ISERP
Working Paper 06-03

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COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK
APRIL 2006

INSTITUTE FOR SOCIAL AND ECONOMIC RESEARCH AND POLICY

PIONEERING SOCIAL SCIENCE RESEARCH AND SHAPING PUBLIC POLICY

REAL INCOME STAGNATION OF COUNTRIES, 1960-2001[1]

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Abstract

This paper examines the phenomenon of real-income stagnation (in which real-income growth is uninterruptedly negligible or negative for a sizable sequence of years). We analyze data for four decades from a large cross-section of countries. Real income stagnation is a conceptually distinct phenomenon from low average growth and other features of the growth sequence that have been previously considered. We find that real income stagnation has affected a significant number of countries (103 out of 168), and resulted in substantial income loss. Countries that suffered spells of real income stagnation were more likely to be poor, in Latin America or sub-Saharan Africa, conflict ridden and dependent on primary commodity exports. Stagnation is also very likely to persist over time. Countries that were afflicted with stagnation in the 1960s had a likelihood of seventy-five percent of also being afflicted with stagnation in the 1990s.

INTRODUCTION

The literature on the determinants of average real income growth is vast. However, until recently little attention has been paid to characterizing or explaining the qualitative features of the income or growth sequence (going beyond averages). There is a burgeoning interest in understanding *patterns* (as opposed to average levels) of economic growth. Examples include Ben-David and Papell (1998) (who attempt to identify structural breaks in the income series between 1950 and 1990 in a cross section of countries) and Pritchett (2000) (which analyzes the instability and volatility of growth rates). Rodrik (1999) considers "growth collapses" and concludes that countries that are conflict-ridden and have weak institutions of conflict-management have experienced the sharpest income downturns. More recently, patterns of "growth acceleration" have been studied by Hausmann, Pritchett and Rodrik (2005), who find that growth acceleration episodes are not well predicted by standard growth determinants or by the occurrence of economic reforms.

This paper contributes to the existing literature in two main ways. Firstly, it describes patterns of growth in an innovative way. Specifically, the paper identifies and describes episodes of sustained negligible or negative income growth, which we refer to as *stagnation spells*. We discuss the conceptual difference between real income stagnation spells and other concepts concerning the pattern of economic growth. Secondly, the paper aims to identify the factors disposing countries to stagnation.

We find that real income stagnation has affected a significant number of countries (103 out of 168). Countries that suffered spells of real income stagnation are found more likely to be poor, in Latin America or sub-Saharan Africa, conflict ridden and dependent on primary commodity exports. Stagnation is also found very likely to persist over time.

The study of growth patterns is driven by two main motivations, one explanatory and the other normative, both of which underpin our work. The explanatory motive is to analyze patterns of real income growth in order better to understand the process of economic growth. The normative motive is to determine whether and how distinct welfare assessments should be made of different income streams (and associated growth patterns).

The remainder of the paper is organized as follows: Section II defines stagnation, describes the conceptual difference between stagnation and low average growth, that between stagnation spells and other features of the growth sequence, and discusses the welfare implications of different stagnation experiences. In Section III we describe features of the stagnation experience in a large cross-section of countries between 1960 and 2001. Section IV investigates the factors associated with stagnation. Section V provides evidence of the persistence of stagnation over time. Section VI contains our conclusions.

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| 1 | WHAT IS STAGNATION?

Identifying and explaining stagnation may in principle require a distinct approach than does identifying and explaining the causes of poor growth experience as such. The reason is that stagnation spells are *concentrated* periods of negligible or negative growth. An *uninterrupted sequence* of poor growth years constitutes a stagnation spell. In this section of the paper, we begin by formalizing the concept of stagnation. Thereafter, we discuss the conceptual difference between stagnation and low average growth. Finally, we discuss whether the occurrence of stagnation spells should influence our judgments concerning the welfare experienced by different countries.

Identifying Spells of Stagnation
We use time-series data on the GDP per capita of countries.[1] The study period is 1960-2001. Since data is not available for all countries and all years, the 'end of the study period' for a specific country refers to the most recent year for which data is available.

The **onset** of a stagnation spell is defined as a year in which a country's per capita real income is lower than at any time in the previous two years and higher than at any time in the subsequent four years. At the onset of a stagnation spell, a country's per capita real income is both the lowest in the three-year interval concluding with it, and the highest in the five-year interval beginning with it. This criterion is deliberately defined stringently, so as to avoid identifying brief interruptions of growth as stagnation spells. Although the onset of a stagnation spell is defined in terms of the relation between income levels in

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[1] Income in a given year is represented by the three-year moving average centered on that year, in order to focus on meaningful variations that are not due to measurement error or very fleeting economic shocks. We use data on the GDP per capita in constant local currency units. Our reason for using LCUs is that PPP-adjusted real GDP figures are not, properly speaking, inter-temporally comparable. Attempts to make them so, such as the Penn World Tables, introduce other distortions that we wish to avoid here. The spells of stagnation that we identify are largely dependent on the features of the per-capita income time series, which are appropriately captured by LCU data. Inter-country comparability of time-series is not required for this purpose. The main aim of the paper is to introduce the concept of real income stagnation and examine its empirical relevance. We operationalize the concept of real income stagnation using LCU GDP data; however the analysis can easily be conducted using PPP-adjusted GDP figures instead. Such an exercise would yield largely similar results due to the high correlation between year-on-year growth rates of the two GDP series.   We have calculated these correlations for a sub-sample of 108 countries from our main dataset (for which PPP-adjusted GDP data for 1960-2000 are available in PTW Mark 6.1). Almost two thirds of the countries had a simple correlation coefficient larger than 0.80, and three quarters of the sampled countries had a correlation coefficient larger than 0.70. For specific countries, the two times series diverge [For a detailed study of the divergence between PWT and LCU data in the case of Venezuela, see Rodriguez (2006)]. In our view the LCU time series is to be strongly preferred in such cases since it is dependent on local national income data and does not reflect adjustments brought about for the sole purpose of level comparability across countries. The PWT income series for a country often reflects the use of arbitrary premises or adjustments for a variety of reasons including the past or present non-participation of many countries in the price surveys of the International Comparison Programme (requiring reliance upon questionable regression estimates for these countries), the arbitrary choice of overlapping 'link countries' to relate real incomes in one region to real incomes elsewhere, the impact of the choice of base year on comparisons of real-incomes across country-years, and other factors. We do use PWT incomes where they are needed to undertake cross-sectional comparisons of countries.

adjacent years, the motive is reliably to identify the onset of periods of sustained negligible or negative income growth.

A **turning point** is defined as a year in which a country's real income is at least one percent higher than it was in the previous year, and at least one percent lower than it is in the subsequent year. This criterion is made permissive, so as to capture the resumption of sustained income growth, even at a low level.

A **spell** of stagnation is defined as the period from the onset of stagnation to the first turning point after the onset. We define the **length of a spell** as the length of this period. Since the criterion for identifying the onset of stagnation is stringent and the criterion for identifying the turning point is permissive, spells defined in this way are defined stringently.

The **depth of a spell** of stagnation is defined as the difference between the income at the onset and the minimum income during the spell, expressed as a share of the income at the end of the study period. The depth of the spell of stagnation has a counterfactual interpretation. Specifically, it represents the percentage by which the per capita income of a country would be higher than it is at the end of the study period if it had experienced a constant income between the onset of stagnation and the year in which the minimum income during the spell was attained instead of having had the income path that it actually had. This counterfactual is conservative in that it assumes zero growth rather than positive growth in this time interval.

The concepts of spell of stagnation, depth and length of stagnation, are illustrated in Figure 1 below (for Syria).
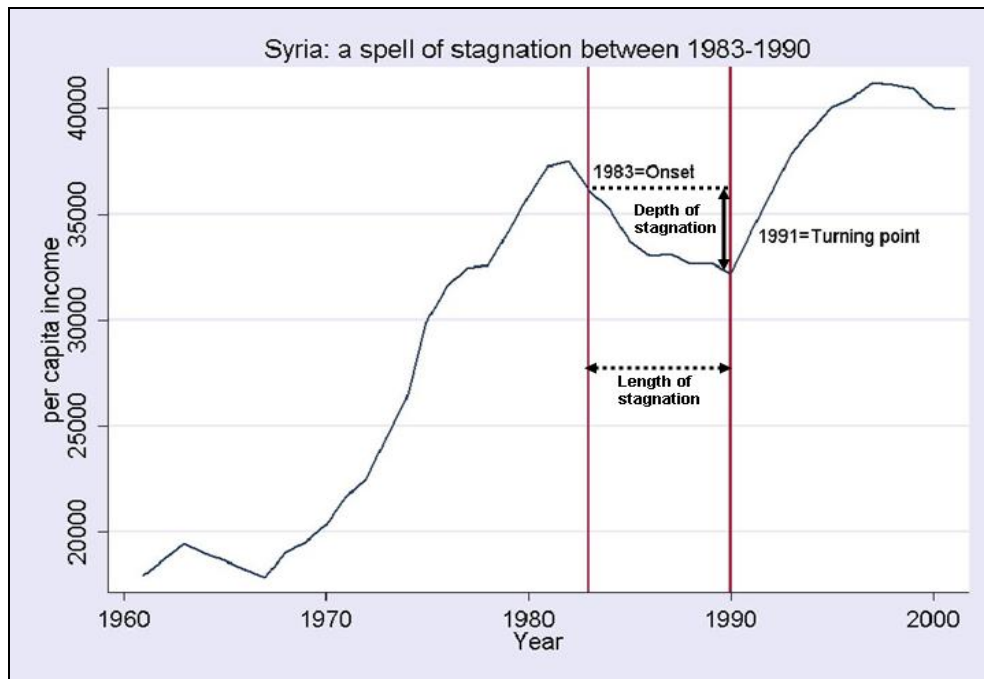

Figure 1. Spell of stagnation, Syria

The income at the end of the study period is defined as the average of the incomes in the last three years of the study period (1960-2001), so as to avoid idiosyncratic results that derive from the presence of short-term volatility.

Identifying Countries as Stagnators

A **stagnator** is defined as a country that has experienced a spell of stagnation at some point during the study period.

A country's **length of stagnation** is defined as the sum of the lengths of all of the spells of stagnation it has experienced.

A country's **depth of stagnation** is defined as the sum of the depths of all of the spells of stagnation it has experienced. A country's depth of stagnation has a counterfactual interpretation. Specifically, it represents the percentage by which the per capita income of a country would be higher than it is at the end of the study period if it had experienced a constant income between the onset of every spell of stagnation and the year in which the minimum income during that spell was attained, instead of having had the income path that it actually had. This counterfactual is conservative in that it assumes zero growth rather than positive growth over each such time interval.

During a given decade, a country is defined as a **decadal stagnator** if at least three years within the decade belong to a stagnation spell. This definition is designed to avoid counting as decadal stagnators countries that merely experienced the end (or beginning) of a spell of stagnation in a given decade. Rather, it identifies a country as a decadal stagnator if it has experienced a sufficiently long period of stagnation in the decade.

A country's **decadal length of stagnation** is defined as the number of years spent in spells of stagnation during the decade.

A spell of stagnation is used to calculate the decadal depth of stagnation (defined below) if at least three years belonging to the spell are contained within the decade.

A country's **decadal depth of stagnation** is defined as the percentage by which its income at the end of the decade[2] would have been higher if it had experienced zero growth in each interval from the first year of a stagnation spell within the decade to the point at which its minimum income during the spell *and* during the decade were experienced (rather than having had the growth experience that it actually did).

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[2] We use the mean income over the last three years of the decade to represent the income at the end of the decade.

<u>Stagnation versus Low Average Growth</u>
The conceptual difference between stagnation (as defined above) and low average income growth can be understood as follows: a stagnation spell consists of an *uninterrupted sequence* of poor growth years. In contrast, an episode of low income growth can be composed of any sequence of growth years, including a sequence which involves alternating positive and negative income shocks. Different income paths can possess the same average growth rates but very different patterns of growth, some of which contain stagnation spells and some of which do not. Suppose that y_t represents the real income per capita of a country in time period t, and γ_t represents the growth rate of real income per capita between *(t-1)* and *t*. Consider the following identity, which reflects the final income achieved by a country, given its initial income and annual growth rates:

$$y_T = y_0 \prod_{t=1}^{T}(1+\gamma_t)$$

The final income y_T is *invariant* to the sequence in which the growth rates γ_t appear. Further, the average (geometric mean) growth rate over the period is *invariant* to the sequence. Countries can possess identical per capita income growth rates but very different growth sequences. As discussed briefly below (and also noted, for example, in Reddy and Minoiu (2006)), the resulting distinct growth sequences can have very different welfare implications.

Our focus in this paper is however on the description and interpretation of a possible feature of a growth sequence. In particular, we examine the occurrence in countries of uninterrupted sequences of negligible or negative income growth years (i.e., stagnation spells) as distinguished from patterns of negative income growth years alternating in some way with positive income growth years.

<u>Distinguishing Stagnation from other Features of the Growth Sequence</u>
Consider a sequence of real incomes $\{y_t\}$. Associated with this sequence of real incomes is a sequence of rates of growth $\left\{\dfrac{\dot{y}_t}{y_t}\right\}$. Associated with the sequence of rates of growth is in turn a sequence of rates of growth acceleration $\left\{\dfrac{\ddot{y}_t}{\dot{y}_t}\right\}$.

Inter-temporal economic patterns can be sought in relation to any one of these three series. For example, it may be of interest to examine the lowness or (highness) of incomes, of growth rates, or of rates of acceleration. The concept of stagnation employed in this paper adopts a focus on uninterrupted sequences of low growth rates. In contrast, other recent contributions to the literature (e.g., Hausmann, Pritchett and Rodrik (2005)) (henceforth, 'HPR') adopt a "hybrid" concept, which simultaneously refers to more than one of these levels of analysis. An episode of growth acceleration is defined by HPR as fulfilling the following conditions: the average growth rate between the beginning of the acceleration episode and its end is at least 3.5 percent per annum; the difference between the mean growth rate during the acceleration episode and the period preceding it is at least 2 percent per annum. Finally, the post-episode income level

is higher than the pre-episode peak. It is evident that HPR's approach mizes criteria involving income levels, rates of growth and rates of growth acceleration. From this standpoint, it is far from clear that it captures growth accelerations as such. The criteria used also appear to be somewhat *ad hoc*.

Growth Patterns and Welfare

It should be noted that neither the concept of real income stagnation, nor that of growth accelerations, can be used straightforwardly for purposes of welfare assessment. In this section, we shall use a few examples to illustrate the issues involved in making welfare comparisons of income streams characterized by stagnation experiences and associated steady-growth counterfactuals.

If two countries' income streams begin and end at the same income levels over a single time period, then the countries will possess the same (geometric) average growth rates. However, they may possess very different income paths over this period. Consider, for example, the income growth experience of Jordan and Morocco between 1975 and 1991 [depicted in Figure 2]. In this period, the two countries had an average growth rate of 1.025 percent. Their (Penn World Tables) per capita income in 1975 was in both cases around $2,400 and that in 1991 was in both cases approximately $3,600. While Jordan experienced rapid early income growth followed by a stagnation spell between 1987 and 1992, Morocco's income path was characterized by fairly steady growth throughout the period. Despite the stagnation experience, Jordan experienced higher welfare throughout the period according to a simple criterion, that of first-order dominance of its income stream over Morocco's: Jordan's income stream was at least as high in every year as Morocco's. On average during the period, Jordanians were richer than Moroccans by $1,093 international (1996 PPP) dollars.

Consider also the hypothetical case of two countries that possess the same average growth rate over a given period of time, and experience similar stagnation spells, but do so at different times, and as a result experience very different levels of material well-being. It is important to draw a distinction between an experience of stagnation which arises early in the study period and is followed by recovery, and an experience of stagnation that arises towards the end of the study period and is preceded by prolonged growth. An early stagnation spell followed by recovery will cause a country to have lost income relative to the steady-growth path, whereas an experience of high growth rates early on followed by a downturn towards the end of the period will lead a country to have gained wealth relative to the same steady-growth path. While both countries will be classified as stagnators (and possess the same average growth rate), the timing of the stagnation spell is greatly relevant to assessing whether the country has experienced gains or losses in welfare relative to the steady-growth counterfactual. It is not the experience of stagnation alone, but the entirety of the growth path that is important in assessing welfare.

Average growth rates are a useful summary statistic for the income growth experience of a country, but can conceal the occurrence of large gains and losses in wealth or welfare. Since it is implausible to believe that the (net) wealth which accrues to a country over a period of time is inconsequential for investment, capital accumulation and human well-

being, we may conclude that features of the entire growth path (including the occurrence and timing of stagnation experiences) will have welfare implications.
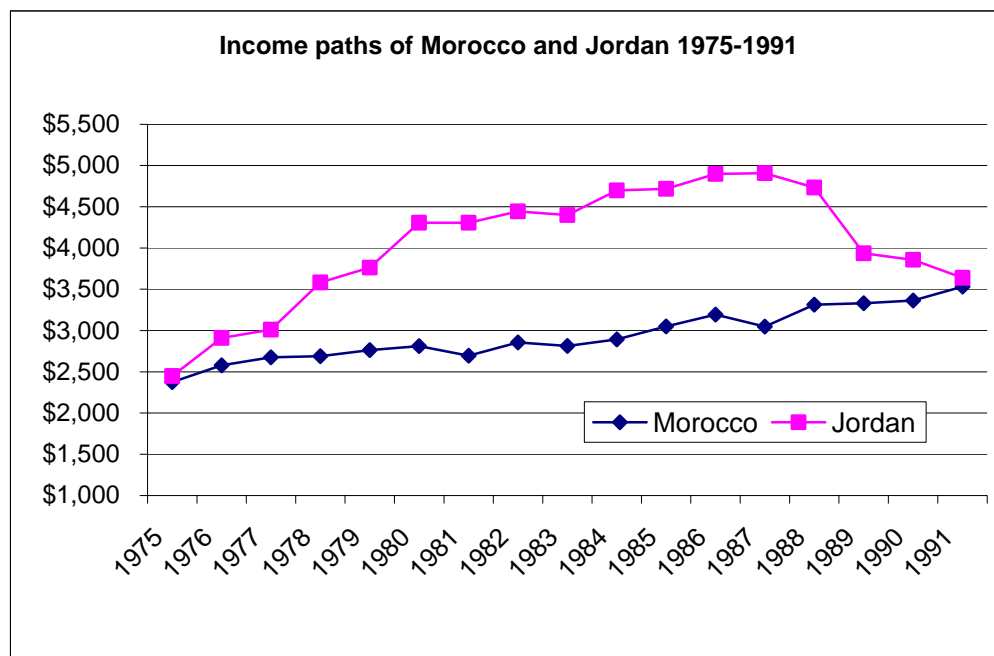

Figure 2. Jordan (high income path) is a stagnator, while Morocco (low income path) is not. Both countries have the same average (geometric mean) growth rate over the period 1975-1991.

| 2 | STAGNATION EXPERIENCE ACROSS COUNTRIES & OVER TIME

In the next section we rely primarily on a data set that we have constructed by expanding that used to analyze the determinants of growth by Levine and Renelt (1992). Our data set contains 119 countries for which constant LCU GDP per capita data is available over the period 1960-2001, thereby permitting the identification of stagnation spells. Definitions and sources of all of the variables contained in the dataset are provided in Appendix 1. We treat the cases of small-island countries and transition countries (only some of which are included in the Levine and Renelt data set), separately.

Frequency and Features of Stagnation by Country Type

Countries in the Main Data Set
Table 1 reports the frequency with which stagnators appear among the countries that belong to the main data set. Of the 119 countries in the dataset, a remarkable 72 (or 60.5 percent) are stagnators. Some striking facts are immediately apparent. For example, only 4 of the 24 rich countries belonging to the OECD were stagnators is in this period (16.7 percent)[3]. In contrast 91.67 percent (or 22 of 24) countries in Latin American and 82.5 percent (or 33 of 40) countries in sub-Saharan Africa were stagnators.

It is also interesting to note that stagnators are heavily represented among countries dependent on primary commodities. Among countries belonging to OPEC, 8 of 10 were stagnators.   We also check how prevalent stagnators are among primary commodity export dependent countries, by constructing two alternative measures of such dependence. Countries are classified as primary commodity exporters according to criterion I if the share of exports of primary commodities in GNP in 1970 was above the mean level for the sample. Countries are classified as primary commodity exporters according to criterion II if the share of exports of primary commodities in GNP in 1970 was one standard deviation above the mean level for the sample. It is interesting to note that a very large proportion of primary commodity exporting countries are stagnators; the proportion of stagnators is roughly the same regardless of which criterion is used to identify primary commodity exporting countries (87.5 percent when criterion I is used, and 83.3 percent when criterion II is used).   A majority of landlocked countries (65.2 percent) are also stagnators.

Table 2 reports in greater detail the stagnation experiences of the countries belonging to these different categories. It may be observed that the average depth of stagnation among stagnators varies considerably across geographical categories, from 0.24 in the case of Latin America to 0.44 in the case of sub-Saharan Africa, whereas the average length of stagnation varies between 10 years (for Latin American countries) and 16 years (in the case of sub-Saharan African countries). Thus, sub-Saharan African countries tend to have both longer and deeper stagnation experiences than Latin American countries. The former also tend to have more stagnation spells per country than the latter (1.5 spells per country compared to 1.3 spells per country).

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[3] The OECD stagnators are: Greece, Iceland, New Zealand and Switzerland.

Remarkably, oil-exporting (OPEC) countries have both the highest average depth of stagnation among all categories of countries (0.97), as well as the highest number of stagnation spells (1.8 spells per country). Intensive (criterion II) primary commodity exporters have an average length of stagnation of 18 years (almost half the study period). Furthermore, the depth and length of stagnation increases with the intensity of primary commodity exports in GNP.

Appendix II identifies the stagnation spells experienced by each of the countries in the sample as well as their traits. The longest spell of stagnation was experienced by Zambia (33 years, from 1968 to 2000) and the deepest was experienced by Iraq (2.89).

Transition Countries—Transition countries are not included in the main dataset, as for many countries the data with which to undertake the analysis do not exist for the period 1960 to 1990. Table 6 describes the frequency and features of stagnation among the transition countries, for which we have data during the period 1990-2001[4]. Of the 26 countries for which stagnation analysis was possible, 20 (or 77 percent) were stagnators in this study period. Moreover, the average depth of stagnation was a striking 0.69 (more than two-thirds of the end of study period income) and the average length of stagnation was 6.6 (almost two-thirds of the study period). The country with the maximum depth of stagnation (2.37) was Tajikistan, whereas the country with the maximum length of stagnation (11 years) was Moldova.

Small Island Developing States—Many small island developing states are also not included in the main dataset, due to gaps in the data available for many of them. Table 7 describes the frequency and features of stagnation among small island developing states (as identified by the United Nations) for the period 1960 to 2001. Of 34 countries for which stagnation analysis was possible, 17 were stagnators. The average depth of stagnation was 0.31 and the average length of stagnation was 11.5 years. Roughly half the island stagnators had a single spell of stagnation, and roughly half had two spells of stagnation. The maximum depth of stagnation (1.82) was experienced by Kiribati, while the maximum length of stagnation (26 years) was experienced by Haiti.

The World as a Whole—The unified sample (including together the countries in the main dataset, transition countries and small island developing states) contains 178 countries. Of the 168 countries for which stagnation analysis was possible, 103 (61 percent, i.e., more than half) were stagnators.

Experience Across the Decades (the World)
The stagnation experience of countries across the decades, is described in Table 3 (for countries in the main data set). It can be seen that the number of **decadal stagnators** increased sharply and steadily between the 1960s (when there were 12, amounting to 12 percent of the countries for which data was available) and the 1980s (when there were 58, amounting to 50 percent of the countries for which data was available), and

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[4] For several countries, there is data going back to as early as 1960 (Hungary and China) and 1965 (Georgia, Latvia and Russian Federation). We do not employ this data here.

diminished somewhat in the 1990s (to 36, amounting to 32 percent of the countries for which data was available).

From the worldwide perspective, the 1980s seem to have been the worst decade. The average length of stagnation peaked in the 1980s at almost 7 years, as did the average depth of stagnation at 0.20. The average depth of stagnation increased monotonically from the 1960s to the 1980s before diminishing in the 1990s. The average length of stagnation varied between 5.5 and 6.8 years/country across the four decades, again peaking in the 1980s.

Experience Across the Decades (Regions)
The proportion of countries that are stagnators (among the countries for which the analysis is possible) is higher in every decade in sub-Saharan Africa than in Latin America, with the exception of the 1980s (Tables 5A and 5B). For the whole study period however, the proportion of Latin American stagnators exceeds that of sub-Saharan African stagnators.

In both continents the proportion of stagnators among countries increases steadily through the decades, peaking in the 1980s (when it reached a maximum of 69 percent in sub-Saharan Africa, and 79 percent in Latin America) and diminishing somewhat in the 1990s.

As shown in Table 4, in all four decades the countries that spent the longest number of years in stagnation were most likely to be in sub-Saharan Africa. As shown in Table 5A, the average depth of stagnation was higher in Latin America than it was in Africa in all decades other than the 1990s. In sub-Saharan Africa, the average length of stagnation was highest in the 1980s and 1990s whereas in Latin America it was highest in the 1960s and 1980s. In sub-Saharan Africa, the average depth of stagnation was highest in the 1990s whereas in Latin America it was highest in the 1960s. This suggests that the 1990s have not been a period of recovery in sub-Saharan Africa.

It is also interesting to examine the correlation between the length and depth of stagnation by region and decade (see Table 5B). It appears that in the 1990s, stagnation experiences in Latin America were likely to be long and deep. This is also true, but to a lesser degree, in sub-Saharan Africa. It is notable that the correlation between depth and length of stagnation seems to have been increasing monotonically across decades for countries in both continents. Over time, it has become more likely that stagnation spells will be *both* relatively deep and relatively long.

| 3 | FACTORS ASSOCIATED WITH STAGNATION

In order to identify the factors associated with stagnation, we undertook a probit analysis of the factors that appear to affect the probability of being a stagnator. We treat whether a country is a stagnator as a binary dependent variable. The probabilities of occurrence of stagnation are assumed to be influenced by the independent variables and to be distributed normally.

In Table 9, we report the summary statistics for the variables used in the subsequent regressions. Tables 10-11 outline the regression results for three versions of probit models with STAGNATOR (a variable which takes on a value of one when a country is a stagnator and a value of zero when it is not) as the dependent variable.

Appendix 1 lists the variables used in the analysis. Summary statistics concerning the variables used in all the probit regressions discussed in this section of the paper are shown in Table 9. We have tried to include in the regressions undertaken (from which those reported are drawn) variables that are standardly used in the literature on the determinants of growth.

The models have relatively good 'fit', with pseudo-R^2 ranging between 0.36 and 0.69. In addition, they show that certain factors are significantly and often robustly associated with stagnation. These include the growth rate of domestic credit, negatively associated with being a stagnator; the difference between the growth rate of the economically active population - between ages 15 and 65 - and the growth rate of the population total ('GEAPOPP'), negatively associated with being a stagnator; a dummy variable taking the value one for primary commodity exporters (according to criterion I) and zero otherwise, positively associated with being a stagnator; the number of revolutions and coups per year, positively associated with being a stagnator; an index of civil liberties taking the value of 1 at the highest and 7 at the lowest, positively associated with being a stagnator (implying an association between weaker civil liberties and stagnation); a dummy variable taking the value 1 for Latin American countries and zero otherwise, and a dummy variable taking the value 1 for sub-Saharan African countries and zero otherwise, both positively associated with being a stagnator.

The signs of these relationships are as one might predict, as is discussed below. The magnitude of these relationships is also often very substantial, as shown in Table 12A (columns 1-3). For example, the probability that a country is a stagnator when GEAPOPP (the rate at which the growth of economically active population outstrips the rate of growth of the entire population) is one-half a standard deviation above the mean for all countries is estimated (depending on the model specification) to be between 41 and 46 percent less than when it is one half a standard deviation below the mean[5]. The probability that a country is a stagnator when the number of revolutions and coups per year is one-half a standard deviation above the mean for all countries is estimated (depending on the model specification) to be 20 percent more than when it is one-half a standard deviation below the mean. Similarly, the probability that the country is a

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[5] We report here and in the remainder of this paragraph only on instances in which the variable in question is significant.

stagnator when the index of civil liberties is one-half a standard deviation above the mean for all countries is estimated to be 35 percent more than when it is one-half a standard deviation below the mean. It is also found that primary commodity exporters according to criterion I have a probability of being a stagnator around 33 percent above other countries.

As a check on the possibility that some of the factors considered above arise endogenously as a result of countries becoming stagnators, we repeated the analysis by using as the dependent variable STAGNATOR90, a dummy variable taking on a value of one if a country was a stagnator in the 1990s, and zero otherwise. We used data for the independent variables from the earlier period 1960 to 1989, so as to capture possible lagged relationships running from these independent variables to STAGNATOR90[6]. It is important to be cautious in interpreting the results found here as revealing any causal information, however, since stagnation from decade to decade is highly correlated, as discussed further below. We find the relationships to be somewhat weaker, but still to be present. As reported in Table 11, the Sub Saharan Africa Dummy, the Latin America Dummy, GEAPOPP, and the number of revolutions and coups per year are significant. In contrast, the primary commodity exporter dummy I, the index of civil liberties, and the growth rate of domestic credit are no longer significant. This is not wholly surprising, as the Sub Saharan Africa Dummy, the Latin America Dummy, and GEAPOPP (directly or indirectly) capture "structural" features of the economy that may have a long-term impact, whereas the index of civil liberties, and the growth rate of domestic credit represent phenomena (such as ambient political circumstances and the conduct of monetary policy) that may arguably have only a more transitory impact on economic performance.

It is also not surprising that measures of primary commodity export dependence are significant determinants of stagnation, in light of the recent literature on the "natural resource curse", which emphasizes that for a range of political and economic (e.g. "Dutch disease") reasons, countries wealthy in natural resources may be poor economic performers (see, for instance, Rodriguez and Sachs (1999), Sachs and Warner (1999), Tornell and Lane (1999)). However, the lack of significance of the primary commodity exporter dummy I in regressions of STAGNATOR90 raises a question mark about the robustness of this relationship. This may be because a great deal of the effect of being a primary commodity exporter is captures by whether a country belongs in specific groupings (in particular Latin America or sub-Saharan Africa). The number of stagnating countries which are primary commodity exporters according to the first of our criteria but neither in Latin America nor in sub-Saharan Africa is only seven (Algeria, Fiji, Iceland, Iraq, Kuwait, New Zealand, Saudi Arabia). The number of stagnating countries which are primary commodity exporters according to the second of our criteria, but are neither in Latin-American nor in sub-Saharan Africa is only four (Fiji, Iraq, Kuwait, Saudi Arabia). In the overall sample of 119 countries (of which 32 are primary commodity exporters according to the first criterion and 12 according to the second), the resulting independent variation may be insufficient to separately identify the effect of being a primary-commodity exporter on stagnation.

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[6] Regression results using data from the earlier period 1974-1989 are similar to the ones we report here.

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The fact that GEAPOPP is significant underlines that a rapid rate of population increase (or rapid aging) that creates an increased rate of dependency of the young and the elderly upon the productive workers in the middle age brackets, may be an important factor creating vulnerability to per capita income stagnation. However, the relationship may be purely endogenous. It may simply be that stagnation causes a reduction in the economically active population and therefore a reduction in GEAPOPP. This latter theory is a possible explanation of the results found in the regressions involving STAGNATOR but not of those involving STAGNATOR90, as the latter seeks to identify the factors associated with *subsequent* stagnation. Both mechanisms may in fact be present. This is suggested by the fact that the magnitude of the effect associated with GEAPOPP is substantially smaller in relation to STAGNATOR90 than in relation to STAGNATOR [See Table 12A].

It is interesting to note that the investment share of GDP is also occasionally significant. The sign of the relationship suggests that higher investment is associated with a higher probability of stagnation. This seems at first implausible, but may be understood in light of the possibility that investment (especially planned public investment) is not always as downwardly flexible as is real income. In this light, the identified relationship may be more of an accounting curiosity than it is causally important.

In both sets of regressions, the Latin America dummy variable is consistently highly significant, whereas the African dummy variable is moderately significant only in the STAGNATOR90 regressions. One reason that this might be true is that the African dummy variable is highly correlated with other variables that are significantly associated with being a stagnator (especially GEAPOPP, the primary commodity exporter dummy I, the number of revolutions and coups, and the index of civil liberties), whereas the Latin America dummy is not to the same extent. This may be seen in Table 12B, which reports pair-wise correlation coefficients among the variables used in both sets of regressions. Although stagnators are more likely to be present in both Africa and Latin America, the factors underlying stagnation in Africa appear to be captured better by those included in the regression analysis than are the factors that underlie stagnation in Latin America. The fact that the Latin America dummy variable is consistently significant suggests that there are variables omitted from the analysis that are important causes of stagnation in Latin America.

| 4 | THE TENDENCY FOR STAGNATION TO PERSIST

It is possible to undertake an analysis of the tendency of countries to shift between non-stagnator and stagnator status.[7] Below, we explore whether countries that have a specific status (as stagnators or non-stagnators) in a particular decade are likely to maintain that status or change status in the subsequent decade. This analysis is undertaken in Table 13A in terms of the raw number of countries that 'stay or switch' and in Table 13B in terms of the proportion of countries that 'stay or switch' between stagnator and non-stagnator status in successive decades.

The analysis leads to some striking conclusions.

First, if a country is a decadal stagnator in the 60s, it has a relatively small chance of not being a decadal stagnator in the 1990s (8.3 percent). In contrast, countries that are stagnators in the 1970s or 1980s, have a higher chance of escaping stagnation by the end of the sample period (31.8 percent and 37.9 percent, respectively). However, the probability of being a stagnator in the 1990s if a country was a stagnator in previous decades is quite high: 75 percent for stagnators from the 1960s, 54.5 percent for stagnators from the 1970s, and 56.9 percent for stagnators from the 1980s. Finally, the probability that a non-stagnator in the 1960s is a stagnator in the 1990s is relatively high (56.9 percent). The probability of being a stagnator in the 1990s is therefore raised by about 20 percent by having been a stagnator (as opposed to a non-stagnator) in the 1960s.

The highest probability (37.9 percent) of a stagnator becoming a non-stagnator in a subsequent decade is experienced between the 1980s and the 1990s. The highest probability of a non-stagnator remaining a non-stagnator (74.5 percent) is experienced between the 1960s and the 1970s. It is notable that the probability of switching out of stagnation has slightly increased over the decades. However, the probability of staying out of stagnation has not increased over the decades for the entire sample of countries. In fact, non-stagnators have had chances often significantly higher than 50 of experiencing stagnation in subsequent decades.

It is most striking that the countries most likely to have been stagnators in the 1960s have a *75* probability of being so in the 1990s. This suggests that underlying and difficult to change structural features of countries make them vulnerable to stagnation, or that stagnation episodes have long-lasting and detrimental effects that generate future vulnerability to stagnation.

It is also important to note that collapses do not occur randomly. There appear to be trigger effects that are concentrated geographically (sub Saharan Africa, Latin America).

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[7] Some caution is required in interpreting these results since the "transition" probabilities could be indicative of either transitory or systematic features of the causal process giving rise to stagnation. Furthermore, the estimates of the probabilities rely on one observation in the time series used to construct the stagnator dummy (i.e., on a single realization of the stochastic process that may be present in the world). Therefore, one cannot make a strong case based on these findings unless further assumptions are made concerning the underlying process.

In sub-Saharan Africa (tables 14A and 14B), once a stagnator, the probability of remaining a stagnator in a subsequent decade ranges between 53.8 percent and 77.8 percent. Even worse, in the 1970s African non-stagnators were faced with a probability of 93.8 percent of falling in stagnation during the 1980s. A similar pattern is observed for Latin American non-stagnators (tables 15A and 15B), which had a probability of 88.9 percent of stagnating in the 1980s, if they had not stagnated in the 1970s. The data is suggestive of the fact that structural features of the economy may play an important role: if they have stagnated in the 1960s, African countries are 77.8 percent likely to have stagnated in the 1990s, while if they have stagnated in the 1960s Latin American stagnators are 100 percent likely to have stagnated in the 1990s.

CONCLUSIONS

We have examined the patterns and causes of real income stagnation (in which real-income growth was negligible or negative for a sizable uninterrupted sequence of years) during the last four decades in a large cross section of countries. Real income stagnation is a concept concerning the pattern of economic growth, and is distinct from that of low average growth as such. We have argued that real income stagnation is also conceptually different from other growth patterns studied in the literature (e.g., those proposed by Hausmann, Pritchett and Rodrik (2005)). However, all such concepts must be used with care when undertaking welfare assessment.

We have found evidence to suggest that a large number of poor countries in the world have suffered deep and lengthy spells of stagnation in the last four decades. These spells of stagnation have caused many of these countries to have lower incomes today than they had at some point in the past. All countries which have experienced stagnation spells have lost 'potential' income. Countries that suffered stagnation are more likely to have been poor, to have been located in certain regions of the world (in particular Latin America and sub-Saharan Africa), to have been conflict-ridden and dependent on primary commodity exports.

Countries that suffered from stagnation in the distant past are also much more likely to have suffered from stagnation in the recent past. These results suggest either that stagnation spells have long-lasting effects that make the reoccurrence of stagnation likely or that there are enduring 'structural' features (within countries or in the global economy) that predispose specific countries to suffer repeatedly from stagnation episodes.

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I. TABLES AND CHARTS

Table 1: Prevalence of Stagnation by Country Type (Main Data Set)

Sample description:

Total number of countries in the Levine-Renelt data set (1992)	119
Total number of countries for which stagnation analysis was possible based on GDP per capita in LCUs	119[8]
Total number of stagnators (1960-2001)	72

Country Type	Number of countries in the sample	Number of stagnators (1960-2001)	Percentage of stagnating countries in total
Sub-Saharan Africa	40	33	82.50
Latin America	24	22	91.67
OECD	24	4	16.67
OPEC	10	8	80.00
Primary Commodity Exporters I [9]	32	28	87.50
Primary Commodity Exporters II [10]	12	10	83.33
Landlocked countries[11]	23	15	65.21

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[8] The only country for which GDP per capita in constant LCU is not available is Taiwan. We have used real GDP adjusted for PPP in US$ from the Economist Intelligence Unit country data online instead.
[9] Based on the first measure: countries with share of exports of primary commodities in GNP in 1970 above the mean are considered primary commodity exporters.
[10] Based on the second measure: countries with share of exports of primary commodities in GNP in 1970 above one standard deviation from the mean are considered primary commodity exporters.
[11] This is the variables ACCESS from the Sachs and Warner dataset. Physical access to international waters is measured by our land-lockedness variable. A country that borders the ocean (a "coastal economy") and that has a container port is given a value of 0, reflecting complete access to international shipping. A landlocked country without navigable access to the sea via rivers is given a value of 1.

Table 2: Characteristics of Stagnation Spells by Country Type (Main Data Set)

	Number of stagnators (1960-2001)	Average depth (1960-2000)	Average length (1960-2000)	Average number of spells	Longest spell
Sub-Saharan Africa	33	0.44	16	1.5	33 years: Zambia
Latin America	22	0.24	10	1.3	26 years: Haiti
OECD countries	4	0.03	7	1.3	7 years: Greece
OPEC countries	8	0.97	15	1.8	32 years: Kuwait
Primary Commodity Exporters I	28	0.50	14	1.3	33 years: Zambia
Primary Commodity Exporters II	8	0.89	18	1.3	33 years: Zambia
Landlocked countries	15	0.54	16	1.7	33 years: Zambia

Table 3: Frequency and features of Stagnation by Decade (Main Data Set)

Decade / Variable	1960-1969	1970-1979	1980-1989	1990-1999
Number of decadal stagnators	12	22	58	43
Number of stagnators in the overall study period for which data is available in the decade[12]	63	68	70	68
Percentage of stagnators in the overall study period for which data is available in the decade	88%	94%	97%	94%
Number of countries for which data is available[13]	103	112	116	114
Percentage of decadal stagnators among all of the countries for which data is available	12%	20%	50%	38%
Average length of stagnation	5.7 years	5.5 years	6.8 years	6.0 years
Average depth of stagnation	0.14	0.15	0.20	0.15
Total number of spells[14]	12	23	58	43
Average number of spells per country in the decade	1	1.13	1.1	1

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[12] No data in the 1960s for the following stagnators: Angola, Ethiopia, Guinea Bissau, Iran, Jordan, Mali, Mozambique, Surinam and Tanzania. No data in the 1970s for Angola, Ethiopia, Mozambique and Tanzania; No data in the1980s for stagnators Afghanistan and Tanzania. No data in the 1990s for Afghanistan, Iraq, Liberia, and Somalia.

[13] No data in the 1960s for non-stagnators Cyprus, West Germany, Mauritius, Swaziland, Turkey, Uganda and Yemen. No data in the 1970s for non-stagnators Mauritius, Uganda and Yemen. No data in the 1980s for non-stagnator Yemen. No data in the 1990s for non-stagnator Oman.

[14] The total no. of spells is almost the same as the total no. of countries, with the exception of the 1970s, when Chad experienced two stagnation spells.

Table 4: Longest and Deepest Stagnation by Decade (Main Data Set)

Decade	Longest stagnation	Length of Stagnation
1960s	Afghanistan, Chad, Haiti, Kuwait, Senegal, Somalia, Sudan	7 years
1970s	Kuwait, Zambia	10 years
1980s	Central African Republic, Dem. Republic of Congo, Cote d'Ivoire, Guyana, Iraq, Kuwait, Madagascar, Malawi, Mali, Mauritania, Nicaragua, Papua New Guinea, Zambia	10 years
1990s	Central African Republic, Dem. Republic of Congo, Republic of Congo, Haiti, Kenya, Niger, Sierra Leone, Zambia	10 years

Decade	Deepest Stagnator	Depth of Stagnation
60s	Haiti	0.76
70s	Kuwait	0.67
80s	Iraq	1.95
90s	Democratic Republic of Congo	1.23

Tables 5A&B: Frequency and Features Of Stagnation Spells By Decade And Continent (Sub-Saharan Africa And Latin America) (Main Data Set)

5A:

	1960-2000	1960s	1970s	1980s	1990s

Sub-Saharan Africa					
Number of stagnators	33	9	13	27	25
Total number of countries for which data is available	40	34	36	39	38
Percentage of stagnators among the countries for which data is available	83%	27%	36%	69%	66%
Average depth	0.44	0.08	0.15	0.15	0.21
Average length	16	5	5	6.7	6.7

Latin America					
Number of stagnators	22	1	4	19	10
Total number of countries for which data is available	24	23	24	24	24
Percentage of stagnators among the countries for which data is available	92%	4%	17%	79%	42%
Average depth	0.24	0.41	0.15	0.17	0.07
Average length	10	7	4	7	5

5B:

Correlations Between Length And Depth Of Stagnation By Region And Decade:

	1960-2000	1960s	1970s	1980s	1990s
Entire sample	0.55	0.28	0.50	0.33	0.54
Sub-Saharan Africa	0.56	0.12	0.26	0.39	0.47
Latin America	0.69	N/A[15]	0.12	0.48	0.78

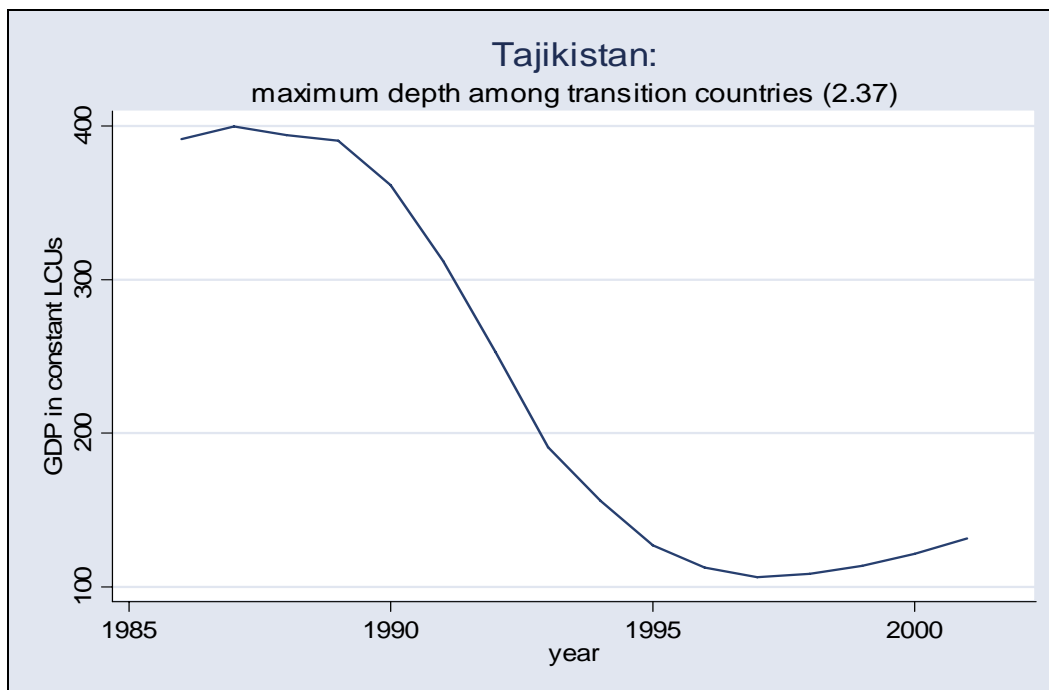[15] The only Latin American country stagnating in the 1960s is Haiti.

Table 6: Frequency and Features of Stagnation among Transition Countries

Sample Description

Total number of countries in the sample	29
Total number of countries for which stagnation analysis was possible based on GDP per capita in constant LCU[16]	26
Total number of stagnators (1990-2001)	20

Frequency and Features of Stagnation

	Number of stagnators (1990-2001)	Average depth	Average length (in years)	Average number of spells
Transition countries	20[17]	0.69	6.55	1
Worst performers		Maximum depth: 2.37 Tajikistan	Maximum length: 11 years Moldova	

Tajikistan:
maximum depth among transition countries (2.37)

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[16] The three transition countries for which spell analysis is not possible are Azerbaijan, Bosnia and Herzegovina, and Federal Republic of Yugoslavia.
[17] 77 percent of transition countries for which sufficient data is available were stagnating in the 1990s.

Table 7: Frequency and Features of Stagnation among Small Island Developing States

Sample description

Total number of countries in the sample	41[18]
Total number of countries for which stagnation analysis was possible based on GDP per capita in constant LCUs	34[19]
Total number of stagnators (1960-2001)	17

	Number of stagnators (1960-2001)	Average depth	Average length (in years)	Average number of spells
Small island developing states	17[20]	0.31	11.47	1.41
Worst performers		Maximum depth: 1.82 Kiribati	Maximum length: 26 years Haiti	Maximum # of spells: 2 (7 islands)[21]

Kiribati: maximum depth among small island developing states (1.82)

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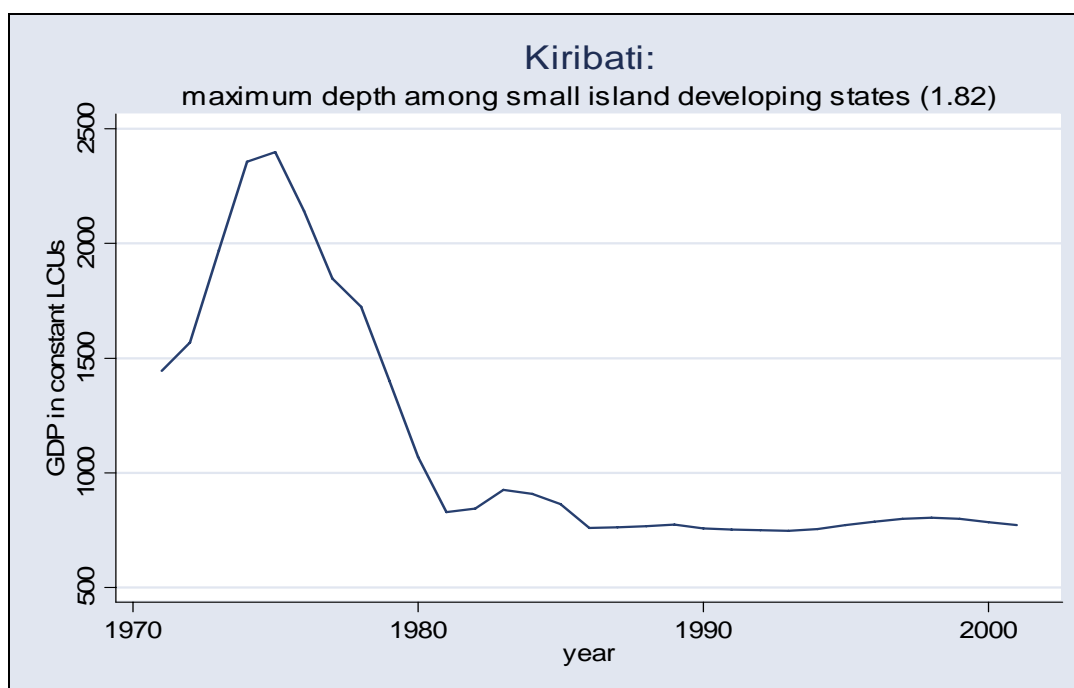
[18] The list of small island developing states is available at: http://www.sidsnet.org/sids_list.html (accessed: March 25, 2005)

[19] The 7 small island developing states for which spells analysis was not impossible due to few data points or inexistent data are: Cook Islands, Cuba, Nauru, Niue, Palau, Tokelau and Tuvalu.

[20] 50 percent of small island developing states for which data is available, qualify as stagnators.

[21] The 7 small island developing states that have experienced 2 spells of stagnation during the sample period are: Jamaica, Haiti, Samoa, the Bahamas, Kiribati, Solomon Islands, and Vanuatu.

Table 8: Frequency and Features of Stagnation throughout the World

Summary statistics for the unified sample[22]

Total number of countries in the sample	178
Total number of countries for which stagnation analysis was possible based on GDP per capita in constant LCUs	168
Total number of stagnators	103
Percentage of stagnators (in the total number of countries for which data is available)	61%

Decadal summary statistics for the unified sample

	1960s	1970s	1980s	1990s
Total number of stagnators	12	26	67	71
Total number of countries for which data is available	69	78	94	102
% of stagnators (in the total number of countries for which data is available)	17%	33%	71%	70%

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[22] Note: the unified sample is made up of the main data set (which already contains 11 small island developing states), the list of transition countries and that of small island developing states. Of these, six are stagnators (and are only counted once in Table 8): Barbados, Fiji, Haiti, Jamaica, Papua New Guinea and Trinidad & Tobago.

Table 9: Summary statistics for the variables used in the Probit regressions

Variable	Mean	St. Dev.	Minimum	Maximum
STAGNATOR			0.000	1.000
STAGNATOR90			0.000	1.000
Real GDP per capita (1960) (log)	0.142	0.934	-1.570	1.999
Literacy rate (1960) (log)	-1.116	1.112	-4.605	0.000
Growth Rate of Domestic Credit (1960-1989)	23.525	20.449	-15.424	134.730
Investment Share of GDP (1960-1989)	0.208	0.058	0.092	0.402
Growth of Exports (1960-1989)	6.783	4.824	-0.938	37.454
Sub Saharan Africa Dummy			0.000	1.000
Latin America Dummy			0.000	1.000
GEAPOPP	0.210	0.343	-0.341	1.117
Primary Commodity Exporter Dummy I			0.000	1.000
Revolutions and Coups per year (1960-1984)	0.217	0.253	0.000	1.150
Index of Civil Liberties (1972-1985)	3.992	1.853	1.000	6.900

Table 10. Factors Associated with Stagnation:

Probit models 1-3 (dependent variable STAGNATOR)

	Model (1)	Model (2)	Model (3)
Real GDP per capita (1960) (log)	0.4633	0.9380*	1.3593**
	[0.5598]	[0.5286]	[0.6758]
Literacy (1960) (log)	-1.0464	-0.8698	-0.4891
	[0.6591]	[0.5837]	[0.6352]
Growth Rate of Domestic Credit (1960-1989)	-0.0170*	-0.0227	-0.0363**
	[0.0096]	[0.0146]	[0.0146]
Investment Share of GDP (1960-1989)	6.9502	10.5224**	11.3272**
	[4.2539]	[4.7323]	[5.1783]
Growth of Exports (1960-1989)	0.1062	0.1724*	0.1912**
	[0.0809]	[0.0961]	[0.0873]
Sub Saharan Africa Dummy	0.7174	1.8417**	0.9905
	[0.7530]	[0.8580]	[0.9295]
Latin America Dummy	4.1204***	4.7922***	5.3650***
	[0.9604]	[1.0573]	[1.1102]
GEAPOPP	-4.3521***	-4.7758***	-6.0371***
	[1.3672]	[1.4132]	[1.8060]
Primary Commodity Exporter Dummy I	1.6163**	1.6821**	2.1314***
	[0.7616]	[0.7835]	[0.7536]
Revolutions and coups per year (1960-1984)		3.2567**	
		[1.4914]	
Index of civil liberties 1972-1985 (1: most freedom)			0.7853***
			[0.2358]
Constant	-2.8607**	-4.7907***	-6.3294***
	[1.3520]	[1.3859]	[1.8285]
Observations	83	83	83
Log-likelihood	-21.02	-18.77	-17.85
Pseudo R-squared	0.63	0.67	0.69
% correctly predicted	87.95%	91.57%	91.57%

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11. Factors Associated with Stagnation:

Probit models 4-6 (dependent variable STAGNATOR90).

	Model (4)	Model (5)	Model (6)
Real GDP per capita (1960) (log)	0.2028	0.0028	0.2453
	[0.2937]	[0.3314]	[0.3105]
Literacy (1960) (log)	-0.3219	-0.3424	-0.3020
	[0.3034]	[0.3371]	[0.3097]
Growth Rate of Domestic Credit (1960-1989)	-0.0105	-0.0092	-0.0107
	[0.0087]	[0.0083]	[0.0088]
Investment Share of GDP (1960-1989)	2.5637	0.7630	2.3693
	[4.8833]	[4.9879]	[4.9369]
Growth of Exports (1960-1989)	0.0187	0.0337	0.0187
	[0.0615]	[0.0649]	[0.0607]
Sub Saharan Africa Dummy	1.5215**	1.2064**	1.5137**
	[0.6113]	[0.6109]	[0.6089]
Latin American Dummy	1.7386***	2.0243***	1.7246***
	[0.5038]	[0.5559]	[0.5037]
GEAPOPP	-0.9701	-1.5778*	-0.9284
	[0.8074]	[0.9074]	[0.7978]
Primary Commodity Exporter Dummy I	0.5072	0.6422	0.5234
	[0.4287]	[0.4545]	[0.4278]
Revolutions and coups per year (1960-1984)		-2.5569***	
		[0.9135]	
Index of civil liberties 1972-1985 (1: most freedom)			0.0404
			[0.1209]
Constant	-1.9792*	-1.1471	-2.0818*
	[1.0223]	[0.9913]	[1.0638]
Observations	83	83	83
Log-likelihood	-35.93	-32.67	-35.91
Pseudo R-squared	0.36	0.42	0.36
% correctly predicted	79.52%	81.93%	79.52%

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 12A: Effects on the dependent variable for Probit models
(dependent variable STAGNATOR in (1)-(3) and STAGNATOR90 in (4)-(6))

Effects for the continuous regressors are shown for changes from their sample mean minus ½ standard deviation to their sample means plus ½ standard deviation. For discrete regressors, the effect of a change from 0 to 1 is shown.

	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP per capita (1960) (log)	0.131	0.250	0.302	0.072	0.001	0.086
Literacy (1960) (log)	-0.325	-0.260	-0.122	-0.127	-0.134	-0.119
Growth Rate of Domestic Credit (1960-1989)	-0.107	-0.136	-0.180	-0.082	-0.071	-0.084
Investment Share of GDP (1960-1989)	0.120	0.173	0.154	0.055	0.016	0.188
Growth of Exports (1960-1989)	0.115	0.178	0.163	0.025	0.045	0.051
Sub Saharan Africa Dummy	0.190	0.384	0.191	0.551	0.447	0.548
Latin America Dummy	0.570	0.607	0.576	0.613	0.684	0.610
GEAPOPP	-0.412	-0.432	-0.463	-0.118	-0.189	-0.113
Primary Commodity Exporter Dummy I	0.349	0.339	0.323	0.193	0.244	0.199
Revolutions and coups per year (1960-1984)		0.204			-0.206	
Index of civil liberties (1972-1985) (1: most freedom)			0.347			0.028

Note: no standard errors are reported for the point estimates.

Table 12B: Pairwise Correlation Coefficients

	Sub Saharan Africa Dummy	Demographic control (geapopp)	Primary Commodity Exporter Dummy I	Revolutions and coups per year	Index of civil liberties
Sub Saharan Africa Dummy	1.000				
Demographic control (GEAPOPP)	**-0.544** (0.000)	**1.000**			
Primary Commodity Exporter Dummy I	**0.265** (0.006)	**-0.101** (0.334)	**1.000**		
Revolutions and coups per year	**0.179** (0.052)	**-0.252** (0.014)	**-0.073** (0.463)	**1.000**	
Index of civil liberties (1: most freedom)	**0.553** (0.000)	**-0.356** (0.000)	**0.173** (0.078)	**0.476** (0.000)	**1.000**

Note: p-values in parentheses.

	Latin America Dummy	Demographic control (geapopp)	Primary Commodity Exporter Dummy I	Revolutions and coups per year	Index of civil liberties
Latin America Dummy	1.000				
Demographic control (GEAPOPP)	**0.314** (0.002)	**1.000**			
Primary Commodity Exporter Dummy I	**-0.001** (0.996)	**-0.101** (0.334)	**1.000**		
Revolutions and coups per year	**0.105** (0.257)	**-0.252** (0.014)	**-0.073** (0.463)	**1.000**	
Index of civil liberties (1: most freedom)	**-0.135** (0.146)	**-0.356** (0.000)	**0.173** (0.078)	**0.476** (0.000)	**1.000**

Note: p-values in parentheses.

Table 13A: Transition Matrix of Decadal Stagnators (Raw Number)

Prior Status (Number)/ Subsequent Status:	Stag60s (12)	Nonstag60s (51)	Stag70s (22)	Nonstag70s (46)	Stag80s (58)	Nonstag80s (12)
Stag60s						
Nonstag60s						
Stag70s	8	13				
Nonstag70s	4	38				
Stag80s	9	43	15	41		
Nonstag80s	2	8	6	5		
Stag90s	9	29	12	28	33	9
Nonstag90s	1	20	7	17	22	3

Note: A given cell (row, column) represents the number of countries in a given status during a decade (row) that had a specific status in a subsequent decade (column). For example, the number 9 in the first column of data should be interpreted as follows: 9 countries that were stagnators in the 1960s were also stagnators in the 1980s. The number 17 in the fourth column of data should be read as follows: 17 countries that were not stagnators in the 1970s were not stagnators in the 1990s either.

Table 13B: Transition Matrix of Decadal Stagnators (Proportions)

Probability	Stag60s (12)	Nonstag60s (51)	Stag70s (22)	Nonstag70s (46)	Stag80s (58)	Nonstag80s (12)
Stag60s						
Nonstag60s						
Stag70s	66.7%	25.5%				
Nonstag70s	33.3%	74.5%				
Stag80s	75.0%	84.3%	68.2%	89.1%		
Nonstag80s	16.7%	15.7%	27.3%	10.9%		
Stag90s	75.0%	56.9%	54.5%	60.9%	56.9%	75.0%
Nonstag90s	8.3%	39.2%	31.8%	36.9%	37.9%	25.0%

Note: A given cell (row, column) represents the proportion of countries in a given status during a decade (row) that had a specific status in a subsequent decade (column). For example, the number 75.0% in the first column of data should be interpreted as follows: 75.0 percent of countries that were stagnators in the 1960s were also stagnators in the 1980s. The number 89.1% in the fourth column of data should be read as follows: 89.1 percent of countries that were not stagnators in the 1970s were stagnators in the 1980s.

Table 14A: Transition Matrix of African Decadal Stagnators (Raw Number)

Prior Status (Number)/ Subsequent Status:	Stag60s (9)	Nonstag60s (18)	Stag70s (13)	Nonstag70s (16)	Stag80s (27)	Nonstag80s (5)
Stag60s						
Nonstag60s						
Stag70s	6	6				
Nonstag70s	3	12				
Stag80s	7	17	10	15		
Nonstag80s	2	1	3	1		
Stag90s	7	14	7	15	20	4
Nonstag90s	1	3	4	1	5	1

Table 14B: Transition Matrix of African Decadal Stagnators (Proportions)

Probability	Stag60s (9)	Nonstag60s (18)	Stag70s (13)	Nonstag70s (16)	Stag80s (27)	Nonstag80s (5)
Stag60s						
Nonstag60s						
Stag70s	66.7%	33.3%				
Nonstag70s	33.3%	66.7%				
Stag80s	77.8%	94.4%	76.9%	93.8%		
Nonstag80s	22.2%	5.6%	23.1%	6.3%		
Stag90s	77.8%	77.8%	53.8%	93.8%	74.1%	80.0%
Nonstag90s	11.1%	16.7%	30.8%	6.3%	18.5%	20.0%

Table 15A: Transition Matrix of Latin American Decadal Stagnators (Raw Number)

Prior Status (Number)/ Subsequent Status:	Stag60s (1)	Nonstag60s (20)	Stag70s (4)	Nonstag70s (18)	Stag80s (19)	Nonstag80s (3)
Stag60s						
Nonstag60s						
Stag70s	0	4				
Nonstag70s	1	16				
Stag80s	1	17	3	16		
Nonstag80s	0	3	1	2		
Stag90s	1	9	2	8	8	2
Nonstag90s	0	11	2	10	11	1

Table 15B: Transition Matrix of Latin American Decadal Stagnators (Proportions)

Probability	Stag60s (1)[23]	Nonstag60s (20)	Stag70s (4)	Nonstag70s (18)	Stag80s (19)	Nonstag80s (3)
Stag60s						
Nonstag60s						
Stag70s	0.0%	20.0%				
Nonstag70s	100.0%	80.0%				
Stag80s	100.0%	85.0%	75.0%	88.9%		
Nonstag80s	0.0%	15.0%	25.0%	11.1%		
Stag90s	100.0%	45.0%	50.0%	44.4%	42.1%	66.7%
Nonstag90s	0.0%	55.0%	50.0%	55.6%	57.9%	33.3%

[23] The only Latin American country stagnating in the 1960s was Haiti.

VII. APPENDIX I. Variables: description and sources

Variable description	Source
Dummy for landlocked countries	Sachs and Warner data set [24]
GDP per capita in constant LCUs	World Development Indicators 2002
Real GDP per capita (1960)	Levine and Renelt data set[25], originally from SH 5.6
Real GDP per capita (1970, 1980, 1990)	PWT 6.1
Literacy rate (1960)	Levine and Renelt data set, originally from WBSI
Growth of real per capita GDP (chain) (averages over different time periods)	Calculation by authors. PWT 6.1
Growth rate of domestic credit (average: 1960-1989)	Levine and Renelt data set, originally from IMFIFS
Investment share of GDP (average: 1960-1989)	Levine and Renelt data set, originally from WBNA
Investment share of GDP (averages over different time periods)	PWT 6.1
Growth of exports (1960-1989)	Levine and Renelt data set, originally from WBNA
GEAPOPP: Difference between the growth rate of the economically active population (between ages 15 and 65) and growth of total population.	Sachs and Warner data set
Share of exports of primary products in GNP in 1970	Sachs and Warner data set
Dummy variable for primary commodity exporters according to criterion I	A country is classified as a primary commodity exporter if its share of exports of primary products in GNP in 1970 is greater than the mean of the 172 countries in the Sachs and Warner dataset. Primary commodity exporters defined as such are: Algeria, Barbados, Bolivia, Cameroon, Costa Rica, Cote d'Ivoire, Fiji, Gabon, Gambia, Ghana, Guyana, Honduras, Iceland, Iraq, Kenya, Kuwait, Liberia, Malawi, Malaysia, Mauritania, Mauritius, New Zealand, Nicaragua, Oman, Saudi Arabia, South Africa, Tanzania, Togo, Uganda, Venezuela, Zambia and Zimbabwe.

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[24] Available at: http://www.nuff.ox.ac.uk/Economics/Growth/datasets/sachs/sachs.htm (accessed: March 25, 2005)

[25] Available at: http://www.worldbank.org/research/growth/ddlevren.htm (accessed: March 25, 2005)

Dummy variable for primary commodity exporters according to criterion II	A country is classified as a primary commodity exporter if its share of exports of primary products in GNP in 1970 is greater by more than one standard deviation above the mean for the 172 countries in the Sachs and Warner data set. Primary commodity exporters defined as such are: Fiji, Gabon, Gambia, Guyana, Iraq, Kuwait, Liberia, Malaysia, Mauritania, Oman, Saudi Arabia, Zambia
Number of revolutions and coups per year (1960-1984)	Levine and Renelt data set, originally from Barro (1991)
Index of civil liberties (1972-1985)	Levine and Renelt data set, originally from Barro (1991)
STAGNATOR STAGNATOR90	Dummies for countries that are classified as stagnators using GDP per capita in constant LCUs
Depth of stagnation	Calculation by authors.
Length of stagnation	Calculation by authors.
Number of stagnation spells	Calculation by authors.
Small island developing states	UN classification[26]
Public expenditure on health as percentage of GDP (1990-2000)	World Development Indicators 2003
Life expectancy, under five mortality, and infant mortality	World Development Indicators 2003

Notes on abbreviations:
IMFIFS   International Monetary Fund, International Financial Statistics
SH 5.6   Summers and Heston version 5.6
WBNA   World Bank National Accounts
WBSI   World Bank Social Indicators
PWT 6.1   The Penn World Tables version 6.1

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[26] Available at: http://www.sidsnet.org/sids_list.html (accessed: March 25, 2005)

II. APPENDIX II: List of Stagnation Spells by Country

a. List of stagnators from main data set, available data, and stagnation characteristics

#	COUNTRY	YRS. DATA AVAILABLE	LENGTH OF STAGNATION	DEPTH OF STAGNATION	NUMBER OF SPELLS	YEARS OF STAGNATION SPELLS
1	Afghanistan	1960-1982	10	0.0735	1	1963-1972
2	Algeria	1960-2001	10	0.1734	1	1986-1995
3	Angola	1960-2001	5	0.4480	1	1990-1994
4	Argentina	1960-2001	10	0.1525	1	1981-1990
5	Bangladesh	1960-2001	3	0.0687	1	1971-1973
6	Barbados	1960-2001	4	0.0741	1	1990-1993
7	Benin	1960-2001	7	0.0622	1	1987-1993
8	Bolivia	1960-2001	14	0.3152	2	1968-1971, 1979-1988
9	Brazil	1960-2001	4	0.0405	1	1989-1992
10	Burma (Myanmar)	1960-2001	5	0.1091	1	1986-1990
11	Burundi	1960-2001	9	0.4394	1	1992-2000
12	Cameroon	1960-2001	12	0.5552	2	1966-1968, 1987-1995
13	Central African Republic	1960-2001	25	0.4470	2	1963-1967, 1978-1997
14	Chad	1960-2001	21	0.5671	3	1963-1974, 1978-1981, 1992-1997
15	Chile	1960-2001	4	0.0500	1	1973-1976
16	Congo, Dem. Rep.	1960-2001	26	2.8002	1	1975-2000
17	Congo, Rep	1960-2001	16	0.3633	1	1985-2000
18	Costa Rica	1960-2001	7	0.0969	1	1980-1986
19	Cote d'Ivoire	1960-2001	16	0.6109	1	1979-1994
20	Ecuador	1960-2001	9	0.0269	1	1982-1990
21	El Salvador	1960-2001	10	0.2687	1	1979-1988
22	Ethiopia	1981-2001	7	0.1774	2	1984-1986, 1989-1992
23	Fiji	1960-2001	6	0.0504	1	1982-1987
24	Gabon	1960-2001	11	0.3867	1	1978-1988
25	Gambia	1966-2001	13	0.1028	1	1985-1997
26	Ghana	1960-2001	12	0.3518	1	1973-1984
27	Greece	1960-2001	7	0.0205	1	1981-1987

28	Guatemala	1960-2001	7	0.1499	1	1981-1987
29	Guinea-Bissau	1970-2001	5	0.0985	1	1977-1981
30	Guyana	1960-2001	15	0.3169	1	1977-1991
31	Haiti	1960-2001	26	0.7070	2	1963-1969, 1982-2000
32	Honduras	1960-2001	15	0.0638	1	1981-1995
33	Iceland	1960-2001	5	0.0352	1	1990-1994
34	Iran	1974-2001	8	0.4413	2	1978-1981, 1985-1988
35	Iraq	1960-1991	11	2.8995	1	1980-1990
36	Jamaica	1960-2001	18	0.3465	2	1974-1986, 1996-2001
37	Jordan	1975-2001	6	0.2835	1	1987-1992
38	Kenya	1960-2001	14	0.0934	2	1982-1985, 1991-2000
39	Kuwait	1962-2001	32	2.5352	2	1963-1989, 1996-2001
40	Liberia	1960-2001	23	1.1273	1	1973-1995
41	Madagascar	1960-2001	31	0.6607	2	1963-1966, 1972-1998
42	Malawi	1960-2001	14	0.0873	1	1980-1993
43	Mali	1967-2001	16	0.2006	1	1980-1995
44	Mauritania	1960-2001	16	0.0886	1	1977-1992
45	Mexico	1960-2001	6	0.0590	1	1983-1988
46	Mozambique	1980-2001	3	0.0871	1	1983-1985
47	New Zealand	1960-2001	9	0.0562	2	1976-1979, 1988-1992
48	Nicaragua	1960-1998	18	1.3322	1	1977-1994
49	Niger	1960-2001	28	1.2927	3	1966-1976, 1981-1985, 1989-2000
50	Nigeria	1960-2001	18	0.3722	2	1978-1987, 1993-2001
51	Panama	1960-2001	3	0.0815	1	1987-1989
52	Papua New Guinea	1960-2001	21	0.2266	2	1975-1990, 1996-2000
53	Paraguay	1960-2001	9	0.0798	2	1983-1987, 1997-2000
54	Peru	1960-2001	8	0.2933	2	1982-1984, 1988-1992
55	Philippines	1960-2001	4	0.1459	1	1983-1986
56	Rwanda	1960-2001	16	0.4820	2	1963-1965, 1983-1995
57	Saudi Arabia	1960-2001	17	0.6548	2	1981-1989, 1993-2001
58	Senegal	1960-2001	23	0.2568	3	1963-1974, 1977-1981, 1989-1994
59	Sierra Leone	1960-2001	17	0.2188	1	1984-2000
60	Somalia	1960-1990	19	0.4098	2	1963-1970, 1973-1983
61	South Africa	1960-2001	12	0.1697	1	1983-1994
62	Sudan	1960-2001	17	0.1831	3	1963-1973, 1978-1980, 1983-1985

#	COUNTRY						
63	Suriname	1970-2001	10	0.2797	1	1979-1988	
64	Switzerland	1960-2001	5	0.0168	1	1992-1996	
65	Syria	1960-2001	8	0.0981	1	1983-1990	
66	Tanzania	1988-2001	4	0.0269	1	1992-1995	
67	Togo	1960-2001	14	0.3803	1	1981-1994	
68	Trinidad and Tobago	1960-2001	10	0.1535	1	1984-1993	
69	Uruguay	1960-2001	3	0.0924	1	1982-1984	
70	Venezuela	1960-2001	14	0.3286	2	1979-1985, 1994-2000	
71	Zambia	1960-2001	33	0.7991	1	1968-2000	
72	Zimbabwe	1960-2001	9	0.2116	2	1975-1978, 1983-1987	

b. List of transition countries, available data and stagnation characteristics

#	COUNTRY	YRS. DATA AVAILABLE	STAGNATOR	LENGTH OF STAGNATION	DEPTH OF STAGNATION	NUMBER OF SPELLS	YEARS OF STAGNATION SPELLS
1	Albania	1980-2001	1	4	0.3071	1	1989-1992
2	Armenia	1990-2001	1	3	0.2077	1	1992-1994
3	Belarus	1987-2001	1	5	0.3065	1	1991-1995
4	Bulgaria	1980-2001	1	9	0.2354	1	1990-1998
5	Croatia	1990-2001	1	3	0.1651	1	1991-1993
6	Estonia	1980-2001	1	6	0.3077	1	1990-1994
7	Georgia	1965-2001	1	10	2.3391	1	1986-1995
8	Hungary	1960-2001	1	4	0.0994	1	1990-1993
9	Kazakhstan	1989-2001	1	6	0.3444	1	1991-1996
10	Kyrgyz Republic	1986-2001	1	5	0.6401	1	1991-1995
11	Latvia	1965-2001	1	4	0.438	1	1991-1994
12	Lithuania	1987-2001	1	5	0.4176	1	1991-1995
13	Macedonia, FRY	1990-2001	1	6	0.1701	1	1991-1996
14	Moldova	1980-2001	1	11	1.6361	1	1990-2000
15	Romania	1975-2001	1	7	0.3773	1	1987-1993
16	Russian Federation	1965-2001	1	9	0.5945	1	1990-1998
17	Tajikistan	1985-2001	1	9	2.3749	1	1989-1997
18	Turkmenistan	1987-2001	1	10	1.1265	1	1989-1998

#	COUNTRY	YRS. DATA AVAILABLE	STAGNATOR DUMMY	LENGTH OF STAGNATION	DEPTH OF STAGNATION	NUMBER OF SPELLS	YEARS OF STAGNATION SPELLS
19	Ukraine	1987-2001	1	9	1.2337	1	1990-1998
20	Uzbekistan	1987-2001	1	6	0.2637	1	1991-1996
21	China	1960-2001	0				
22	Czech Republic	1990-2001	0				
23	Poland	1990-2001	0				
24	Slovak Republic	1984-2001	0				
25	Slovenia	1990-2001	0				
26	Vietnam	1984-2001	0				
27	Azerbaijan	1993-2001	.				
28	Bosnia and Herzegovina	1995-2001	.				
29	Yugoslavia	1995-2001	.				

c. List of small island developing states, available data and stagnation characteristics

#	COUNTRY	YRS. DATA AVAILABLE	STAGNATOR DUMMY	LENGTH OF STAGNATION	DEPTH OF STAGNATION	NUMBER OF SPELLS	YEARS OF STAGNATION SPELLS
1	Bahamas, The	1960-2000	1	14	0.3696	2	1970-1976, 1990-1996
2	Bahrain	1980-2001	1	6	0.1567	1	1981-1986
3	Barbados	1960-2001	1	4	0.0741	1	1990-1993
4	Comoros	1980-2001	1	15	0.2279	1	1986-2000
5	Fiji	1960-2001	1	6	0.0508	1	1982-1987
6	Haiti	1960-2001	1	26	0.707	2	1963-1969. 1982-2000
7	Jamaica	1960-2001	1	18	0.3465	2	1974-1986, 1996-2001
8	Kiribati	1970-2001	1	15	1.8207	2	1976-1981, 1985-1993
9	Micronesia	1987-2001	1	6	0.1664	1	1995-2000
10	Netherlands Antilles	1980-1985	1	6	0.0995	1	1980-1985
11	Papua New Guinea	1960-2001	1	21	0.2266	2	1975-1990, 1996-2000
12	Samoa	1978-2001	1	10	0.1375	2	1980-1983, 1989-1994
13	Sao Tome and Principe	1986-2001	1	14	0.1131	1	1987-2001
14	Solomon Islands	1967-2001	1	9	0.4304	2	1969-1973, 1997-2000
15	Trinidad and Tobago	1960-2001	1	10	0.1509	1	1984-1993

16	Vanuatu	1979-2001	1	11	0.1552	2	1986-1989, 1994-2000
17	Virgin Islands (U.S.)	1970-1989	1	4	0.0597	1	1974-1977
18	Antigua and Barbuda	1977-2001	0				
19	Aruba	1987-1994	0				
20	Cape Verde	1981-2001	0				
21	Cyprus	1975-2000	0				
22	Dominica	1977-2001	0				
23	Dominican Republic	1960-2001	0				
24	Grenada	1977-2001	0				
25	Maldives	1984-2001	0				
26	Malta	1960-2001	0				
27	Marshall Islands	1999-2001	0				
28	Mauritius	1980-2001	0				
29	Seychelles	1960-2001	0				
30	Singapore	1960-2001	0				
31	St. Kitts and Nevis	1977-2001	0				
32	St. Lucia	1980-2001	0				
33	St. Vincent and the Grenadines	1977-2001	0				
34	Tonga	1981-2001	0				
35	Cook Islands	.	.				
36	Nauru	.	.				
37	Niue	.	.				
38	Palau	1999-2001					
39	Tokelau	.	.				
40	Tuvalu	.	.				
41	Cuba	1994-2000	.				

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APRIL 2006