

Real Income Stagnation of Countries 1960–2001

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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 analyse 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 75 per cent of also being afflicted with stagnation in the 1990s.*

I. Introduction

The literature on the determinants of average real income growth is vast. However, until recently little attention has been paid to characterising 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 of recent studies on this theme include Ben-David and Papell (1998), which attempts to identify structural breaks in the income paths experienced by countries; Rodrik (1999), who studies ‘growth collapses’ and concludes that countries that are conflict-ridden and have weak institutions of conflict-management have experienced the sharpest income downturns; Pritchett (2000), who analyses the instability and volatility of growth rates; and Hausmann et al. (2005), who find that growth acceleration episodes are not predicted well by standard growth determinants or by the occurrence of economic reforms. Hausmann et al. (2006) analyse episodes of prolonged negative growth in a large cross-section of countries, identifying events that coincide with the onset of crises such as sudden stops in capital flows, high inflation, export collapses and

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armed conflict, while Calvo et al. (2006) seek to explain the occurrence and duration of output collapses associated with sudden stops in capital flows.

In this paper we study episodes of sustained negligible or negative income growth arising for any reason, which we refer to as stagnation spells. We demonstrate that real income stagnation spells are distinct from concepts relating to the pattern of economic growth which have previously been employed in the literature. There is no 'theory of stagnation' in the literature, and we do not aim to provide one. Rather, we present an empirical analysis aimed at uncovering the prevalence of stagnation spells; in this sense, the analysis is related to that of Anderson and Morrissey (2006), who seek to provide statistical analysis of why some countries appear as 'poor performers' on various criteria. We also seek to identify the factors disposing countries to stagnation, although this is not a claim for identifying causal factors or determinants of stagnation.

The authors found that real income stagnation has affected a large number of countries (103 out of 168) during the period 1960–2001. It was found that countries that suffered spells of real income stagnation are more likely to be poor, in Latin America or sub-Saharan Africa, to be conflict ridden and dependent on primary commodity exports. Also it was found that stagnation is very likely to persist over time.

The study of growth patterns is driven by two main motivations, one explanatory and the other normative. The explanatory motive is to analyse patterns of real income growth in order to better 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). We believe stagnation spells to be of interest for both of these reasons.

The remainder of the paper is organised as follows: section II defines stagnation, describes the conceptual differences between stagnation and low average growth and between stagnation spells and other growth patterns, and discusses the welfare implications of stagnation (as distinguished from low average economic growth). In section III, we describe stagnation experiences in a large cross-section of countries between 1960–2001. Section IV investigates the factors associated with real income stagnation; and section V provides evidence of the persistence of stagnation over time. Section VI presents our conclusions.

II. What Is Stagnation?

Identifying and explaining stagnation requires a distinct approach from identifying and explaining the causes of low average economic growth. The central 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 define the concept of stagnation, discuss the conceptual difference between stagnation and low average growth, and examine the role that the occurrence of stagnation spells should play in welfare judgments.

Identifying Spells of Stagnation

We employ time-series data on the GDP per capita of countries¹ over a study period of 1960–2001. Since data are 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 are 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 adjacent years, the motive is to reliably 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 per cent higher than it was in the previous year, and at least one per cent lower than it is in the subsequent year. This criterion is deliberately 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 (for 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.²

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

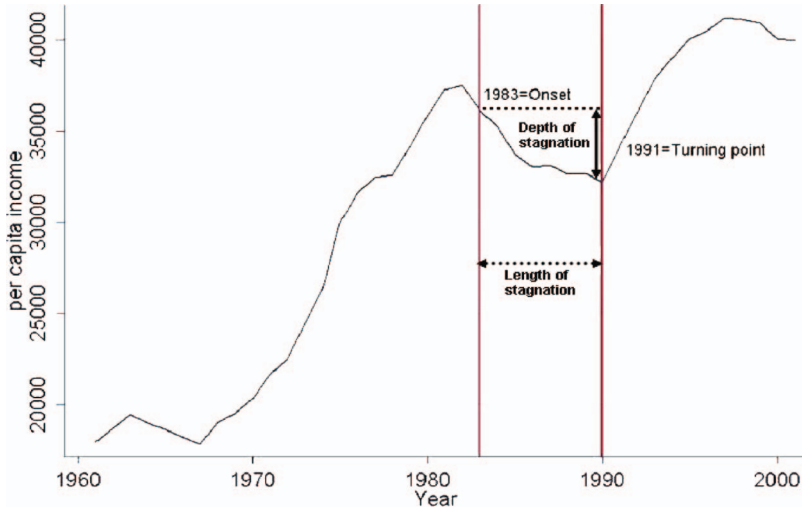


Figure 1. Spell of stagnation, Syria 1983–1990

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 stagner* if, at least, three years within the decade belong to a stagnation spell. This definition is designed to avoid counting as decadal stagner 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 stagner 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 country's *decadal depth of stagnation* is defined as the percentage by which its income at the end of the decade 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 was experienced (rather than having had the growth experience that it actually did).³

Stagnation versus Low Average Growth

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, 2006a), the resulting distinct growth sequences can have very different welfare implications.

Distinguishing Stagnation Spells from other Growth Patterns

Consider a sequence of real incomes $\{y_t\}$. Associated with this sequence of real incomes is a sequence of rates of growth $\{\dot{y}_t/y_t\}$. Associated with the sequence of rates of growth is in turn a sequence of rates of growth acceleration $\{\ddot{y}_t/\dot{y}_t\}$. 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 (for example, Hausmann et al., 2005), adopt a concept which simultaneously refers to more than one of these levels of analysis. An episode of growth acceleration is defined by Hausmann et al. (2005) as fulfilling the following conditions: the average growth rate between the beginning of the acceleration episode and its end is at least 3.5 per cent per annum; the difference between the mean growth rate during the acceleration episode and the period preceding it is at least 2 per cent per annum. Finally, the post-episode income level is higher than the pre-episode peak. It is evident that Hausmann et al.'s (2005) approach mixes criteria involving income levels, rates of growth and rates of growth acceleration. From this standpoint, it is unclear 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 sub-section, we shall use a few examples to illustrate the issues involved in making welfare comparisons of income streams characterised 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 1975–1991 (depicted in Figure 2). In this period, the two countries had an average growth rate of 1.025 per cent. Their purchasing power parity (PPP)

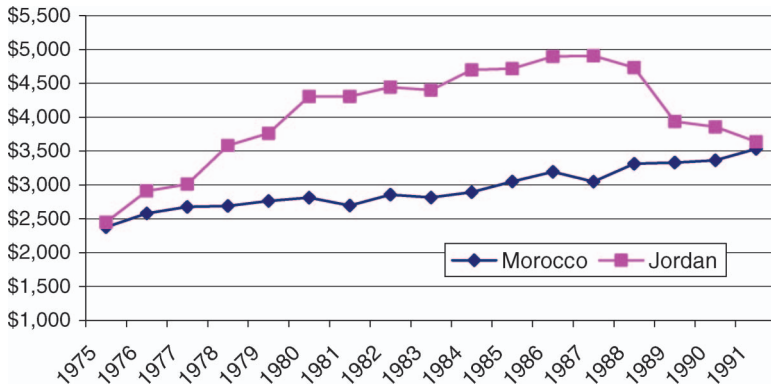


Figure 2. Income paths of Morocco and Jordan 1975–1991. Jordan (high income path) is a stagnator, while Morocco (low income path) is not. Both countries have the same average (geometric mean) growth rate over the period 1975–1991

adjusted per capita income in 1975 was in both Jordan and Morocco around \$2,400 and, in 1991, was in both cases around \$3,600. While Jordan experienced rapid early income growth followed by a stagnation spell between 1987 and 1992; Morocco's income path was characterised 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 (1996 PPP).

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

III. Stagnation Experience across Countries and over Time

We employ a dataset we have constructed for the analysis containing 119 countries for which constant local currency units (LCU) GDP per capita data (from the World Development Indicators online database, 2002) is available over the period 1960–2001, thereby permitting the identification of stagnation spells. We treat the cases of small-island countries and transition countries separately. The unified dataset containing all countries for which stagnation analysis is possible includes 168 countries. We describe the prevalence and characteristics of stagnation spells by time period and country type in the Appendix. A list of the stagnation spells experienced by each of the countries analysed and their characteristics are presented in Reddy and Minoiu (2006b see Appendix II).

Features of Stagnation by Country Type

In Table 1, we report the frequency with which stagnators appear among the countries that belong to the main dataset. Of the 119 countries in the dataset, a remarkable 72 (or 60.5%) are stagnators. Similarly, in the unified dataset which includes transition countries and small-island developing states, 103 out of 168 countries (or 61.3%) experienced at least one spell of real income stagnation since 1960. Some striking facts are immediately apparent. For example, only four of the 24 rich countries belonging to the OECD were stagnators in this period (16.7%). These were: Greece, Iceland, New Zealand and Switzerland. In contrast 91.67 per cent (or 22 out of 24) of countries in Latin America and 82.5 per cent (or 33 out of 40) of countries in sub-Saharan Africa were stagnators.

Stagnators are heavily represented among countries dependent on primary commodities.

Among countries belonging to OPEC in the sample, 8 out of 10 were stagnators. We check how prevalent stagnation is among primary commodity export dependent countries by constructing two alternative measures of such dependence. Countries are classified as primary commodity exporters (PCEs) 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 PCEs 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. Using these definitions, we find 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 them (87.5% when criterion I is used, 83.3% when criterion II is used). A majority of landlocked countries (65.2%) are also stagnators.

The average depth of stagnation 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 individual stagnation spells 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 than the latter (1.5 spells compared to 1.3 spells per country). Remarkably, oil-exporting (OPEC) countries have both

Table 1. Prevalence of stagnation and characteristics of stagnation spells by country type (1960–2001) in the main dataset

Country type	No. of countries	No. of stagnators	% stagnators	Average depth	Average length	Average no. of spells	Longest spell (yrs)	Country with longest spell
Unified sample of countries	168	103	61.30					
Countries in main dataset	119	72	60.50	0.39	13	1.4	33	Zambia
Transition countries (1990–2001)	26	20	76.92	0.69	7	1	11	Moldova
Small island developing states	34	17	50.00	0.31	12	1.4	26	Haiti
Sub-Saharan Africa	40	33	82.50	0.44	16	1.5	33	Zambia
Latin America	24	22	91.67	0.24	10	1.3	26	Haiti
OECD	24	4	16.67	0.03	7	1.3	7	Greece
OPEC	10	8	80.00	0.97	15	1.8	32	Kuwait
PCE I	32	28	87.50	0.50	14	1.3	33	Zambia
PCE II	12	10	83.33	0.89	18	1.3	33	Zambia
Landlocked countries	23	15	65.21	0.54	16	1.7	33	Zambia

Note: PCE I and II as defined in the text.

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). Countries that intensively export primary commodities (according to criterion II) have an average length of stagnation of 18 years (almost half the study period). Both the depth and length of stagnation are higher for countries classified as primary commodity exporters according to criterion II, than for those classified as such according to criterion I. The longest spell of stagnation was experienced by Zambia (33 years, from 1968–2000) and the deepest was experienced by Iraq (2.89).

For transition countries, we undertake the analysis for the period 1990–2001, due to the absence of data from prior years for many of these countries.⁴ Of the 26 countries for which stagnation analysis was possible, 20 (77%) 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 years (almost two-thirds of the study period). The country with the highest depth of stagnation (2.37) was Tajikistan, whereas the country with the maximum length of stagnation (11 years) was Moldova.

Stagnation was a prevalent experience among small-island developing states as well. Of the 34 countries for which stagnation analysis was possible, 50 per cent were stagnators during the period 1960–2001. Their average depth of stagnation is 0.31 – almost one third of the end-of-study-period income. They also experienced an average length of stagnation of 12 years. About half of the island stagnators had a single spell of stagnation and roughly half had two spells of stagnation. The highest depth of stagnation (1.82) was experienced by Kiribati, while the highest length of stagnation (26 years) was experienced by Haiti.

Features of Stagnation over Time

The stagnation experience of countries in different decades is described in Table 2 (upper panel). The number of decadal stagnators increased sharply and steadily between the 1960s (when there were 12) and the 1980s (when there were 58), and diminished somewhat in the 1990s (to 43 countries). From a worldwide perspective, the 1980s seem to have been the worst decade. The average length of stagnation peaked in the 1980s at almost seven years, as did the average depth of stagnation at 0.20. The average depth of stagnation increased from decade to decade until the 1980s before diminishing in the 1990s. The length of stagnation varied between 5.5 and 6.8 years per country across the four decades, again peaking in the 1980s.

The proportion of stagnating countries was higher in sub-Saharan Africa than in Latin America in every decade, with the exception of the 1980s (Table 2, lower panels). For the whole study period, however, the proportion of stagnators in Latin America exceeded the proportion in sub-Saharan Africa. In both regions the proportion of stagnators increased steadily through the decades, peaking in the 1980s (when it reached maxima of 69% in sub-Saharan Africa, and 79% in Latin America) and diminishing somewhat in the 1990s. 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.

Table 2. Frequency and features of stagnation by decade

Main dataset: 119 countries	1960s	1970s	1980s	1990s
No. of decadal stagnators	12	22	58	43
% of decadal stagnators among all of the countries for which data is available	12	20	50	38
Average length of stagnation (yrs)	5.7	5.5	6.8	6.0
Average depth of stagnation	0.14	0.15	0.20	0.15
Total no. of spells*	12	23	58	43
Average number of spells per country in the decade	1	1.13	1.1	1
Deepest stagnator	Haiti	Kuwait	Iraq	Zaire
Sub-Saharan Africa	1960s	1970s	1980s	1990s
No. of decadal stagnators	9	13	27	25
% of decadal stagnators among all of the countries for which data is available	27	36	69	66
Average length of stagnation (yrs)	5	5	6.7	6.7
Average depth of stagnation	0.08	0.15	0.15	0.21
Latin America	1960s	1970s	1980s	1990s
No. of decadal stagnators	1	4	19	10
% of decadal stagnators among all of the countries for which data is available	4	17	79	42
Average length of stagnation (yrs)	7	4	7	5
Average depth of stagnation	0.41	0.15	0.17	0.07

Note: * The total number of spells is almost the same as the total number of countries, with the exception of the 1970s, when Chad experienced two stagnation spells.

In sub-Saharan Africa, the average depth of stagnation was highest in the 1990s whereas in Latin America it was highest in the 1960s. The 1990s do not appear to have been a period of recovery in sub-Saharan Africa.

The correlation between the length and depth of stagnation by region and decade is also informative to examine.⁵ In the 1990s, stagnation experiences in Latin America were likely to be both long *and* deep. This was true to a lesser degree in sub-Saharan Africa. Furthermore, the correlation between depth and length of stagnation has been increasing across decades in both continents. Over time, it has become more likely that stagnation spells were simultaneously relatively deep and relatively long.

IV. Factors Associated with Stagnation

In order to identify the factors associated with stagnation, we undertook a probit analysis of the incidence of stagnation across countries. We seek to explain with contemporaneous covariates (representing averages over the period analysed) the probability of experiencing a spell of stagnation between 1960–2001. In order to circumvent the possible problem of endogeneity caused by feedback from the covariates, we also seek to identify the factors in previous decades which dispose countries towards experiencing spells of stagnation in the 1990s. In Table 3

Table 3. Summary statistics for the variables used in regression analysis

Variable	No. of available observations	Mean	Standard deviation	Minimum	Maximum
Per capita GDP (ln) 1960	83	1.92	1.85	0.21	7.38
Per capita GDP (ln) 1990	82	8.41	1.14	6.20	10.18
Life expectancy 1960	83	53.56	12.75	31.61	73.40
Life expectancy 1990	83	63.88	11.62	35.20	78.84
Growth rate of domestic credit (1960–1989)	83	23.28	21.22	–15.42	134.73
Investment share of GDP (1960–1989)	83	20.86	5.76	9.21	40.25
Growth rate of exports (1960–1989)	83	6.19	3.37	–0.94	19.20
Demographic control	83	0.21	0.33	–0.34	1.12
Revolutions and coups per year (1960–1984)	83	0.19	0.23	0.00	1.15
Index of civil and political liberties (1972–1985)	83	3.76	1.90	1.00	6.90
ICRG Institutional Quality index (1984–1989)	76	36.98	11.23	18.39	58.38
World Bank Governance indicator (1996)	75	0.90	5.96	–12.71	11.31

we report the summary statistics for the variables used in regression analysis, while the variable definitions and data sources are documented in Table A1.

It can be challenging within the framework of conventional growth theory to explain why countries experience stagnation episodes, especially those that involve initial real income decline or are prolonged. One reason is that in conventional growth theory full employment of resources is typically assumed. In such a framework, only deterioration in external terms of trade, a negative shock to endowments of factors of production, or a negative shock to production technology can explain real income deterioration. Further, the accumulation of factors of production and knowledge is typically thought to take place gradually, making it difficult to explain large variations (and especially reductions) in output. If less than full employment of resources is assumed, then it must be explained how underemployment equilibrium (or disequilibrium) results and how it is maintained over periods of time within the context of a growth process.

The challenges faced in explaining why stagnation spells occur are related to those faced in explaining why short-term fluctuations (such as business cycles) take place. However, there are differences between these two explanatory problems which must also be recognised. Stagnation spells may be triggered by negative shocks (worsening of external terms of trade, financial crises, civil conflicts or other factors) but deepen over time due to the occurrence of vicious cycles (for instance, in which the stock of productive or human capital diminishes due to the inability to undertake investment adequate to compensate for depreciation, or in which conflict over the control of available rents intensifies due to the actions of competing interest groups and

individuals aimed at maintaining their absolute or relative positions). The logic of cumulative causation according to which stagnation spells take place may in some instances be more closely related to that which accounts for the occurrence of poverty traps (see for example Sachs et al., 1994), than to that which accounts for business cycles generally.

In choosing factors that may be associated with real income stagnation, we draw on the literature of the determinants of growth to identify variables that are commonly used in cross-country growth regressions. In particular, we include variables which fall into the following broad categories: initial conditions (initial income, initial literacy rate); domestic policies (growth rate of domestic credit, investment share of GDP, openness to trade); dependence on primary commodity exports (PCE I and PCE II dummy variables); geographical factors (regional dummies, share of land in tropical areas); quality of institutions (indices of control of corruption, quality of bureaucracy, governance, and political and social stability drawn from the Institutional Country Risk Guide [ICRG] database, Freedom House, and the World Bank Aggregate Governance Indicators datasets); and a demographic control variable representing the rate at which the growth rate of the economically active population (between ages 15–65) outstrips that of the total population. In Tables 4 and 5, we present results for the best-fitting and most informative empirical estimates from the probit regressions. The coefficients represent average marginal effects expressed in percentages and evaluated at sample means for all continuous covariates, and for a change from 0 to 1 for binary variables.⁶

The models presented in Table 4 have excellent fit, with McFadden's (1974) pseudo- R^2 ranging between 63–69 per cent. In addition, they show that certain factors are statistically significantly and often robustly associated with stagnation. These include the growth rate of domestic credit, negatively associated with being a stagnator; the demographic control, negatively associated with being a stagnator; dependence on primary commodity exports, positively associated with being a stagnator; extent of political and social unrest, positively associated with being a stagnator; institutional quality proxied by the Freedom House index of civil and political liberties and the ICRG institutional quality index, negatively associated with being a stagnator; indicator variables for Latin American countries and sub-Saharan African countries, both positively associated with being a stagnator. Furthermore, a higher per capita income level in 1960 is associated with an increased probability of stagnation after controlling for possible confounding factors; this positive relationship reflects the fact that a few rich countries (such as Greece, New Zealand, Switzerland) and many middle-income countries were stagnators during the period. The World Bank governance indicator does not appear to be statistically significant in explaining the incidence of stagnation.⁷

The magnitude of the estimated relationships is often sizeable. For example, the probability that a country is a stagnator rises by 6–7 percentage points when the rate at which the growth of its economically active population outstrips the rate of growth of its entire population by one tenth of a percentage point. A one year increase in the number of revolutions and coups is associated with a 39 percentage point increase in the likelihood of stagnation.⁸ Similarly, the probability that a country is a stagnator falls by almost 10 percentage points when the index of civil

Table 4. Factors associated with stagnation: PROBIT models

	Model (1)	Model (2)	Model (3)	Model (4)
Initial (1960) per capita GDP (ln)	6.0* [3.3]	7.2* [3.8]	7.6** [3.6]	10.0** [3.9]
Initial (1960) life expectancy	-0.8 [0.5]	-0.3 [0.6]	-1.0 [0.6]	-0.0 [0.7]
Growth Rate of Domestic Credit (1960–1989)	-0.3 [0.3]	-0.5** [0.3]	-0.3* [0.2]	-0.3* [0.2]
Investment Share of GDP (1960–1989)	1.9*** [0.7]	1.9** [0.8]	2.2*** [0.8]	2.1** [0.9]
Growth rate of exports (1960–1989)	2.5* [1.4]	2.7** [1.3]	2.0 [1.5]	2.2 [1.4]
Sub Saharan Africa Dummy	30.8*** [8.0]	15.0 [11.3]	16.7 [13.4]	20.1* [10.8]
Latin American Dummy	54.8*** [4.2]	57.2*** [3.9]	55.9*** [5.0]	52.6*** [6.6]
Demographic control	-64.1*** [17.7]	-74.4*** [20.3]	-72.2*** [20.2]	-66.1*** [18.7]
Primary Commodity Exporter 1 Dummy	20.8** [8.7]	26.1*** [7.1]	24.4** [10.7]	28.0*** [9.1]
Revolutions and Coups (1960–1984)	38.9** [19.5]	9.8*** [3.3]		
Civil liberties (1972–1985) (1: most freedom)			-1.0** [0.5]	-0.6 [1.8]
ICRG Institutional Quality index (1984–1989)				
World Bank Governance indicator (1996)				
# of countries	83	83	76	75
Pseudo R-squared	0.67	0.69	0.63	0.66
Log-likelihood	-18.93	-17.42	-19.21	-17.65
Wald Chi-squared	55.33	50.73	53.69	36.50
% correctly predicted	81.51	82.35	81.51	79.83

Notes: Dependent variable: STAGNATOR (Indicator variable for countries that have experienced at least one spell of stagnation during 1960–2001). Robust standard errors in parentheses. *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

Table 5. Factors associated with stagnation: PROBIT models

	Model (1)	Model (2)	Model (3)	Model (4)
Initial (1990) per capita GDP (ln)	-7.9 [9.5]	-9.4 [10.8]	-24.9** [11.7]	-19.8* [11.1]
Initial (1990) life expectancy	-1.0 [1.0]	-0.8 [1.2]	-0.1 [1.0]	-0.8 [1.2]
Growth Rate of Domestic Credit (1960–1989)	-0.2 [0.2]	-0.2 [0.2]	-0.3 [0.3]	-0.4 [0.3]
Investment Share of GDP (1960–1989)	0.8 [0.9]	1.9** [1.0]	2.2*** [0.9]	2.5*** [1.0]
Growth rate of exports (1960–1989)	-0.0 [1.1]	-0.3 [1.3]	-0.4 [1.3]	-0.1 [1.3]
Sub Saharan Africa Dummy	10.6 [13.9]	32.5* [16.9]	19.1 [16.7]	24.0 [17.4]
Latin American Dummy	33.2*** [12.4]	32.0** [13.8]	37.4*** [13.3]	40.9*** [15.0]
Demographic control	-23.1* [13.7]	-16.1 [15.1]	-18.4 [15.5]	-16.9 [14.1]
Primary Commodity Exporter 1 Dummy	7.0 [10.1]	3.0 [10.6]	2.9 [10.3]	3.2 [11.3]
Revolutions and Coups (1960–1984)	-65.3*** [17.4]	-3.5 [3.3]		
Civil liberties (1972–1985) (1: most freedom)			2.1*** [0.7]	0.0 [1.6]
ICRG Institutional Quality index (1984–1989)				
World Bank Governance indicator (1996)				
# of countries	83	83	76	75
Pseudo R-squared	0.4976	0.4156	0.4714	0.3991
Log-likelihood	-28.39	-33.02	-26.71	-29.77
Chi-squared	49.13	39.34	46.67	32.30
% correctly predicted	73.10	77.31	73.10	75.63

Notes: Dependent variable: STAGNATOR90 (Indicator variable for countries that have experienced at least one spell of stagnation during the 1990s). Robust standard errors in parentheses. *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

and political liberties improves by one unit (on a scale from 1–7). Primary commodity exporters are roughly 25 percentage points more prone to stagnation than other countries. Similarly, sub-Saharan Africa and Latin American countries are respectively 20–30 percentage points and 55 percentage points more likely to experience real income stagnation than are other countries.

In order to investigate the possibility that some of the estimates discussed suffer from endogeneity bias, we analysed whether earlier period variables (averaged over 1960–1989) influenced countries propensity to experience stagnation during the 1990s (Table 5). It is important to be cautious in interpreting the results found here as revealing any causal information, since stagnation from decade to decade is highly correlated as discussed in the next section. We find the estimated relationships to be somewhat weaker in this lagged specification (with pseudo R-squared between 39–49%) but still to be present. The sub-Saharan Africa dummy, the Latin America dummy, and the measure of political and social unrest have statistically significant coefficient estimates. In contrast, the PCE I dummy, the index of civil and political liberties and the growth rate of domestic credit are no longer associated with stagnation. This is not entirely surprising, as the regional dummies and the demographic control 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) which may plausibly be argued to have only a more transitory impact on economic performance.

It is not surprising that primary commodity export dependence is strongly correlated with the incidence of stagnation in light of recent literature on the ‘natural resource curse’, which emphasises that for a range of political and economic reasons (for example related to the presence of the so-called Dutch disease), 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 correlation between the PCE I dummy and subsequent stagnation experience (Table 5) raises a question mark about the robustness of this relationship. One reason for the absence of an estimated relationship is that the effect of being a primary commodity exporter is captured to a considerable extent by whether a country belongs in specific regional groupings (in particular, Latin America or sub-Saharan Africa). The number of stagnating countries which are PCEs (according to criterion I) but neither in Latin America nor in sub-Saharan Africa is only two (Algeria and New Zealand). In the overall sample of 83 countries used in the first two regressions (of which 23 are PCEs according to our first criterion), the resulting independent variation from the two observations is insufficient to separately identify the impact of being a primary commodity exporter on the propensity to experience subsequent stagnation.

Our demographic control variable is associated with the probability of experiencing a stagnation spell between 1960–2001. One interpretation is that a high fertility rate (or rapid aging) creates an increased rate of dependency of the young and the elderly upon productive workers in the middle age brackets, and diminishes per capita income growth correspondingly. However, the relationship may be endogenous. Stagnation may cause a reduction in the economically active population (those who are either employed or searching for work). This is a plausible

explanation of the results found in the regressions relating stagnation to contemporaneous variables, but not of those relating stagnation during the 1990s to lagged variables. Of course, both mechanisms may be present, as is suggested by the fact that the magnitude of the coefficient estimate for the demographic variable is substantially smaller for the lagged specification than for the contemporaneous specification.

It is interesting to note that the investment share of GDP is also correlated with stagnation. The estimated coefficients suggest that an investment to GDP ratio that is higher by 1 percentage point is associated with a probability of stagnation that is higher by approximately 2 percentage points, both contemporaneously and subsequently. One interpretation of this apparently surprising result may be that investment (especially planned public investment) is not always as downwardly flexible as is real income, in which case stagnation may give rise to an increase in the investment share of (reduced) GDP. In this light, the identified relationship may be more of an accounting curiosity than it is causally important.

In both sets of regressions, the coefficient on the Latin America dummy is consistently highly statistically significant, whereas that on the African dummy is moderately statistically significant and in half of the cases insignificant. One reason for this pattern is that the African dummy variable is highly correlated with other variables which explain the incidence of stagnation (especially the demographic control, the PCE I dummy, the measure of political and social unrest, and the indicators of institutional quality), whereas the Latin America dummy is not correlated with other covariates to the same extent (Reddy and Minoiu, 2006b: see Table 12B). 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 predictive of the incidence of stagnation suggests that there are variables omitted from the analysis that are important causes of stagnation in Latin America.

Three indicators of institutional quality were employed. The Freedom House index of civil and political liberties is negatively correlated with the likelihood of contemporaneous stagnation but cannot explain subsequent stagnation. An increase in political and social unrest during the period 1960–1984 raises the probability of contemporaneous stagnation (Table 4). However, conflict is negatively correlated with subsequent stagnation: an increase in the average number of revolutions and coups by 1 is associated with a likelihood of subsequent stagnation that is lower by 65 per cent (Table 5). One explanation may be that periods of conflict are often followed by periods of recovery in which sustained economic growth takes place (although much of this growth may simply reinstate output lost during the conflict episode). This finding is mirrored in the switch in sign of the estimated coefficient on the ICRG index of institutional quality between Tables 4 and 5 (representing respectively the contemporaneous and lagged models). Lower quality of institutions (along dimensions such as corruption, accountability, rule of law, ethnic tensions, and internal and external conflict) is associated with higher probability of contemporaneous stagnation⁹ but is associated with lower probability of subsequent stagnation. However, the magnitude of the (surprising) second effect is small. These

results are not straightforward to rationalise and further effort may be required to understand them.

V. The Tendency for Stagnation to Persist

Here, we explore whether countries that were stagnators or non-stagnators in a particular decade were likely to maintain that status or to change status in subsequent decades. The results of the analysis are reported in Tables 6 and 7, which describe the number and the proportion of countries that ‘stay or switch’ between stagnator and non-stagnator status in subsequent decades. These numbers do not add up to 100 per cent as there are some countries for which stagnation analysis is possible in early decades but is not possible in later decades (due to the absence of data). The true probabilities of staying and switching are both likely to be underreported as a result. If the probability of missing data in later decades is higher for countries that undergo subsequent stagnation, then the probabilities of remaining or becoming a stagnator may well be understated more than those remaining or becoming a non-stagnator.

The analysis leads to some striking conclusions.¹⁰ First, if a country was a (decadal) stagnator in the 1960s, it had a relatively small chance of not being a (decadal) stagnator in the 1990s (8.3%). In contrast, countries that were stagnators in the 1970s or 1980s, had a higher chance of avoiding being a stagnator in the 1990s (31.8% and 37.9%, respectively). However, the probability of being a stagnator in the 1990s if a country was a stagnator in previous decades is quite high: 75 per cent for stagnators from the 1960s, 54.5 per cent for stagnators from the 1970s, and 56.9 per cent for stagnators from the 1980s. Finally, the probability that a non-stagnator in the 1960s became a stagnator in the 1990s was relatively high (56.9%). The probability of being a stagnator in the 1990s was therefore raised by about 20 per cent by having been a stagnator (as opposed to a non-stagnator) in the 1960s.

Table 6. Transition matrix of decadal stagnators (raw number)

Prior status →	Stagnator	Non-	Stagnator	Non-	Stagnator	Non-
	1960s	stagnator	1970s	stagnator	1980s	stagnator
No. of countries	12	51	22	46	58	12
Subsequent status ↓						
Stagnator 1970s	8	13				
Non-stagnator 1970s	4	38				
Stagnator 1980s	9	43	15	41		
Non-stagnator 1980s	2	8	6	5		
Stagnator 1990s	9	29	12	28	33	9
Non-stagnator 1990s	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 7. Transition matrix of decadal stagnators (proportions) (%)

Prior status →	Stagnator 1960s	Non- stagnator 1960s	Stagnator 1970s	Non- stagnator 1970s	Stagnator 1980s	Non- stagnator 1980s
No. of countries	12	51	22	46	58	12
Subsequent status ↓						
Stagnator 1970s	66.7	25.5				
Non-stagnator 1970s	33.3	74.5				
Stagnator 1980s	75.0	84.3	68.2	89.1		
Non-stagnator 1980s	16.7	15.7	27.3	10.9		
Stagnator 1990s	75.0	56.9	54.5	60.9	56.9	75.0
Non-stagnator 1990s	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 per cent 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 per cent of countries that were not stagnators in the 1970s were stagnators in the 1980s.

The highest probability (37.9%) of a stagnator becoming a non-stagnator in a subsequent decade was experienced between the 1980s and the 1990s. The highest probability of a non-stagnator remaining a non-stagnator (74.5%) was experienced between the 1960s and the 1970s. It is notable that the probability of exiting stagnation has slightly increased over the decades. However, the probability of remaining a non-stagnator has not increased over the decades for the entire sample of countries. In fact, non-stagnators have in certain decades possessed a risk of 50 per cent or greater of experiencing stagnation in subsequent decades.

It is noteworthy that the countries that were stagnators in the 1960s had a 75 per cent probability of also being stagnators in the 1990s. This finding is suggestive of the possibility that underlying and difficult to change structural features of countries make them endemically vulnerable to stagnation or alternatively that those stagnation episodes, once experienced, have long-lasting and detrimental effects which give rise to subsequent persistent 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 (for example, in sub-Saharan Africa and Latin America).

In sub-Saharan Africa, the probability of a country remaining a stagnator in a subsequent decade once it is already a stagnator ranges between 53.8 per cent and 77.8 per cent (Reddy and Minoiu, 2006b see Tables 14–15). Even worse, in the 1970s, African non-stagnators were faced with a probability of 93.8 per cent of falling into stagnation during the 1980s. A similar pattern is observed for Latin American non-stagnators, which had a probability of 88.9 per cent of stagnating in the 1980s if they had not stagnated in the 1970s. This data is again suggestive of the possibility that structural features of economies may play an important role in creating a disposition to stagnate: African countries that stagnated in the 1960s had a likelihood of

77.8 per cent of having stagnated in the 1990s, whereas all Latin American countries that stagnated in the 1960s also stagnated in the 1990s.

VI. 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 (for example, those proposed by Hausmann et al., 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 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 experienced stagnation spells have lost 'potential' income. Countries that suffered stagnation are more likely 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. Very rich countries were unlikely to have experienced stagnation episodes, which were concentrated among low- and middle-income countries.

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. Our results are in line with those of Cerra and Saxena (2005) who find that output contractions are not followed by fast recoveries and that trend output lost is (on average) not regained in the wake of political and financial crises.

We have attempted to present the elements of a descriptive and explanatory framework for the analysis of stagnation episodes, which we have shown to be a prevalent phenomenon. Future research priorities may include exploring the implications of employing alternative definitions for stagnation, the determinants of the onset and exit from stagnation spells,¹¹ the political economy origins and implications of stagnation experiences, the welfare impact of stagnation experiences (resulting for instance from their impact on public investments), and approaches to the integration of stagnation and sustained growth episodes into a unified theory of growth patterns.

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Notes

1. Income in a given year is represented by the three-year moving average centred 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 primary 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 operationalise 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 Penn World Table 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 Rodríguez, 2006.) In our view, the LCU time series is to be 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. Among the factors giving rise to concern about these estimates are 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 dependence of the estimates on the arbitrary choice of overlapping ‘link countries’ to relate real incomes in one region to real incomes elsewhere and the sizeable impact of the choice of base year on comparisons of real-incomes across country-years. We use PWT incomes where they are needed to undertake cross-sectional comparisons of countries, in particular in the selection of explanatory variables in our regression analysis.
2. Our definition of a spell of stagnation may result in under-counting of the number of spells of stagnation a country experiences, and in under-counting of the number of countries experiencing such spells over the study period. If growth has been negligible or negative for a short time period before the last year for which data is available (2001), then we may be unable to identify the onset of a spell of stagnation since that year must be followed by four years of lower income levels to constitute the onset of a stagnation spell as we define it. We choose, however, not to project the income series forward in time in order to deal with such cases since that would require the use of a forecasting model for the income series of each country. If the onset of a spell of stagnation has been identified but a turning point has not occurred by the end of the study period, then the country is counted as a stagnator in our analysis. The depth and the length of stagnation in that country may, however, be underestimated, since the spell is truncated at the last year for which data is available. The number of countries affected by this truncation is 15 out of 119 in the main dataset, in addition to one transition economy and seven small island developing states.
3. We use the mean income over the last three years of the decade to represent the income at the end of the decade. A spell of stagnation is used to calculate the decadal depth of stagnation, if at least three years belonging to the spell are contained within the decade.
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, however, both as it is sparse and because the comparability of early years with subsequent years in these time series is questionable.
5. The results are available in Reddy and Minoiu (2006b, see Table 5B).
6. The Stata routine *margeff* has been used to obtain the empirical estimates (Bartus, 2005). The standard errors of the marginal effects were computed using the Delta method.
7. We have also investigated the effect of other factors on the likelihood of stagnation. These include: geography variables (such as the average number of frost days, the share of area in the tropics, landlockedness, and AIDS prevalence); trade and monetary policy variables, for example, openness to

trade measured by the Sachs-Warner (1995) dummy variable updated by Wacziarg and Welch (2003) and the Burnside and Dollar (2000) policy indicator; external shocks (average and standard deviation of terms of trade); and other measures of institutions (CPIA policy and institutional rankings, and a differently weighted ICRG index of institutional quality). However, these were either not robustly associated with stagnation, or left the main results unchanged, and it was decided not to report those specifications. In order to minimise the possibility of endogeneity due to reverse causation, we often included initial values of the reported covariates (for example, initial trade policy) but, the results remained broadly the same as those reported here. All these regression results are available from the authors upon request, along with the data sources and variable definitions.

8. The fact that growth collapses are robustly correlated with the outbreak of civil war has also been documented recently by Jones and Olken (2005).
9. Jerzmanowski (2006) argues that countries with ‘weaker’ institutions tend to spend more time in stagnation episodes (and hence possess, as has been frequently observed, lower average growth rates of income).
10. Some caution is required in interpreting these results since the estimated transition probabilities could be indicative of the impact of fleeting shocks or be the consequence of more deep-seated ‘structural’ causal processes. Moreover, the structural causal processes may themselves change over time. It is, therefore, difficult to make causal inferences on the basis of the available data. It can also be argued that the estimates of the probabilities rely on a single realisation of the data generating process giving rise to the world income vector in each year, and for that reason carry little information. In view of these considerations, the transition probabilities that we report should be viewed purely as descriptive devices.
11. Interesting recent contributions in this regard are those of Calvo et al. (2006), and Jones and Olken (2005).

References

- Anderson, E. and Morrissey, O. (2006) A statistical approach to identifying poorly performing countries. *Journal of Development Studies*, 42(3), pp. 469–489.
- Bartus, T. (2005) MARGEFF: Stata module to compute average marginal effects for categorial and limited dependent variable models. *Stata Journal*, 5(3), pp. 309–329.
- Ben-David, D. and Papell, D.H. (1998) Slowdowns and meltdowns: post-war growth evidence from 74 countries. *Review of Economics and Statistics*, 80, pp. 561–571.
- Burnside, C. and Dollar, D. (2000) Aid, policies and growth. *American Economic Review*, 90(4), pp. 847–869.
- Calvo, G.A., Izquierdo, A. and Talvi, E. (2006) Phoenix miracles in emerging markets: recovering without credit from systemic financial crises. NBER Working Paper No. 12101, National Bureau of Economic Research, Cambridge, MA.
- Cerra, V. and Saxena, S.C. (2005) Growth dynamics: the myth of economic recovery. IMF Working Paper No. 05/147, International Monetary Fund, Washington, DC.
- EIU CountryData (2002) Economist Intelligence Unit, Bureau van Dijk Electronic Publishing, accessed at: <http://eiu.bvdep.com/cgi/template.dll?product=101&user=ipaddress>
- Hausmann, R., Pritchett, L. and Rodrik, D. (2005) Growth accelerations. *Journal of Economic Growth*, 10(4), pp. 303–329.
- Hausmann, R., Rodríguez, F. and Wagner, R. (2006) Growth collapses. Wesleyan Economics Working Paper No. 024, Department of Economics, Wesleyan University.
- Jerzmanowski, M. (2006) Empirics of hills, plateaus, mountains, and plains: a Markov-switching approach to growth. *Journal of Development Economics*, 81(2), pp. 357–385.
- Jones, B.F. and Oklen, B.A. (2005) The anatomy of start-stop growth. NBER Working Paper No. 11528, National Bureau of Economic Research, Cambridge, MA.
- Kaufmann, D., Kraay, A. and Mastruzzi, M. (2006) *Governance matters V: Governance indicators for 1996–2005* (Washington DC: The World Bank), accessed at: www.worldbank.org/wbi/governance/govmatters5
- Levine, R. and Renelt, D. (1992) A sensitivity analysis of cross-country growth regressions. *The American Economic Review*, 82(4), pp. 942–963.

- McFadden, D. (1974) The measurement of travel demand. *Journal of Public Economics*, 3(4), pp. 303–328.
- Penn World Table Version 5.6 (1995) A. Heston, R. Summers, D.A. Nuxoll and B. Aten, University of Pennsylvania, January.
- Penn World Table Version 6.1 (2002) A. Heston, R. Summers and B. Aten, Centre for International Comparisons at the University of Pennsylvania (CICUP), October.
- Pritchett, L. (2000) Understanding patterns of economic growth: searching for hills among plateaus, mountains, and plains. *World Bank Economic Review*, 14(2), pp. 221–250.
- Reddy, S. and Minoiu, C. (2006a) True income gains versus economic growth: a conceptual distinction and an empirical assessment. Mimeo: Columbia University.
- Reddy, S. and Minoiu, C. (2006b) Real income stagnation of countries, 1960–2001. United Nations Department of Economic and Social Affairs Working Paper No. 28, accessed at: www.un.org/esa/policy/backgroundpapers/reddy_stagnation.pdf
- Rodríguez, F. (2006) The anarchy of numbers: understanding the evidence on Venezuelan economic growth. *Canadian Journal of Development Studies*, 27(4), pp. 37–56.
- Rodríguez, F. and Sachs, J. (1999) Why do resource abundant economies grow more slowly? A new explanation and an application to Venezuela. *Journal of Economic Growth*, 4(3), pp. 277–303.
- Rodrik, D. (1999) Where did all the growth go? External shocks, social conflict and growth collapses. *Journal of Economic Growth*, 4(4), pp. 385–412.
- Sachs, J.D. and Warner, A.M. (1995) Economic reform and the process of global integration. *Brookings Papers on Economic Activity*, 1, pp. 1–118.
- Sachs, J.D. and Warner, A.M. (1997) Sources of slow growth in African economies. *Journal of African Economies*, 6(3), pp. 335–376.
- Sachs, J.D. and Warner, A.M. (1999) The big rush, natural resource booms and growth. *Journal of Development Economics*, 59(1), pp. 43–76.
- Sachs, J.D., McArthur, J.W., Schmidt-Traub, G., Kruk, M., Bahadur, C., Faye, M. and McCord, G. (1994) Ending Africa's poverty trap. *UN Millennium Project, Brookings Papers on Economic Activity*, 1, pp. 117–240.
- Tornell, A. and Lane, P. (1999) The voracity effect. *American Economic Review*, 89(1), pp. 22–46.
- Wacziarg, R. and Welch, K.H. (2003) Trade liberalization and growth: new evidence. NBER Working Paper No. 10152, National Bureau of Economic Research, Cambridge, MA.
- World Bank Development Indicators online (2002) World Bank, Washington, DC, accessed at: <http://devdata.worldbank.org/dataonline/old-default.htm>

Appendix

Table A1. Variable definitions and data sources

Variable	Source
GDP per capita in constant LCUs	World Development Indicators online database (2002) except for Taiwan, for which per capita GDP in constant US\$ at PPP is from the EIU Country Data (2002)
Real GDP per capita (1960)	Levine and Renelt (1992), originally from the Penn World Tables Mark 5.6
Real GDP per capita (1990)	Penn World Tables Mark 6.1
Life expectancy (1960, 1990)	World Development Indicators online database (2002)
Growth rate of domestic credit (1960–1989), Investment share of GDP (1960–1989), Growth rate of exports (1960–1989), Number of revolutions and coups per year (1960–1984), Index of civil and political liberties (1972–1985)	Levine and Renelt (1992)
Demographic control variable: Difference between the growth rate of the economically active population (between ages 15–65 years) and growth of total population	Sachs and Warner (1997)
Landlocked dummy; Share of exports of primary products in GNP in 1970	Sachs and Warner (1995)
Small-island developing states	United Nations classification, accessed at: http://www.sidsnet.org/sids_list.html
Institutional Country Risk Guide index of institutional quality (1984–1989) represents the summation of the following components: corruption in government, rule of law, democratic accountability, government stability, ethnic tensions, and internal and external conflict	S. Knack and P. Keefer, IRIS-3: file of International Country Risk Guide (ICRG) data. College Park, Maryland: IRIS (producer). East Syracuse, New York: The PRS Group, Inc. (distributor)
World Bank Aggregate Governance Indicators 1996–2005. The variable used in the regressions represents the summation of the following components: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption	Kaufmann et al. (2006).