primary Producers*, Hobart Paper 24, Institute of Economic Affairs Limited, London, 1966.

_____: "Instability of Primary Product Prices: A Protest and a Proposal", *Economic Journal*, vol. 64, pp. 610-614, 1954.

Charette, M.F.: "Determinants of Export Instability in the Primary Commodity Trade of LDCs", *Journal of Development Economics*, vol. 18, pp. 13-21, May-June 1985.

CNUCED (UNCTAD): *Le Financement Compensatoire des Deficits de Recettes d'Exportation*, Rapport du Groupe d'Experts, Nations Unies, New York, 1985.

Coppock, J.D.: *International Economic Instability*, McGraw-Hill, New York, 1962.

Cuddy, J.D.A. and P.A. Della Valle: "Measuring the Instability of Time Series Data", *Oxford Bulletin of Economics and Statistics*, vol. 40, pp. 79-85, 1978.

Della Valle, P.A.: "On the Instability Index of Time Series Data: A Generalization", *Oxford Bulletin of Economics and Statistics*, vol. 41, pp. 247-248, 1979.

Erb, G.F. and S. Schiavo-Campo: "Export Instability, Level of Development and Economic Size of Less Developed Countries", *Oxford Bulletin of Economics and Statistics*, vol. 31, pp. 263-283, 1969.

Friedman, M.: *A Theory of the Consumption Function*, Princeton University Press, Princeton, 1957.

Friend, I. and P. Taubman: "The Aggregate Propensity to Save: Some Concepts and their Application to International Data", *Review of Economics and Statistics*, vol. 48, pp. 113-123, 1966.

Fry, M.J.: "National Saving, Financial Saving and Interest Rate Policy in Asian Developing Economies", *Savings for Development*, pp. 29-46, Department of International Economic and Social Affairs, United Nations, New York, 1986.

Gilbert, C.L.: "International Commodity Agreements: Design and Performance", *World Development*, vol. 15, pp. 591-616, May 1987.

Gillis, M., D.W. Perkins, M. Roemer and D.R. Snodgrass: *Economics of Development*, W.W. Norton and Company, New York, 1987.

Glezakos, C.: "Export Instability and Economic Growth: Reply", *Economic Development and Cultural Change*, vol. 32, pp. 615-623, April 1984.

_____: "Instability as a Stimulus to Export Growth: A Classical Case of Tautological Findings", *Economia Interzionale*, vol. 35, pp. 458-469, 1982.

_____: "Inflation and Growth: A Reconsideration of the Evidence from the LDCs", *Journal of Developing Areas*, vol. 12, pp. 171-181, January 1978.

_____: "Export Instability and Economic Growth", *Economic Development and Cultural Change*, vol. 21, pp. 670-78, 1973.

Glezakos, C. and J.F. Nugent: "More on the Causes of Instability in Export Earnings", *Oxford Bulletin of Economics and Statistics*, vol. 45, pp. 379-83, November 1983.

Guillaumont, P.: "From Export Instability Effects to International Stabilization Policies", *World Development*, vol. 15, pp. 633-643, 1987.

_____: *Economie du Developpement*, Themis, Presses Universitaires de France, Tome 3, Paris, 1985.

Gupta, K.L.: "On some Determinants of Rural and Urban Households Saving Behaviour", *The Economic Record*, vol. 46, pp. 598-583, December 1970a.

_____: "Personal Saving in Developing Nations: Further Evidence", *The Economic Record*, vol. 46, pp. 243-249, June 1970b.

Hallwood, P.: *Stabilization of International Commodity Markets*, Jai Press, 1979.

Harris, S., M. Salmon and B. Smith: *Analysis of Commodity Markets for Policy Purposes*, Trade Policy Research Centre, Ditchling Press, London, 1978.

Helleiner, G.K.: *International Trade*, Penguin Books, England, 1972.

Hewitt, A.P.: "Stabex and Commodity Export Compensation Schemes: Prospects for Globalization", *World Development*, vol. 15, pp. 617-631, May 1987.

Hirschman, A.O.: "Primary Products and Substitutes: Should Technological Progress be Policed?", *Kyklos*, vol. 12, pp. 354-361, 1959.

Hueth, D. and A. Schmitz: "International Trade in Intermediate and Final Goods: Some Welfare Implications of Destabilized Prices", *Quarterly Journal of Economics*, vol 86, pp. 351-365, August 1972.

IMF: *International Financial Statistics*, Washington, D.C., 1987.

_____: *International Financial Statistics*, Supplement on Trade Statistics, Supplement Series No. 15, Washington, D.C., 1988.

Johnston, J.: *Econometrics Methods*, McGraw Hill, New York, 1963.

Karunasekera, M.V.D.J.: *Export Taxes on Primary Products: A Policy Instrument in International Development*, Commonwealth Economic Papers, No. 19, Commonwealth Secretariat, London, 1984.

Katrak, H.: "Commodity Concentration and Export Fluctuations: A Probability Analysis", *Journal of Development Studies*, vol. 9, pp. 556-565, July 1973.

Kenen, P. and C. Voivodas: "Export Instability and Economic Growth", *Kyklos*, vol. 25, pp. 791-804, 1972.

Kmenta, J.: *Elements of Econometrics*, Macmillan, New York, 1971.

Knudsen, O.K. and A. Parnes: *Trade Instability and Economic Development: An Empirical Study*, Lexington Books, Lexington, Mass., 1975.

Knudsen, O.K. and P.A. Yotopoulos: "A Transitory Income Approach to Export Instability", *Food Research Institute Studies*, vol. XV, pp. 91-108, 1976.

Labys, W.C.: "Commodity Price Stabilization Models: A Review and Appraisal", *Journal of Policy Modeling*, vol. 2, pp. 121-136, 1980.

Lancieri, E.: "Export Instability and Economic Development: A Reappraisal", *Banca Nazionale del Lavoro Quarterly Review*, pp. 139-152, 1978.

Laumas, G.S. and P.S. Laumas: "The Permanent Income Hypothesis in an Underdeveloped Economy", *Journal of Development Economics*, vol. 3, pp. 289-297, 1976.

_____: "On How to Calculate Permanent Income", *Review of Income and Wealth*, vol. 18, pp. 435-438, 1972.

Laumas, P.S.: "Exports and the Propensity to Save", *Economic Development and Cultural Change*, vol. 30, pp. 831-841, 1982.

Law, A.D.: *International Commodity Agreements*, Lexington Books, Lexington, Mass., 1975.

Lawson, C.W.: "Changes in the Export Instability of LDC's - A Dissenting Note", *Banca Nazionale del Lavaro Quarterly Review*, vol. 33, pp. 105-107, 1980.

_____: "The Decline in World Export Instability: A Reappraisal", *Oxford Bulletin of Economics and Statistics*, vol. 36, pp. 53-65, 1974.

Lawson, C.W. and C. Thanassoulas: "Commodity Concentration and Export Instability: A Missing Link or Hunting a Snark?", *Oxford Bulletin of Economics and Statistics*, vol. 43, pp. 201-206, 1981.

Lee, K.H.: "Exports and the Propensity to Save in LDCs", *The Economic Journal*, vol. 81, pp. 341-351, June 1971.

Leith, J.C.: "The Decline in World Export Instability: A Comment", *Oxford Bulletin of Economics and Statistics*, vol. 32, pp. 267-272, 1970.

Lim, D.: "Export Instability, Investment and Economic Growth in Developing Countries", *Australian Economic Papers*, vol. 26, pp. 318-27, 1987.

_____: "Export Instability and Revenue Instability in Less Developed Countries", *The Malayan Economic Review*, vol. 26, pp. 46-52, October 1981.

_____: "Income Distribution, Export Instability, and Savings Behavior", *Economic Development and Cultural Change*, vol. 28, pp. 359-364, 1980.

_____: "Export Instability and Economic Growth", *Oxford Bulletin of Economics and Statistics*, vol. 38, pp. 311-322, 1976.

Lipsey, R.E. and I.B. Kravis: *Saving and Economic Growth*, Conference Board Research Report No. 901, Conference Board, Washington, D.C., 1987.

Little, I.M.D.: *Economic Development: Theory, Policy, and International Relations*, Basic Books, New York, 1982.

Love, J.: "Export Instability and Recurrent and Development Expenditure in a Sample of Developing Countries", *Journal of Developing Areas*, vol. 24, pp. 19-26, October 1989a.

_____: "Export Instability, Imports and Investment in Developing Countries", *Journal of Development Studies*, vol. 25, pp. 183-191, January 1989b.

_____: "Commodity Concentration and Export Earnings Instability", *Journal of Development Economics*, vol. 24, pp. 239-248, December 1986a.

_____: "Currency of Denomination and the Measurement of Export Instability", *Journal of Development Studies*, vol. 23, pp. 106-113, October 1986b.

_____: "Export Instability: An Alternative Analysis of Causes", *Journal of Development Studies*, vol. 21, pp. 244-252, January 1985.

_____: "Concentration, Diversification and Earnings Instability: Some Evidence on Developing Countries' Exports of Manufactures and Primary Products", *World Development*, vol. 11, pp. 787-793, 1983.

_____: "Trade Concentration and Export Instability", *Journal of Development Studies*, vol. 15, pp. 60-69, 1979.

_____: "The Decline in Export Instability?", *Oxford Bulletin of Economics and Statistics*, vol. 39, pp. 355-359, 1977.

MacBean, A.I.: "Trade Instability and Economic Development, by O.Knudsen and A.Parnes, A Review", *Journal of Development Studies*, vol. 13, October 1976.

_____: *Export Instability and Economic Development*, George Allen & Unwin, London, 1966.

Maizels, A.: "Commodities in Crisis: An Overview of the Main Issues", *World Development*, vol. 15, pp. 537-549, 1987.

_____: "Selected Issues in the Negotiation of International Commodity Agreements", *Trade and Development*, pp. 52-78, UNCTAD, Winter 1981.

_____: *Exports and Economic Growth of Developing Countries*, Cambridge University Press, London, 1968.

Massell, B.F.: "Export Instability and Economic Structure", *American Economic Review*, vol. 60, pp. 618-630, September 1970.

_____: "Export Concentration and Fluctuations in Export Earnings: A Cross-Section Analysis", *American Economic Review*, vol. 54, pp. 47-63, March 1964.

Mathieson, D.J. and R.I. McKinnon: "Instability in Underdeveloped Countries: The Impact of the International Economy", in *Nations and Households in Economic Growth*, P.A. David and M.W. Reder, Eds., Academic Press, New York, 1974

Michaely, M.: "Exports and Growth: An Empirical Investigation", *Journal of Development Economics*, vol. 4, pp. 49-53, 1977.

_____: *Concentration in International Trade*, North-Holland, Amsterdam, 1967.

Mikesell, F. and J.E. Zinser: "The Nature of the Savings Function in Developing Countries: A Survey of the Theoretical and Empirical Literature", *Journal of Economic Literature*, vol. 11, pp. 1-26, March 1973.

Moran, C.: "Export Fluctuations and Economic Growth", *Journal of Development Economics*, vol. 12, pp. 195-218, 1983.

Mullor-Sebastian, A.: "A New Approach to the Relationship between Export Instability and Economic Development",

Economic Development and Cultural Change, vol. 36, pp. 217-236, January 1988.

Murray, D.: "Statistical Measurement of Export Earnings Instability", *The Malayan Economic Review*, vol. 23, pp. 87-98, April 1978a.

_____: "Export Earnings Instability: Price, Quantity, Supply, Demand?", *Economic Development and Cultural Change*, vol. 27, pp. 61-73, 1978b.

Nations Unies: *Etude sur l'Economie mondiale: Tendances et Politiques Economiques Actuelles dans le Monde*, New York, 1988.

Naya, S.: "Fluctuations in Export Earnings and Economic Patterns Of Asian Countries", *Economic Development and Cultural Change*, vol. 21, pp. 629-641, July 1973.

Newbery, D.M.G. and J.E. Stiglitz: *The Theory of Commodity Price Stabilization*, Clarendon Press, Oxford, 1981.

Nguyen, D.T.: "The Effects of Partial Price Stabilization on Export Earnings Instability and Level", in *Commodities, Finance and Trade*, A. Sengupta, Ed., Westport, Conn., 1980.

Papanek, G.F.: "Aid, Foreign Private Investment, Savings, and Growth in Less Developed Countries", *Journal of Political Economy*, vol. 81, pp. 120-130, May/June 1973.

Porter, R.C.: "On Placing the Blame for Primary Product Instability", *International Economic Review*, vol. 11, pp. 175-8, February 1970.

Radetzki, M.: *International Commodity Market Arrangements*, C. Hurst, London, 1970.

Rangarajan, C. and V. Sundararajan: "Impact of Export Fluctuations on Income: A Cross Country Analysis", *Review of Economics and Statistics*, vol. 58, pp. 368-372, 1976.

Savvides, A.: "Export Instability and Economic Growth: Some New Evidence", *Economic Development and Cultural Change*, vol. 32, pp. 607-614, April 1984.

Smith, G.W.: "Commodity Instability and Market Failure: A Survey of Issues", in *Stabilizing World Commodity Markets*, F.G. Adams and S.A. Klein, Eds., Lexington Books, Lexington, Mass., 1978.

Stein, L.: "Export Instability and Development: A Review of Some Recent Findings", *Banca Nazionale del Lavaro Quarterly Review*, vol. 30, pp. 281-290, September 1977.

Sundrum, R.M.: "Trade Instability and Economic Development, by O.Knudsen and A.Parnes, A Review", *Journal of Political Economy*, vol. 84, pp. 897-899, 1976.

Tan, G.: "Export Instability, Export Growth and GDP Growth", *Journal of Development Economics*, vol. 12, pp. 219-227, 1983.

Tanzi, V.: "Fiscal Policy Responses to Exogenous Shocks in Developing Countries", *American Economic Review*, vol. 76, pp. 88-91, May 1986.

Thirlwall, A.P.: *Growth and Development*, Halsted Press, New York, 1977.

Todaro, M.P.: *Economic Development in the Third World*, Longman, London, 1985.

Tuong, H.D. and A. Yeats: "A Note on the Measurement of Trade Concentration", *Oxford Bulletin of Economics and Statistics*, vol. 38, pp. 299-309, 1976.

Voivodas, C.S.: "The Effect of Foreign Exchange Instability on Growth", *Review of Economics and Statistics*, vol. 56, pp. 410-412, August 1974.

Williamson, J.G.: "Personal Saving in Developing Nations: An Intertemporal Cross-section from Asia", *The Economic Record*, vol. 44, pp. 194-209, June 1968.

Wilson, P.: "The Consequences of Export Instability for Developing Countries - A Reappraisal", *Development and Change*, vol. 14, pp. 39-59, 1983.

World Bank: *World Development Report*, 1984, Oxford University Press, New York, 1984.

_____: *World Development Report*, 1988, Oxford University Press, New York, 1987.

Yotopoulos, P. and J. Nugent: *Economics of Development*, Harper and Row, New York, 1976.

Zaidi, M.I.: "Saving, Investment, Fiscal Deficits, and the External Indebtedness of Developing Countries", *World Development*, vol. 13, pp. 573-588, 1985.