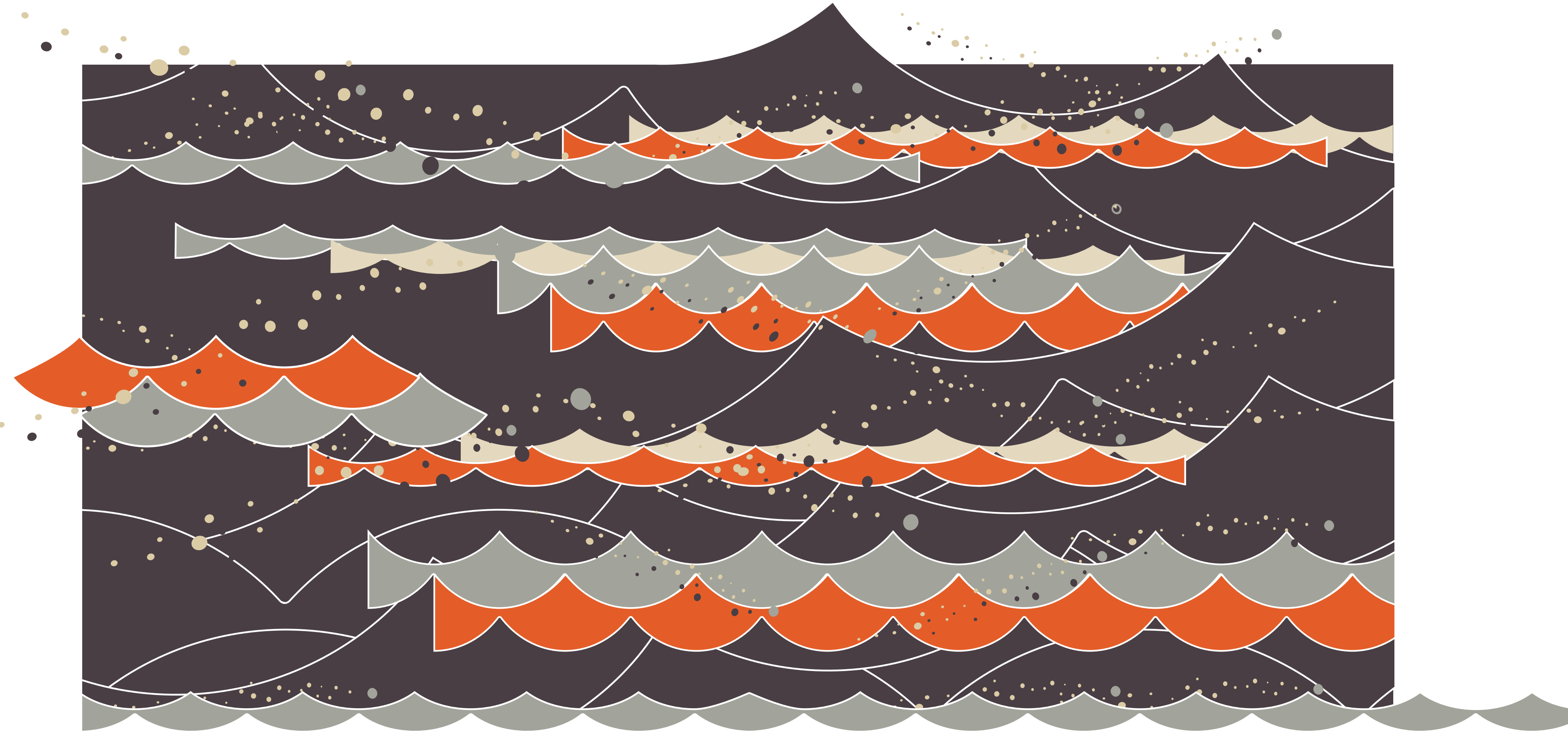


The Dynamics of Economic Growth

A Visual Handbook of Growth Rates, Regimes, Transitions and Volatility

The Effective States and Inclusive Development Research Centre (ESID)

The Effective States and Inclusive Development Research Centre (ESID) is a network of researchers and policy partners in Bangladesh, Ghana, India, Malawi, Rwanda, South Africa, Uganda, the UK, the USA and other countries. ESID researchers are working together to investigate what kinds of politics help to secure inclusive development and how these can be promoted. ESID is funded by the UK Department for International Development (DFID) and is led from the School of Environment and Development and the Brooks World Poverty Institute at the University of Manchester, UK.

ESID partners include the Institute for Economic Growth, India, BRAC Development Institute, Bangladesh, University of Malawi, Centre for Democratic Development, Ghana, University of Cape Town, South Africa and the Centre for International Development at the Kennedy School of Government, Harvard University, USA, as well as research associates in Rwanda, the UK and elsewhere.

ESID research will investigate the political drivers of inclusive development, particularly how state capacity and elite commitment can emerge and be sustained and how to support these processes. There will be a central focus on the role of power relations and dominant ideas in shaping developmental forms of state capacity and elite commitment.

The centre has a strong focus on capacity strengthening, building partnerships and networks and exchanging knowledge and experience.

The Dynamics of Economic Growth: A Visual Handbook of Growth Rates, Regimes, Transitions and Volatility

Sabyasachi Kar[1]
Lant Pritchett[2]
Selim Raihan[3]
Kunal Sen[4]

1 Institute of Economic Growth, Delhi, India

2 Harvard Kennedy School and CID, USA

3 Department of Economics, University of Dhaka, and South Asian Network on Economic Modeling (SANEM), Bangladesh

4 IDPM and BWPI, University of Manchester, UK and Joint Research Director, ESID

The Dynamics of Economic Growth: A Visual Handbook of Growth Rates, Regimes, Transitions and Volatility

First published by the DFID-funded Research Programme Consortium on Effective States and Inclusive Development (ESID), June 2013

IDPM and BWPI, School of Environment and Development
University of Manchester
Arthur Lewis Building
Oxford Road
Manchester
M13 9PL
UK

www.effective-states.org

ISBN 978-1-908749-18-5

Produced and designed by: The Studio, email: studio@york.ac.uk
Cover image designed by: The Studio

This document is an output from a project funded by UK Aid from the UK Department for International Development (DFID) for the benefit of developing countries. However, the views expressed and information contained in it are not necessarily those of or endorsed by DFID, which can accept no responsibility for such views or information or for any reliance placed on them.

Table of Contents

List of Symbols and Abbreviations

Abbreviations

BP	Bai-Perron
GDP	Gross Domestic Product
PWT	Penn World Tables
GDPPC	Gross Domestic Product Per Capita
MA	Moving Average
OLS	Ordinary Least Squares
ppa	Percent per annum
PWT	Penn World Tables
SD	Standard Deviation

Symbols

Ln	Natural Log
g	Average Annual Growth Rate
R^2	Co-Efficient of Determination
SD	Standard Deviation
Δg	Change in Growth Rate

List of Country Codes

Country	Code
Afghanistan	**AFG**
Albania	**ALB**
Algeria	**DZA**
Angola	**AGO**
Argentina	**ARG**
Australia	**AUS**
Austria	**AUT**
Bangladesh	**BGD**
Belgium	**BEL**
Benin	**BEN**
Bolivia	**BOL**
Botswana	**BWA**
Brazil	**BRA**
Bulgaria	**BGR**
Burkina Faso	**BFA**
Burundi	**BDI**
Cambodia	**KHM**
Cameroon	**CMR**
Canada	**CAN**
Central African Republic	**CAF**

Country	Code
Chad	**TCD**
Chile	**CHL**
China	**CHN**
Colombia	**COL**
Congo, Rep.	**COG**
Congo, Dem Rep.	**ZAR**
Costa Rica	**CRI**
Côte d'Ivoire	**CIV**
Cuba	**CUB**
Cyprus	**CYP**
Denmark	**DNK**
Dominican Republic	**DOM**
Ecuador	**ECU**
Egypt, Arab Rep.	**EGY**
El Salvador	**SLV**
Ethiopia	**ETH**
Fiji	**FJI**
Finland	**FIN**
France	**FRA**
Gabon	**GAB**

Country	Code
Gambia, The	**GMB**
Germany	**DEU**
Ghana	**GHA**
Greece	**GRC**
Guatemala	**GTM**
Guinea	**GIN**
Guinea-Bissau	**GNB**
Guyana	**GUY**
Haiti	**HTI**
Honduras	**HND**
Hong Kong SAR, China	**HKG**
Hungary	**HUN**
India	**IND**
Indonesia	**IDN**
Iran, Islamic Rep.	**IRN**
Iraq	**IRQ**
Ireland	**IRL**
Israel	**ISR**
Italy	**ITA**
Jamaica	**JAM**

Country	Code
Japan	**JPN**
Jordan	**JOR**
Kenya	**KEN**
Korea, Rep.	**KOR**
Lao PDR	**LAO**
Lebanon	**LBN**
Lesotho	**LSO**
Liberia	**LBR**
Madagascar	**MDG**
Malawi	**MWI**
Malaysia	**MYS**
Mali	**MLI**
Mauritania	**MRT**
Mauritius	**MUS**
Mexico	**MEX**
Mongolia	**MNG**
Morocco	**MAR**
Mozambique	**MOZ**
Namibia	**NAM**
Nepal	**NPL**
Netherlands	**NLD**
New Zealand	**NZL**

Country	Code
Nicaragua	**NIC**
Niger	**NER**
Nigeria	**NGA**
Norway	**NOR**
Oman	**OMN**
Pakistan	**PAK**
Panama	**PAN**
Papua New Guinea	**PNG**
Paraguay	**PRY**
Peru	**PER**
Philippines	**PHL**
Poland	**POL**
Portugal	**PRT**
Puerto Rico	**PRI**
Romania	**ROM**
Rwanda	**RWA**
Senegal	**SEN**
Sierra Leone	**SLE**
Singapore	**SGP**
Somalia	**SOM**
South Africa	**ZAF**
Spain	**ESP**

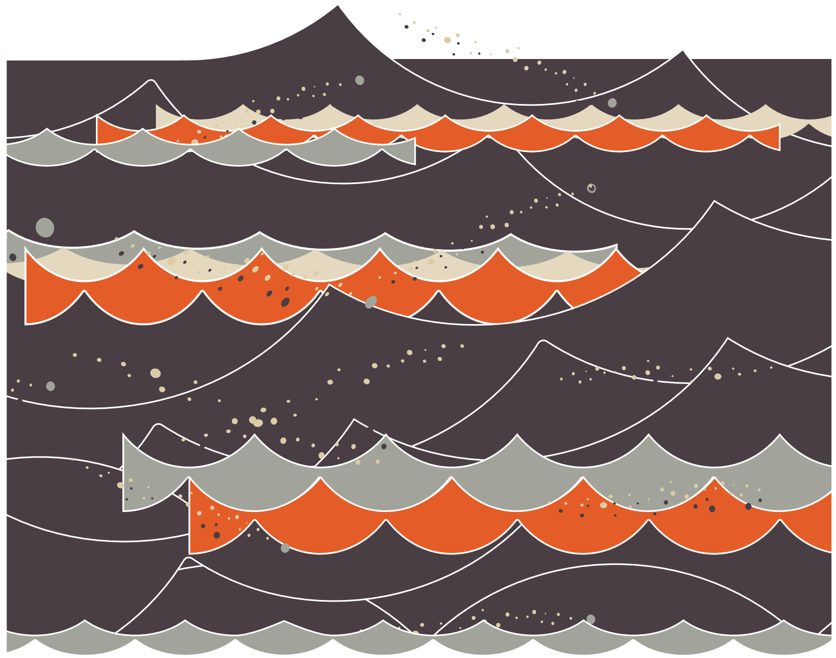
Country	Code
Sri Lanka	**LKA**
Sudan	**SDN**
Swaziland	**SWZ**
Sweden	**SWE**
Switzerland	**CHE**
Syrian Arab Republic	**SYR**
Taiwan	**TWN**
Tanzania	**TZA**
Thailand	**THA**
Togo	**TGO**
Trinidad and Tobago	**TTO**
Tunisia	**TUN**
Turkey	**TUR**
Uganda	**UGA**
United Kingdom	**GBR**
United States	**USA**
Uruguay	**URY**
Venezuela, RB	**VEN**
Vietnam	**VNM**
Zambia	**ZMB**
Zimbabwe	**ZWE**

Acknowledgements

This handbook would have not been possible without the able research assistance of Jagadish Sahu, Sitakanta Panda, Debajit Jha (all at Institute of Economic Growth, India), Mir Tanzim Nur Angkur (SANEM), and Aroni Barkat (SANEM and Department of Economics, University of Dhaka). We are grateful to all these individuals for their help. The genesis of the handbook occurred during a meeting in SANEM in November 2012, and we would like to thank Sk. Ashibur Rahman, P.S. to the Executive Director, SANEM, who made sure that the logistics of the meeting were taken care of smoothly. We would also like to thank Aarti Krishnan at the University of Manchester for her editorial support and Julia Brunt, Programme Manager of ESID, also at the University of Manchester, for ably guiding the production process from start to finish. Finally, we would like to thank Monika Kerekes for providing the STATA algorithm to run the Bai-Perron test.

Abstract

Why there are such significant and persistent differences in living standards across countries is one of the most important and challenging areas of development policy. In spite of a voluminous literature on the causes of economic growth, we still have a long way to go in understanding why the growth experiences of countries differ so much, why growth changes so much (for good and ill) over time, and why only a handful of developing countries have seen their incomes converge to the levels observed in developed countries. To understand the causes of economic growth, we first need to understand what growth *is*. Much of the focus in the academic and policy literature on "growth" has been on steady-state or long-run average rates of growth of output per capita, or equivalently, comparing *levels* of income. But the focus on one single growth rate for a particular country misses the point that most countries observe dramatic changes in their growth of per capita income. We present *visually* the *dynamics* of the growth experiences of 125 countries. The graphs themselves (and embedded numeric information) highlight the key point that we would like to convey in this Handbook – that economic growth is dynamic and episodic and that many countries have gone through very different growth phases. We identify the timing and magnitude of "breaks" or "episodes" or "regime transitions" for all our 125 countries from the application of a standard statistical procedure. Viewing economic growth as transitions across growth phases would imply that we would need to move beyond the current approaches to growth, and that new "third generation" theoretical models and empirical methods would need to be developed to understand what determines economic growth.



Part I

Economic Growth: Getting the Question Right

Part I: Economic Growth: Getting the Question Right

Is there some action a government of India could take that would lead the Indian economy to grow like Indonesia's or Egypt's? If so, what, exactly? If not, what is it about the "nature of India" that makes it so? The consequences for human welfare involved in questions like these are simply staggering: once one starts to think about them, it is hard to think about anything else.

NOBEL LAUREATE ROBERT E. LUCAS 1988, P. 5

Why are there such significant and persistent differences in living standards across countries? This is one of the most important and challenging areas of development policy. These differences arise primarily due to different rates of economic growth across countries. In spite of a voluminous literature on the causes of economic growth: it is *still* "hard to think about anything else". We still have a long way to go in understanding why the growth experiences of countries differ so much, why growth changes so much (for good and ill) over time, and why only a handful of developing countries have seen their incomes converge to the levels observed in developed countries – and "what, exactly" could be done about it.

To understand the causes of economic growth, we first need to understand what growth *is*. Much of the focus in the academic and policy literature on "growth" has been on steady-state or long-run average rates of growth of output per capita, or equivalently, comparing *levels* of income (e.g. Barro, 1991, 1996, 1997; Acemoglu *et al.*, 2001, 2002; Hall and Jones, 1999). But the focus on *one single* growth rate for a particular country misses the point that most countries observe dramatic changes in their growth of per capita income.

Lucas's concern that slow growth might be the "nature of India" reflected the possibility India was trapped in the so-called "Hindu rate of growth". But it wasn't the "nature of India" to grow slowly. Lucas's writings were confirmed only a few years later – as India came out of an incipient macroeconomic crisis in 1991. From 1991 to 2010, GDP per capita grew at a pace of 4.8 percent per annum (ppa) compared with the pace of 2.5 percent from 1970 to 1991. GDP in 2010 was USD 1.45 *trillion* higher than had the previous pace continued (calculation based on 2005 international currency units of the Penn World Tables 7.1) and the cumulative output gain of the higher growth trajectory of 1991-2010 versus 1970-1991 was over USD 8 trillion. A staggering gain of USD 8 trillion!

Long-run growth averages within countries, therefore, mask distinct periods of success and failure (Easterly *et al.*, 1993; Ben-David and Papell, 1998; Pritchett, 2000; Jones and Olken, 2008; Jerzmanowski, 2006; Kerekes 2012). While the growth process of all "developed" economies is well characterized by a single growth rate and a "business cycle" around that trend (at least until the recent crises) – this is not true for most countries in the world (Aguiar and Gopinath, 2007). Massive discrete *changes* in growth are common in developing countries. Most developing countries experience distinct growth *episodes:* growth accelerations and decelerations or collapses (Rodrik, 1999, 2003; Hausmann *et al.*, 2006; Aizenman and Spiegel, 2010). For policymakers, and business people too, what matters is not the infinite horizon level, but what will happen to output growth in the medium term (five to ten years), when economic growth is unstable and highly unpredictable in most countries (Pritchett and Werker 2012).

This Handbook describes *visually* in graphs (and numbers) the *dynamics* of the growth experiences of 125 countries. We use the chained real Gross Domestic Product (GDP) per capita ("rgdpch") from the Penn World Tables (PWT) version 7.1 for each country for the years available (with the earliest starting year being 1950, and the ending year for all countries being 2010). For each country, we provide a set of **eight** *exactly comparable* graphs; each captures some essential features of the dynamics of economic growth. The emphasis is on a *visual* presentation of the varied experiences of economic growth across the world and we avoid tables to give the reader (viewer) a *feel* of growth. The graphs themselves (and embedded numeric information) highlight the key point that we would like to convey in this Handbook – that economic growth is dynamic and episodic and that countries have gone through very different growth phases.

Our objective here is **'to get the question right'** – *what are the empirical phenomena to be explained by a theory and empirics explaining 'economic growth'*? By presenting graphs that summarize the evolution of output per capita in a variety of ways we show that the phenomenon of "growth" to be explained is much more than just a single "growth rate". But we consciously do not propose any "answers" – we are scrupulously free of any assertions about the "causes" of any aspect of growth.[1] Our goal is to describe adequately the "Left Hand Side" – the level and time evolution of GDP per capita. We deliberately do not present any "Right Hand Side"as correlates (much less assert these are "determinants") of the dynamics of economic growth.

The rest of the Handbook is in three parts.

Part II presents visually the stylized facts of economic growth. For each of 125 countries we present four *exactly comparable* graphs that summarize different aspects of the growth experience and are a visual rendition of standard summary statistics (growth, growth by decade, volatility of growth, comparison with world average growth, etc.). Our value added is *comparability,* as we solve the prosaic, but surprisingly unaddressed, problem that, since nearly all graphs of GDP per capita adjust the vertical

1 There is a vast literature on the so-called 'growth empirics' which are studies on the causes of growth. A few examples: Edwards (1993) and Rodriquez and Rodrik (2001) on trade; Levine (1997) on finance; Barro and McCleary (2003) on religion; Hausmann *et al.* (2007) and Hidalgo et al. (2007) on product space; and Jones and Olken (2005) on political leadership.

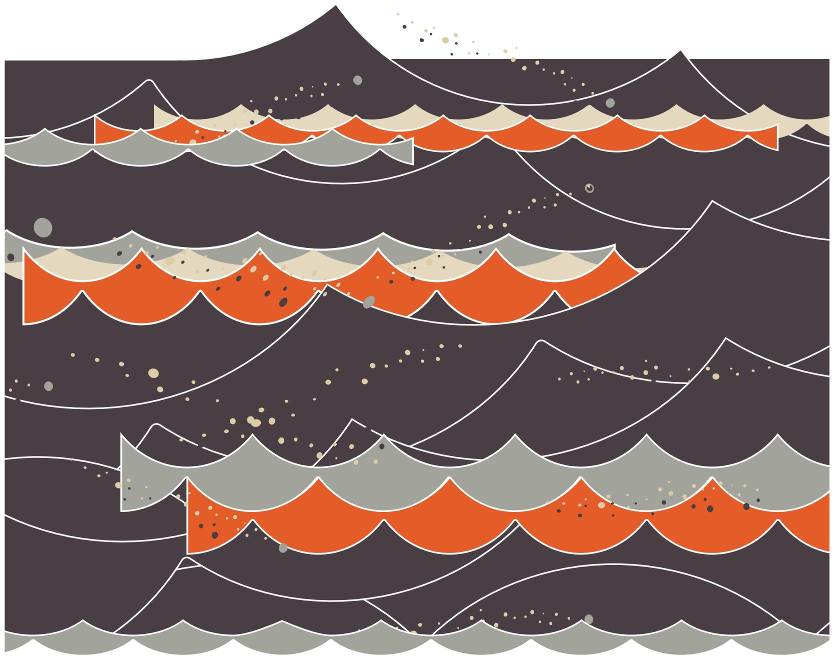
and horizontal scales to the data of the particular country, the visual "slope" of the graphs is not comparable. In fact, the automatic adjustments of the scale of the vertical axis done by nearly all spreadsheets or statistical programs cause countries with 1 percent, 3 percent and 5 percent growth to look exactly alike.

In Part III, we provide more structure and examine "breaks" in growth. We do this by implementing a modified version of a statistical method (Bai-Perron) that is commonly used to identify breaks in the GDP per capita series. Using this method, we demarcate each country's growth experience into distinct growth phases and present our results graphically. The graphs show that economic growth in many countries has apparently discrete and quantitatively massive transitions between periods of high growth, periods of negative growth, and periods of stagnation. Further, we establish when these periods started and ended, and what have been the magnitudes of GDP per capita change in each of these episodes. We also highlight the common features of the growth experiences of very disparate countries – features that a focus only on a single time-averaged growth rate, or even that allow growth to vary in units of decades (e.g. 70s vs 80s), miss.

Our view is that we are moving into a "third generation" of growth research. First generation growth theory was Solow-Swan and its variants (Solow, 1956; Barro *et al.*, 1995; Barro and Sala-i-Martin; 1992, 1995, 1997; Jones, 1997; Mankiw *et al.,* 1992; Sala-i-Martin, 1996a, 1996b). The "second generation" had a theoretical and empirical component. The "endogenous growth" models provided theoretical models with interested comparative dynamics of steady state growth rates by endogenizing technical change (Romer, 1986, 1990, 1993; Lucas, 1988; Aghion and Howitt, 1992; 2009; Helpman, 2004). The "second generation" of empirics started with Barro (1991) type regressions and progressed from throwing every conceivable variable on the "Right Hand Side" (e.g. Sala-i-Martin's 1997 'four million" regressions) to using more sophisticated panel data methods and more careful and robust selection of the set of instrumental variables (Islam, 1995; Jones, 1995; Levine and Renelt, 1992). The "second generation" also included theoretical and empirical work on the *levels* of income (e.g. Hall and Jones, 1999) including the emphasis on the role of "institutions" in determining long-run levels/growth rates (e.g. Acemoglu *et al.*, 2001, 2002, 2004; Acemoglu *et al.*, 2003; North *et al.*, 2009; Easterly and Levine, 1997; Rodrik *et al.,* 2004).

But the principal variable of interest in theoretical and empirical "second generation" literature is the level of output or long-run or time-averaged growth rate of per capita output. As we conclude in Part IV, this visual Handbook shows that such a conceptualization of growth is not a complete description of the reality of economic growth in developing countries.[2] Viewing economic growth as transitions across growth phases would imply that new "third generation" theoretical models and empirical methods would need to be developed to understand what determines economic growth. We hope that the next stage of research in economic growth will be to use a different set of Left Hand Side variables – including perhaps some we present in Part III of the Handbook.

2 To be fair to our intellectual forbears in the "first generation" of theoretical work, Hicks in Capital and Growth (1965) pointed out the growth theory of the "comparative dynamics" of differences in steady state growth rates was the least relevant branch of economics to developing countries, as their growth dynamics were dominated by "catch up" growth and "structural transformation" that were clearly incompatible with "steady state" differences in dynamics in which, almost by definition, all key ratios of the economy had to be constant.



Part II

Section I: Everything You Always Wanted to Know About Growth

Part II: Section I: Everything You Always Wanted to Know About Growth

What are the stylized facts of economic growth? In this part, we present the summary features of economic growth using PWT 7.1 data on real GDP per capita for 125 countries, both developed and developing. Our sample contains all countries from PWT 7.1 which have data at least since 1970 and with a population in 2000 of over 700,000. These cut-offs exclude mostly the new countries formed after the breakdown of the Soviet empire (e.g. Tajikistan, Croatia), very small nation-states (mostly small oil-states, e.g. Bahrain, Brunei), small islands in the Caribbean (e.g. Bermuda) and Pacific (e.g. Tonga) and some countries, such as Kuwait and Saudi Arabia, for which PWT 7.1 GDP per capita data is only available from the mid-1980s.

In the following section, we present four graphs per country.

Figure 1 presents the plot of natural log (Ln) GDP per capita (GDPPC) for the country. On the plot are shown the growth rates overall (all available data) plus overall the decadal and five-year growth rates (ten-year growth rates at the top of the line graph and five-year growth rates at the bottom of the graph). Unless otherwise specified, all reported "growth rates" are the coefficient from an OLS regression of ln(GDPPC) on a time trend over the specified period.[3]

The top left hand side of Figure 1 presents three summary statistics:

i) **g** – the OLS growth rate over the available data.
ii) **R^2** – the R-square of regressing ln(GDPPC) on a single time trend
iii) $\sigma_{\Delta Y}$ – the standard deviation of the annual log changes in GDPPC.

"The" growth rate (g) is the single number of "growth" and is conventionally used in single cross-section growth regressions (usually over some common period). The other two summary statistics provide a characterization of the temporal behaviour of the GDPPC series.

When growth is moderate and steady (e.g. Denmark R^2=0.96) or rapid (e.g. Thailand R^2=0.98) the R^2 is very high (well above 0.9). A lower R^2 suggests either very low growth (Senegal R^2=0.1, g=0.1) or that the time evolution of output is not well-summarized by a single trend line (Republic of Congo R^2=0.6 even with g=1.6).

3 There are of course many other ways of calculating a "growth rate" – one could take the annual growth rates (as log first difference) and average them, or one could calculate the total change endpoint to endpoint and compute the exponential growth rate that would have achieved that change, one could just take N-period ln differences and divide by N.

4 Of course the standard measure of "cyclical" volatility through a decomposition into "trend" and "deviation around a trend" presumes there is a stable "trend", which, in our view, and as Aguiar and Gopinath (2007) emphasize, gets the cart before the horse by assuming that the "cycle" (which isn't really a "cycle") is not what determines the "trend".

The standard deviation of the first differences of ln(GDPPC) – $\sigma_{\Delta Y}$ – is one measure of growth rate volatility.[4] Developed economies tend to be quite stable by this measure (USA $\sigma_{\Delta Y}$=2.6, Belgium $\sigma_{\Delta Y}$=2.3), while developing economies have much higher volatility, almost always above 4, even in relatively stable middle income countries (Indonesia $\sigma_{\Delta Y}$=4.3, Turkey $\sigma_{\Delta Y}$=5.4) and reaching spectacular highs in unstable countries (Nigeria $\sigma_{\Delta Y}$=7.8).

For all countries the horizontal and vertical axes are the same, so that the "eyeball slope" (vertical gain per horizontal movement) represents the same gain in ln(GDPPC) per unit time across all graphs. While the *levels* of GDPPC are not comparable across country graphs, each vertical axes has 2.1 log units (the *absolute* values of the y-axis are set for each country by placing the lowest value of the vertical axis .1 ln units below the minimum value of ln (GDPPC) for each country)[5]. The levels of GDP per capita in USD for each country at its minimum, maximum and median are indicated on the right axis. This common scaling does mean some countries have lots of "white space" and some countries (e.g. Taiwan, the Republic of Korea) have their graph disappear out the top.[6] The advantage is that, unlike every other graph of economic growth you have ever seen, what looks steeper in one country than another really does represent a faster growth rate. It is not an artefact of compressing the horizontal (to years available) or vertical (to minimize white space or display all data) scales.

Table 1 presents a tabular overview of Figure 1 by classifying each of the 125 countries by (i) growth rate (above or below zero), (ii) volatility ($\sigma_{\Delta Y}$ above or below 3.0) and (iii) goodness of fit of a single time trend (weak fit, $R^2 < 0.5$, moderate fit, $0.9 > R^2 > 0.5$ and strong fit, $R^2 > 0.9$).

All 38 countries with weak fit ($R^2 < 0.5$) have high volatility ($\sigma_{\Delta Y} > 3.0$). As can be seen even in the simplest graph, and in more detail in the others, most of these countries exhibit very sharp and massive growth breaks and multiple growth regimes, often with strongly positive growth followed by negative growth. For instance, Ethiopia had moderate positive growth in the 1950s and 1960s, negative growth in the 1970s and 1980s, but has had rapid growth (g = 5.4) recently and hence has overall g = 0.5, R^2 = 0.29, and $\sigma_{\Delta Y}$ = 6.1). While most of the 38 "weak fit" countries are Sub-Saharan African, there are countries from other regions as well, such as Albania and Poland from Eastern Europe, Iran and Jordan from the Middle East, and Papua New Guinea from the South Pacific and Bangladesh in South Asia. For countries where fit is weak, either (a) it makes little sense to think of representing the time evolution of output as a *single* growth rate for each country or (b) the single stable trend growth rate is very near zero (positive or negative).

The 10 of the 38 with weak fit, high volatility, and negative growth (g < 0) include conflict affected and "failing states" – Nicaragua, Afghanistan, Haiti and Iraq – but also non-conflict weak performers – Zambia, Nigeria, Togo.

In the 40 countries with moderate fit ($0 < R^2 < 0.9$) growth transitions and episodes are also pronounced and volatility is high (only 2 have $\sigma_{\Delta Y}$<3.0 –

5 Setting the vertical axes so that all countries – from the USA to Ethiopia – are on the same absolute scale causes nearly all countries to look like the same flat line, with little gain.

6 The vertical scale of 2.1 units means that countries with more than an 8.2 fold (=exp(2.1)) increase in GDPPC go out the top of the graph before reaching 2010. On the other hand, expanding the vertical scale for every country, so that the Republic of Korea and Singapore's data would fit, caused most countries' variations to nearly disappear.

Guatemala and South Africa, both at $\sigma_{\Delta Y}$ = 2.6). The regional background of countries in this category is more mixed. We have countries from every region, including Asia and Europe. Greece, a (borderline) advanced economy, is here too. Many of these countries have moderate overall growth rates, but massive differences over time. Peru, for instance, had g = 4.8 2000-2010 but g = -2.4 in the 1980s. This is a *range* of decade growth rates of 7.2 ppa (compared with a standard deviation of decade growth rates across countries of only around 2 ppa).

Interestingly, three of the 'miracle growth' countries identified by the Commission for Growth and Development (2008) – Brazil, Japan and Oman – are in this category, which demonstrates just how much growth rates change over time. Brazil had g = 5.5 in the 1970s but g = -0.1 in the 1980s, Japan had among the most "miraculous" growth rates of all time in the 1960s, g = 8.8, but tepid growth (g =0.6) in the 1990s.

In this "moderate fit" category with g < 0 are states with sufficient economic decline to create a moderate fit around a negative trend, e.g. Liberia g = -4.1, Somalia g = -1.8, Niger g = -1.4, Madagascar g = -1.1).

The 14 countries with strong fit (R-square > 0.9) and low volatility ($\sigma_{\Delta Y}$ < 3.0) include 12 developed countries, Colombia and, perhaps surprisingly, Pakistan. Note that stable growth at moderate rates is a "typical" pattern for rich industrial countries, but extremely rare among developing countries.

The 31 countries with strong fit, positive growth and high volatility are a mixed bag. The rapid catch up countries of the OECD (Spain, Finland, Ireland, Portugal) are here. So are the high performing East Asian countries (China, Indonesia, the Republic of Korea, Malaysia, Thailand, Taiwan, and Vietnam). But there are also countries from other regions – India, Sri Lanka and Nepal from South Asia, Botswana and Lesotho from Sub-Saharan Africa, Egypt, Morocco and Tunisia from the Middle East and North Africa, and Dominican Republic and Mexico from Latin America and the Caribbean.

Of course to have strong fit around a negative trend (g < 0) a country has to be a consistent basket case of growth. The Central African Republic has had negative growth in each of the last four decades.

Table 1: Summary of Growth Experiences across the World

	g>0		g<0	
	$\sigma_{\Delta y}$> 3.0	$\sigma_{\Delta y}$< 3.0	$\sigma_{\Delta y}$>3.0	$\sigma_{\Delta y}$< 3.0
$0 < R^2 < 0.5$	AGO, ALB, BDI, BGD, BOL, CIV, CMR, ETH, GAB, GHA, GUY, IRN, JOR, KEN, LBN, MNG, MWI, NAM, PNG, POL, RWA, SEN, SLE, TCD, UGA, VEN, ZWE		AFG, GIN, GMB, GNB, HTI, IRQ, NGA, NIC, TGO, ZMB	
$0.5 \leq R^2 < 0.9$	ARG, BEN, BFA, BGR, BRA, CHE, CHL, COG, CUB, DZA, ECU, FJI, GRC, HND, HUN, JAM, JPN, KHM, MLI, MOZ, MRT, MUS, OMN, PER, PHL, PRY, ROM, SDN, SLV, SWZ, SYR, TTO, TZA, URY	GTM, ZAF	LBR, MDG, NER, SOM, ZAR	
$0.9 \leq R^2 < 1$	AUS, BWA, CHN, CRI, CYP, DOM, EGY, ESP, FIN, HKG, IDN, IND, IRL, ISR, KOR, LAO, LKA, LSO, MAR, MEX, MYS, NPL, NZL, PAN, PRI, PRT, SGP, THA, TUN, TUR, TWN, VNM	AUT, BEL, CAN, COL, DNK, FRA, GBR, DEU, ITA, NLD, NOR, PAK, SWE, USA	CAF	

Figure 2 presents a different view of growth by showing the *level* of each country's ln(GDPPC) relative to all other countries at its first year of data and in 2010 (with data starting in 1960 or 1970).

The diagonal lines demarcate different growth benchmarks. Since the axes are equal, zero growth is a 45 degree line (adjusting for aspect ratio) and countries below this line finished 2010 poorer than they started. The 2% line is (roughly) the average economic growth rate across all countries, so countries above grew faster than average and below slower than average. Countries above the 4% line grew (roughly) one cross-national standard deviation (about 2 ppa) above the average (also about 2 ppa).

Figure 2 also shows numerically the level (not natural log) of GDP per capita at the beginning and end of the available data and the ratio of the two. It also provides information on the relative rank (from the bottom) of the country's per capita income.

The USA provides a nice benchmark, as it was near the top in 1960 (103 of 104) and stayed near the top (102 of 104 in 2010) but growing at almost exactly the average pace (g=2.1 in Figure 1) and hence increasing GDPPC by a factor of 2.7.[7] Countries with a ratio higher than 2.7 converged on the leader; those with ratios less than 2.7 did not. There is little evidence of *unconditional* relative income convergence for most developing countries (Pritchett, 1997) but some countries with massive gains. The Republic of Korea (USD1656) and The Philippines (USD1459) started out with similar levels of per capita income in 1960. The Republic of Korea's GDPPC in 2010 was 16.1 times higher, USD26,609 – by 2010 it had converged on developed country levels. GDPPC in The Philippines only went up by a factor of 2.2 – which is real progress – but fell relative to the leaders. Most developing countries were like the Philippines in not exhibiting income convergence, but some converging – and some of the rapid convergers had very big populations (e.g. China, India, Indonesia).

Figure 3 plots the first differences of ln GDPPC (which is roughly the annual percent growth rate of GDPPC) and the five-year moving average (MA) of the first differences. As in Figure 2, we benchmark the world average growth rate of 2% with a horizontal solid line, and the growth rates of 0% and 4% (about a cross-national standard deviation above and below) with two broken horizontal lines.

This figure captures the *volatility* in the GDPPC growth series over time. The number of times the five-year MA of a particular country crosses **both** the two broken horizontal lines gives us an indication of how volatile the growth rate of GDPPC for that country is. For stable countries, most of the annual observations and nearly all the smoothed five year moving averages are inside these lines – they mostly experience in each year a "typical" growth rate. But for many countries, even the smoothed five-year MA of first differences crosses *both* the 0% and 4% horizontal lines multiple times. For instance, Jordan has a low growth rate (g =0.9) and high volatility ($\sigma_{\Delta Y}$ = 9.8), so the MA crosses the 0% and 4% lines 11 times.

Figure 4 compares the distribution of all eight-year (overlapping) growth rates of the particular country with the distribution of all eight-year growth rates for the rest of the world (of course we could have done this for any other number of years). That is, we calculate all possible overlapping growth rates of duration eight-years (e.g. 1960-67, 1961-68, 1962-69, etc) for each country in the world.

We allocated these growth rates into six discrete bins (shown as the groups of bars on Figure 4): (i) growth less than -2.0% (growth collapse); (ii) growth between -2.0% and zero (negative growth); (iii) growth rate between zero and +2.0% (stagnation); (iv) growth between +2.0% and +4.0% (moderate growth); (v) growth between +4.0% and +6.0% (strong growth); and (vi) growth above +6.0% (rapid growth). Since the world average growth rate is 2.0% per annum, and the standard deviation (SD) of the world average growth rate is 2.0, these bins correspond roughly to an empirical "normal" distribution of growth rates.

Figure 4 shows that the same average growth rate can result from very different distributions of growth rates over time. Developed economies, like the UK, had g = 2.4 and nearly all of its eight-year growth rates were between 0% and 4%. But between 1970 and 2010 Cambodia has almost exactly the same average growth rate (g = 2.3), but did so by spending

7 These two being linked of course by the formula: *Ratio* = $\frac{yt+N^{y}}{yt}\frac{t+N}{yt} = (1+g)^{N}$, though this will not be exact, as g is an OLS estimate, not calculated endpoint to endpoint.

substantial time in collapse ($g < -2$) and substantial time in rapid growth ($g > 6$).

Some countries were reasonably consistent growth "stars" and spent most time with $g > 4$ (e.g. Singapore, the Republic of Korea). Other countries were consistently poor performers (e.g. Central African Republic, Senegal).

As an example of how the four figures look like for a particular country, we present Figures 1-4 for Uganda below. Figure 1 shows that decadal growth rates varied from -4 % in the 1970s to +4.4% in the 1990s, in the context of a low average rate of growth of 0.4% per annum. Figure 2 shows that Uganda's relative rank in GDPPC has changed very little in the period 1960-2010 (fifteenth from the bottom in 1960 and sixteenth from the bottom in 2010) and that Uganda's average growth rate in 1960-2010 was below the world average rate of growth of 2% per annum. Figure 3 indicates that GDP per capita growth in Uganda has been volatile, with the MA of GDPPC growth crossing both the 0% and 4% horizontal lines. Finally, Figure 4 shows that Uganda has spent more time than the average country in "growth collapse" and "negative growth", but also spent more time than the average county in "moderate growth". Uganda, then, illustrates very well our point that economic growth can change quite remarkably in a relatively short period of time in a single country, and that focusing on the average rate of growth masks this very significant transition in growth phases.

Uganda

Figure 1: Overall, ten, and five year growth rates: Uganda

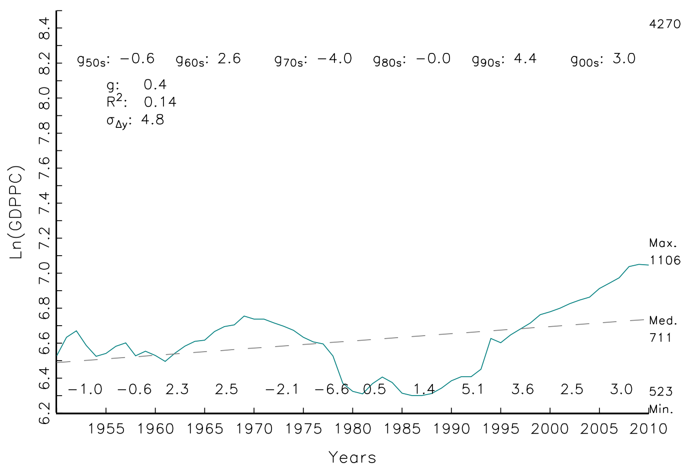


Figure 2: Initial and Final level of GDPPC: Uganda

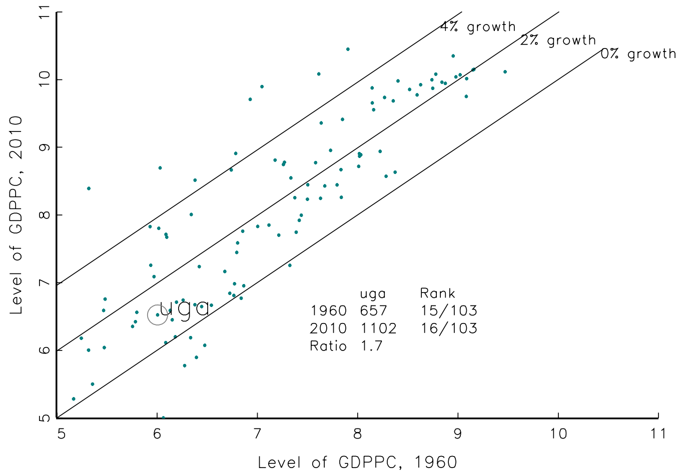


Figure 3: (ln) First Differences and five year MA: Uganda

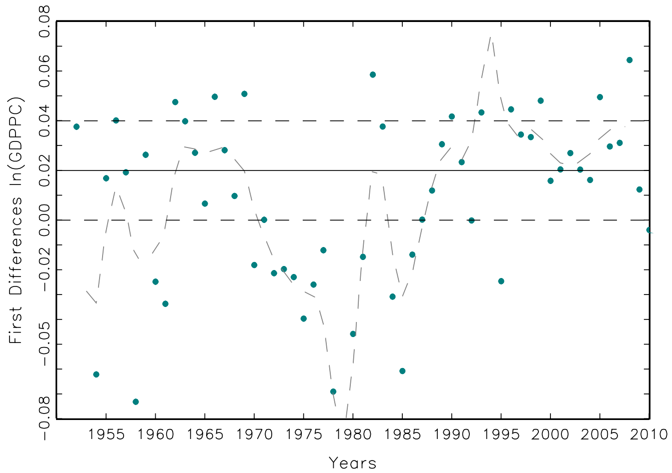
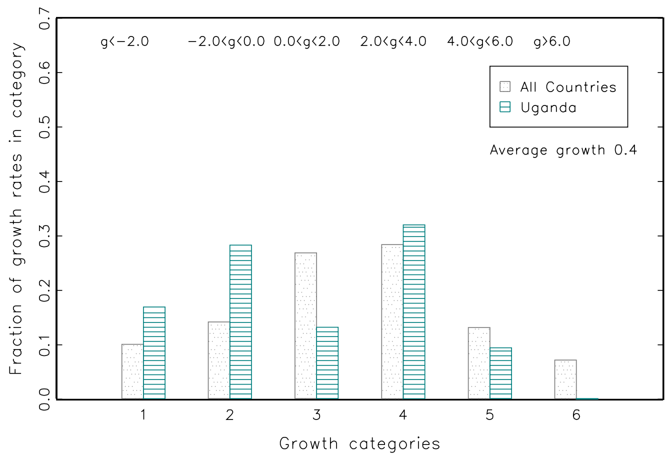


Figure 4: Distribution of all 8 year growth rates
Uganda vs. world



For many countries the following seemingly paradoxical fact is that *knowing* what country the growth rate comes from *increases* the variance of your guess of the growth rate. That is, suppose you were drawing a country eight-year period growth rate from the world distribution of growth rates, you would know that the standard deviation is about 2 and the likelihood of being in either "collapse" or "rapid growth" is about 5%. But if we tell you that you are just choosing from the eight-year growth experiences of a country like Ghana, Nigeria, Jordan, Cambodia, Mozambique and Malawi, then your uncertainty about what you will find *increases.* These countries show more variation in the distribution of their growth episodes than the variation in growth rates across all countries in the world. These countries have spent more time in **both** rapid growth and growth collapse than the "typical" country.

Section II: Country Graphs

Afghanistan

Figure 1: Overall, ten, and five year growth rates: Afghanistan

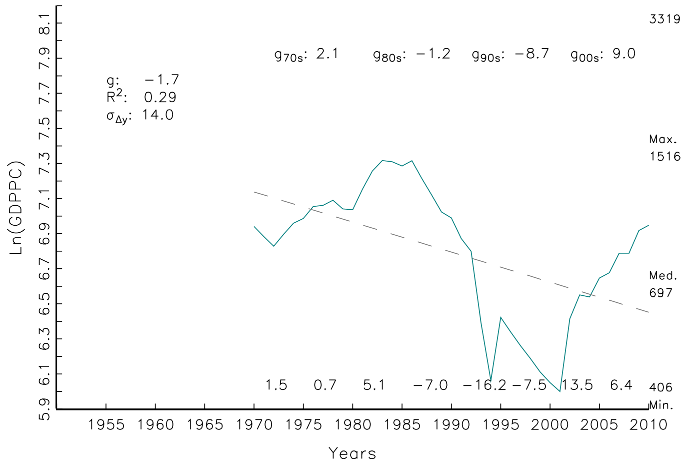


Figure 2: Initial and Final level of GDPPC: Afghanistan

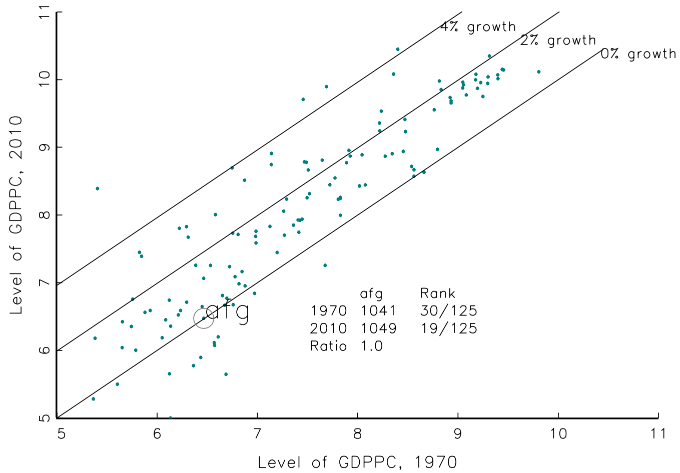


Figure 3: (ln) First Differences and five year MA: Afghanistan

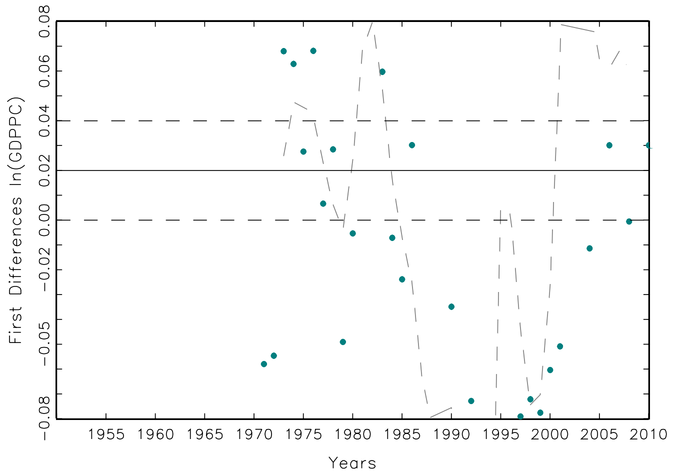
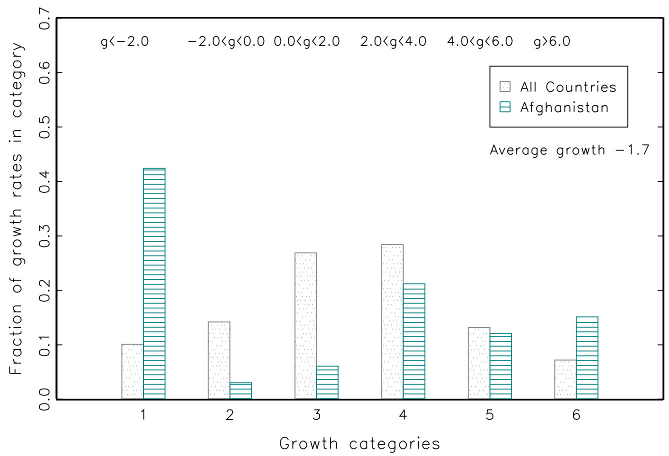


Figure 4: Distribution of all 8 year growth rates Afghanistan vs. world



Albania

Figure 1: Overall, ten, and five year growth rates: Albania

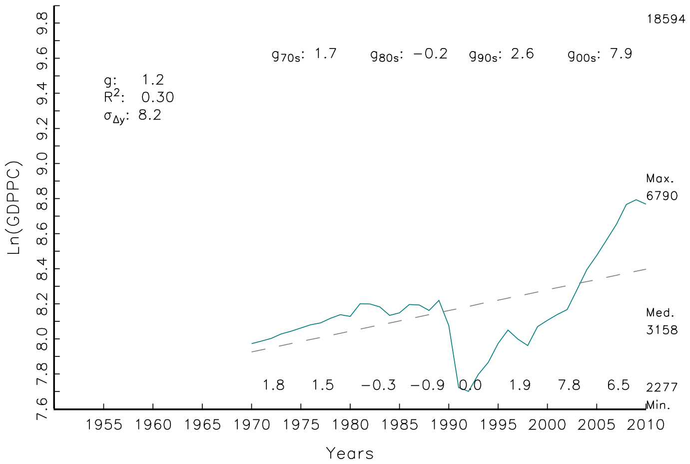


Figure 2: Initial and Final level of GDPPC: Albania

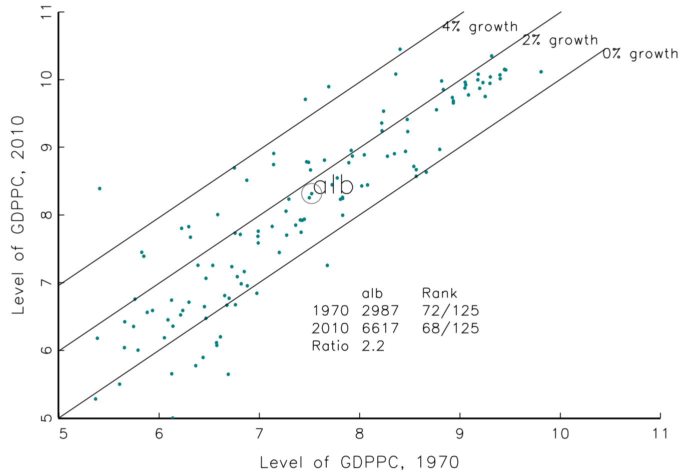


Figure 3: (ln) First Differences and five year MA: Albania

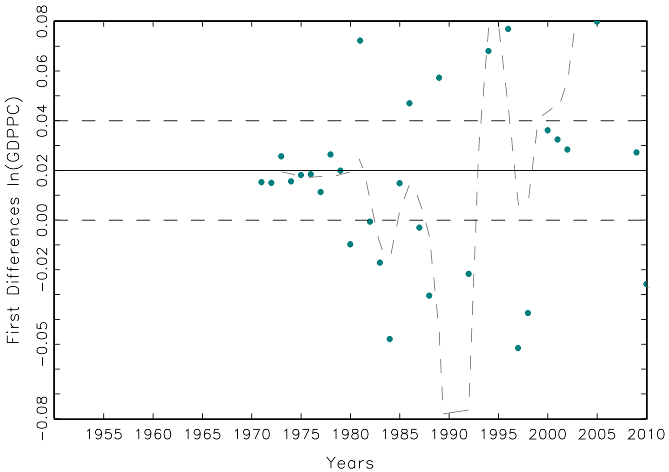
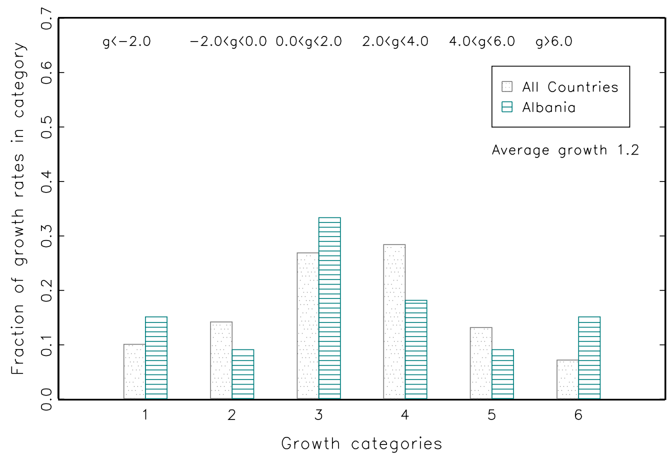


Figure 4: Distribution of all 8 year growth rates Albania vs. world



Algeria

Figure 1: Overall, ten, and five year growth rates: Algeria

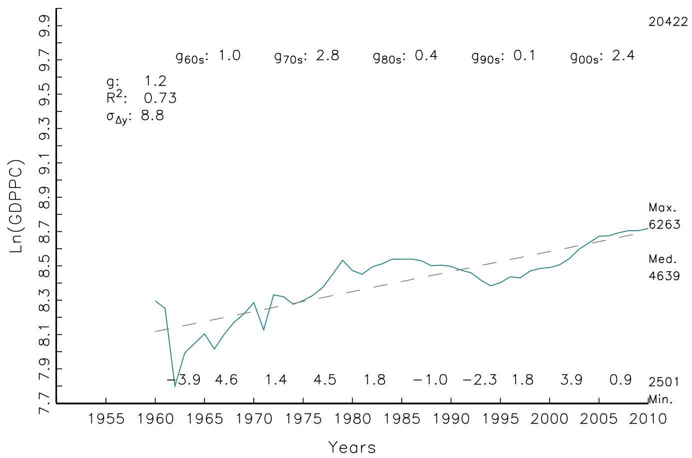


Figure 2: Initial and Final level of GDPPC: Algeria

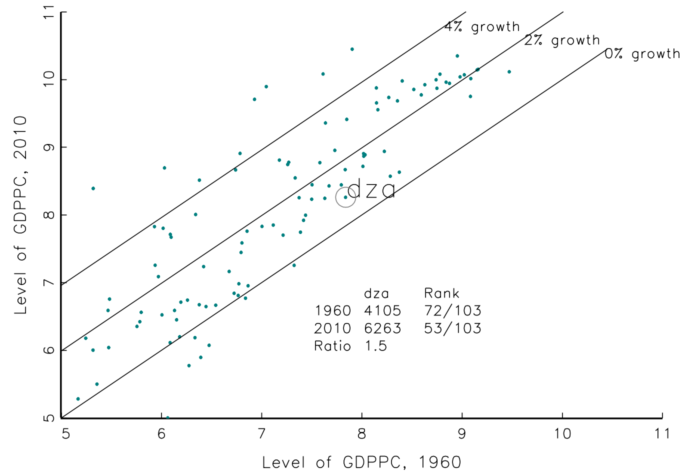


Figure 3: (ln) First Differences and five year MA: Algeria

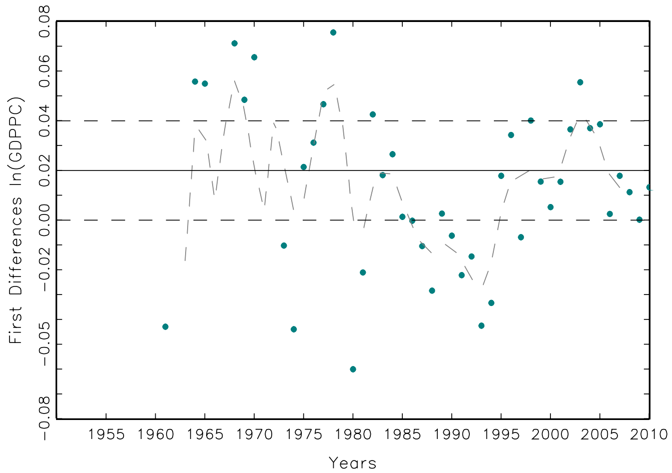
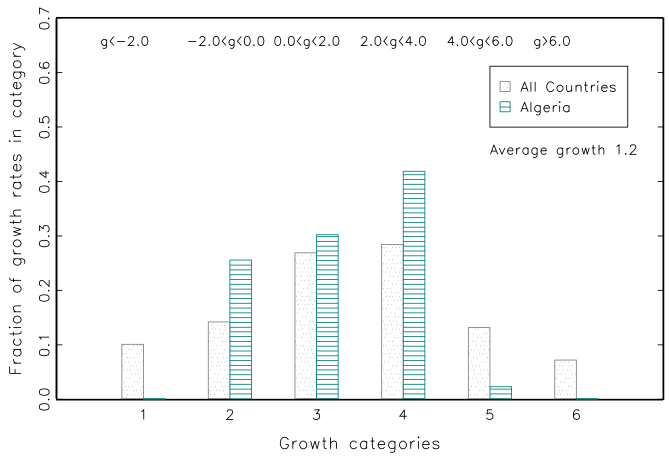


Figure 4: Distribution of all 8 year growth rates
Algeria vs. world



Angola

Figure 1: Overall, ten, and five year growth rates: Angola

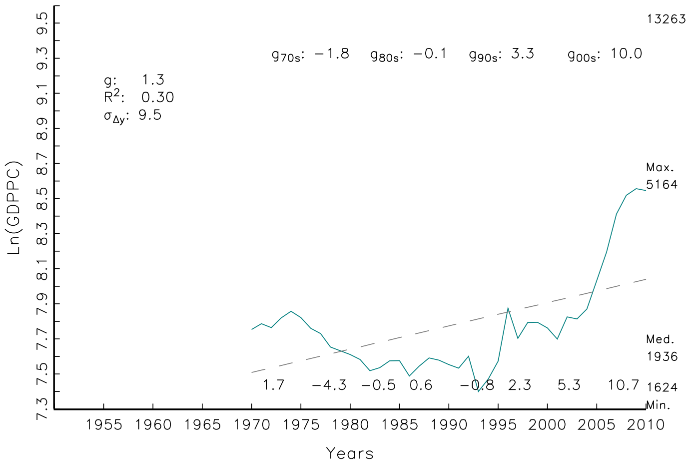


Figure 2: Initial and Final level of GDPPC: Angola

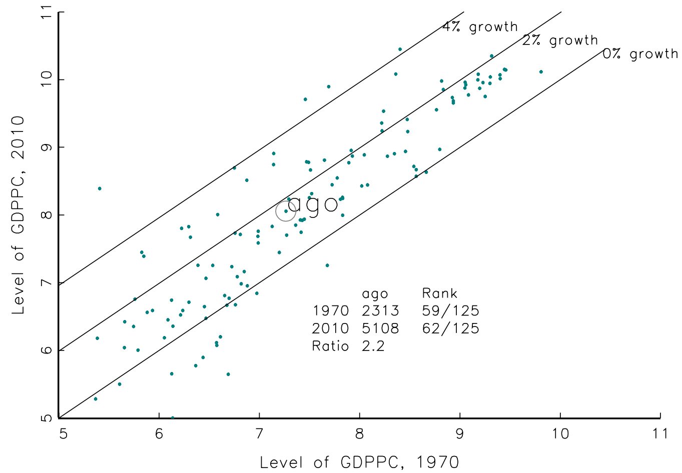


Figure 3: (ln) First Differences and five year MA: Angola

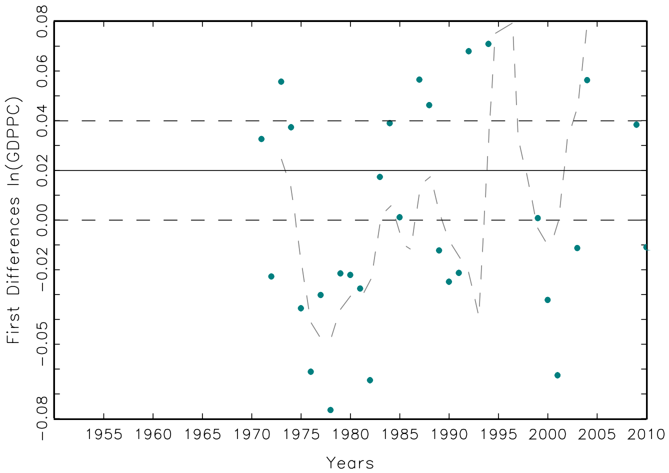
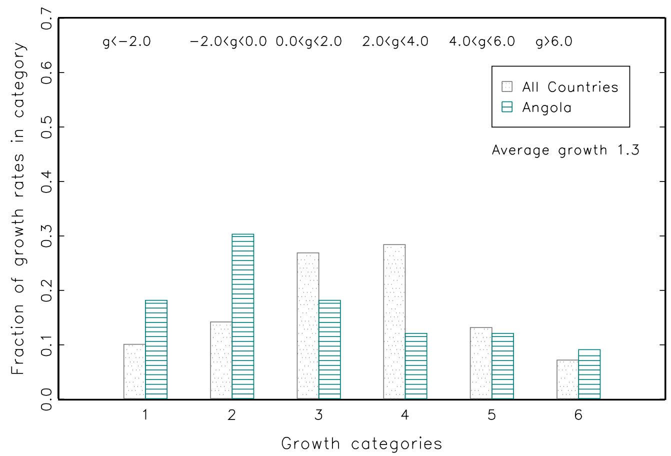


Figure 4: Distribution of all 8 year growth rates
Angola vs. world



Argentina

Figure 1: Overall, ten, and five year growth rates: Argentina

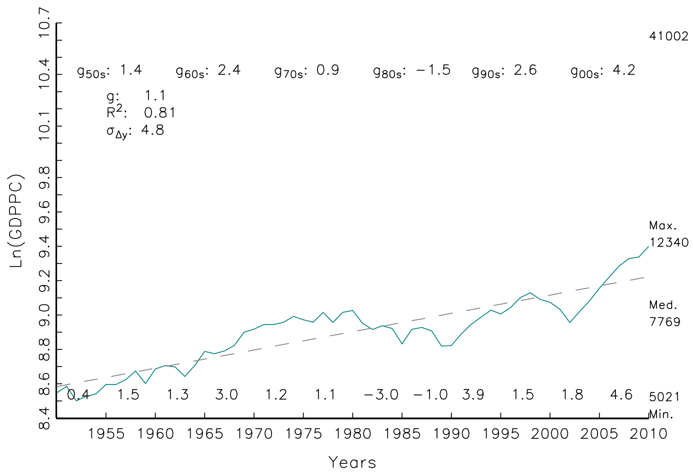


Figure 2: Initial and Final level of GDPPC: Argentina

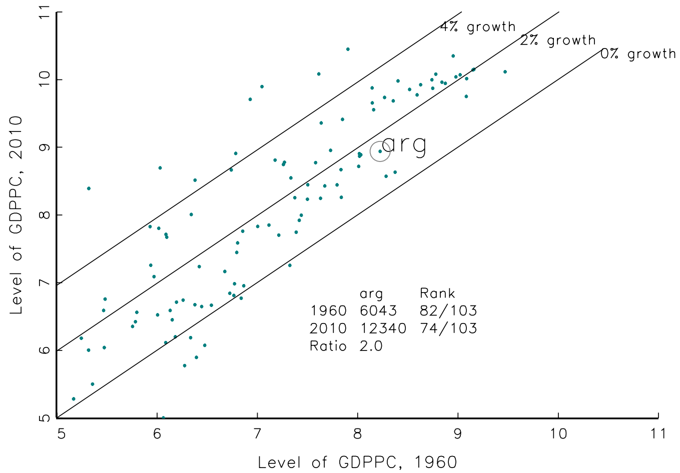


Figure 3: (ln) First Differences and five year MA: Argentina

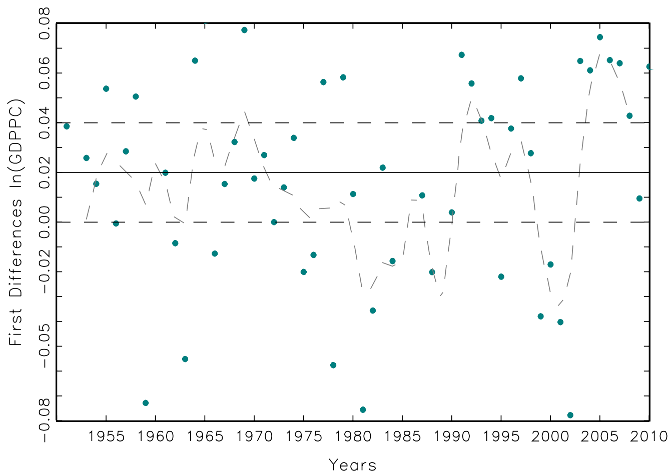
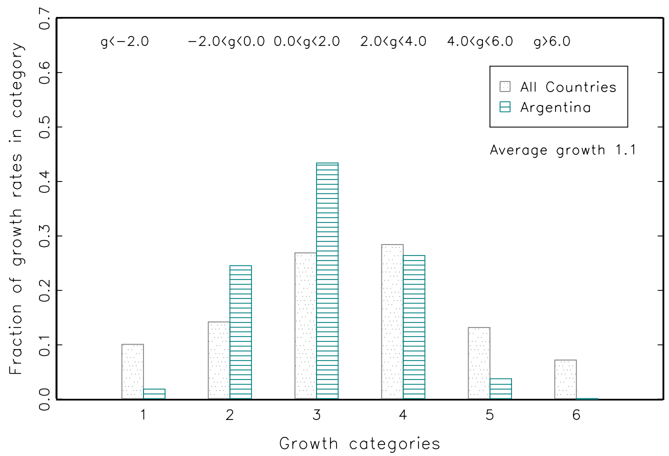


Figure 4: Distribution of all 8 year growth rates Argentina vs. world



Australia

Figure 1: Overall, ten, and five year growth rates: Australia

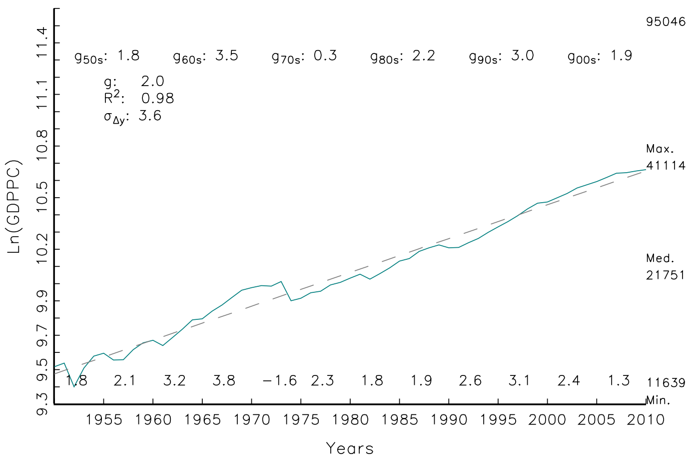


Figure 2: Initial and Final level of GDPPC: Australia

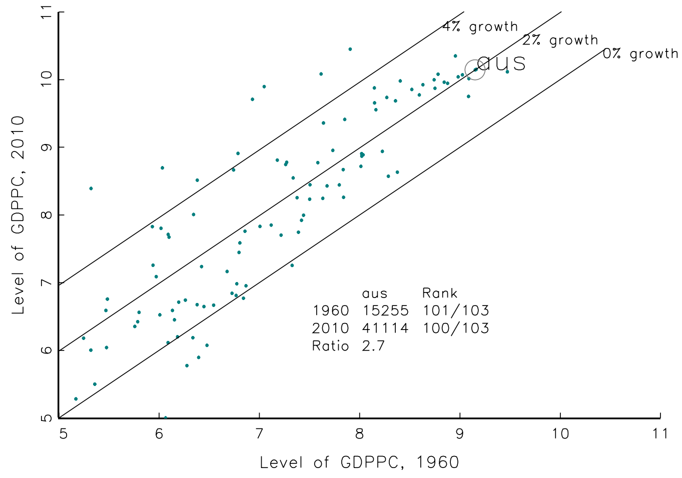


Figure 3: (ln) First Differences and five year MA: Australia

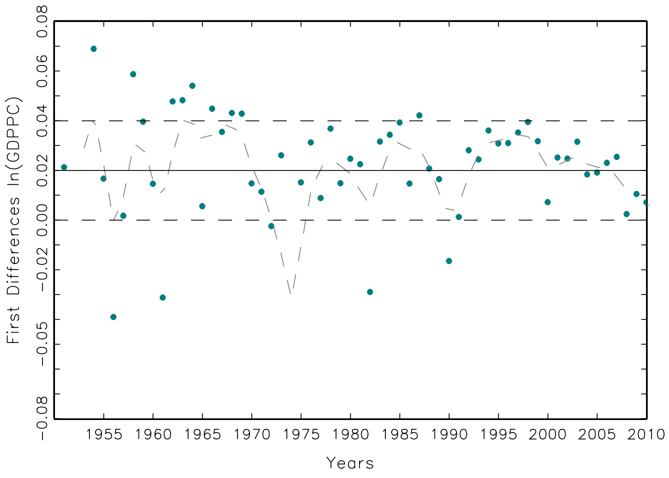
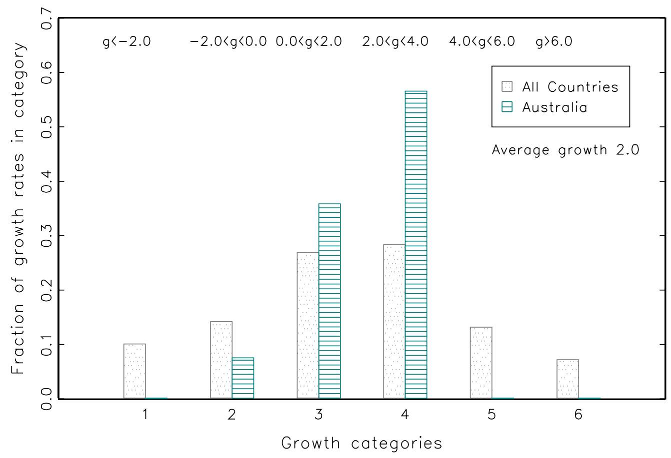


Figure 4: Distribution of all 8 year growth rates
Australia vs. world



Austria

Figure 1: Overall, ten, and five year growth rates: Austria

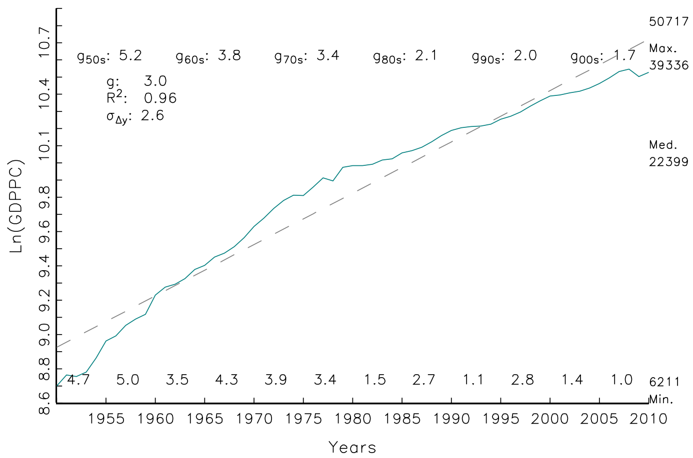


Figure 2: Initial and Final level of GDPPC: Austria

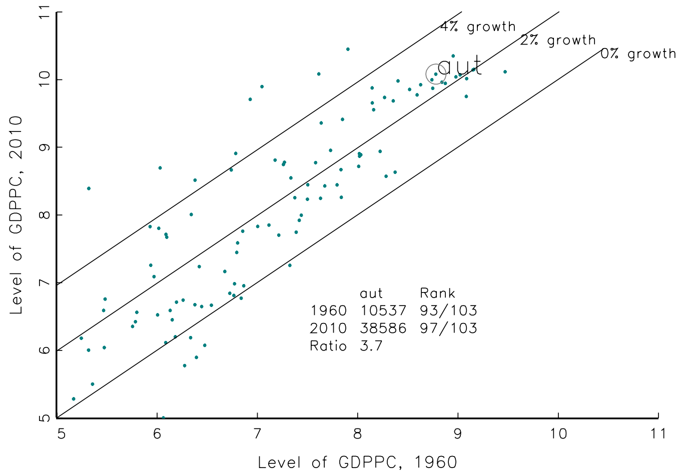


Figure 3: (ln) First Differences and five year MA: Austria

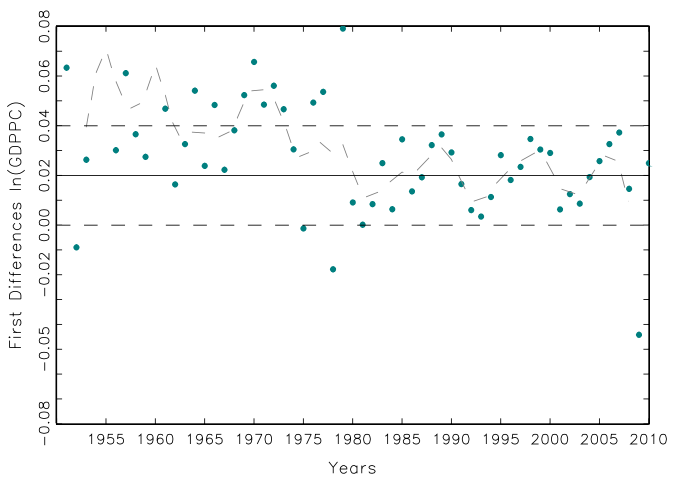
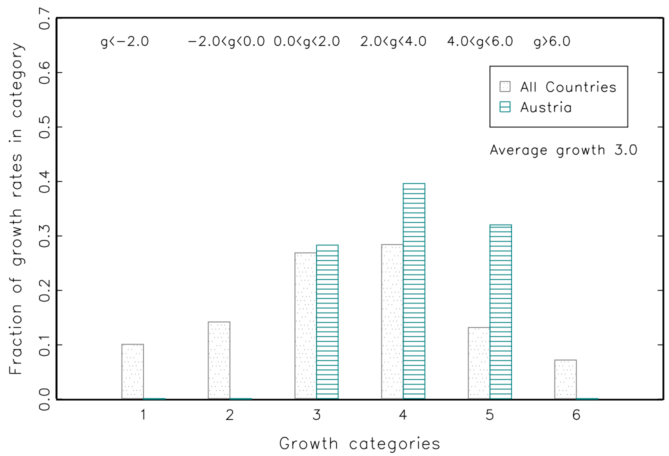


Figure 4: Distribution of all 8 year growth rates
Austria vs. world



Bangladesh

Figure 1: Overall, ten, and five year growth rates: Bangladesh

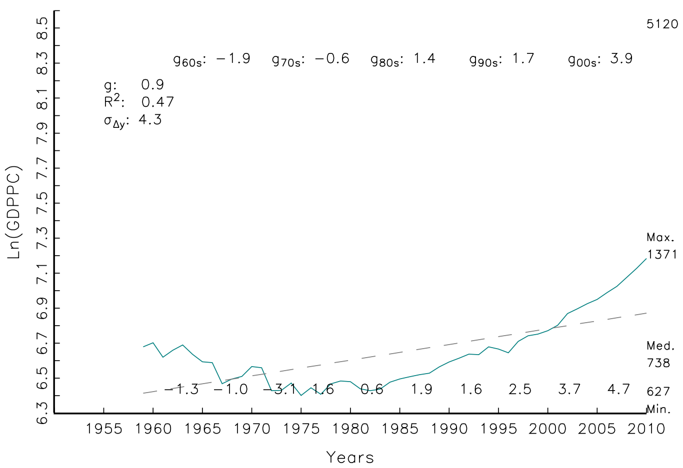


Figure 2: Initial and Final level of GDPPC: Bangladesh

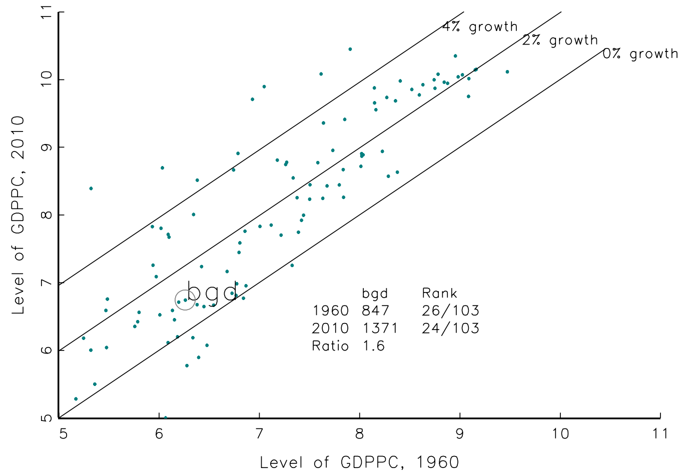


Figure 3: (ln) First Differences and five year MA: Bangladesh

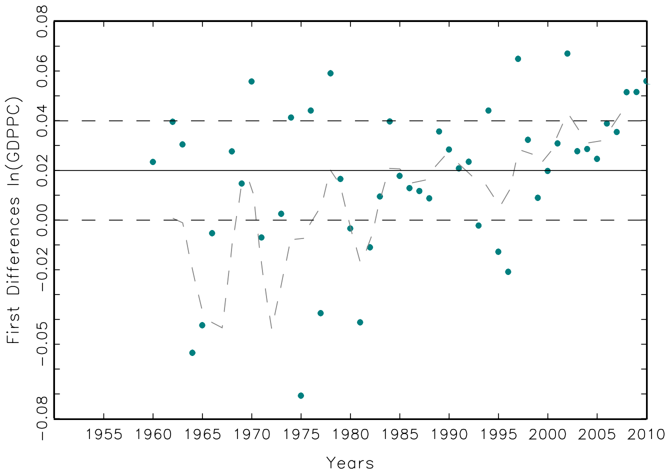
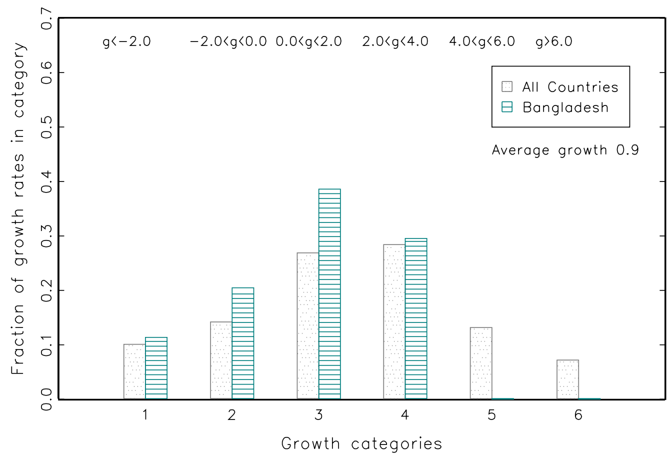


Figure 4: Distribution of all 8 year growth rates
Bangladesh vs. world



Belgium

Figure 1: Overall, ten, and five year growth rates: Belgium

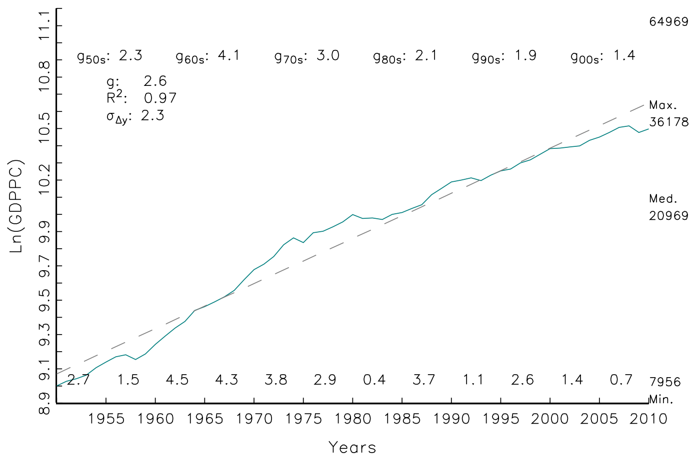


Figure 2: Initial and Final level of GDPPC: Belgium

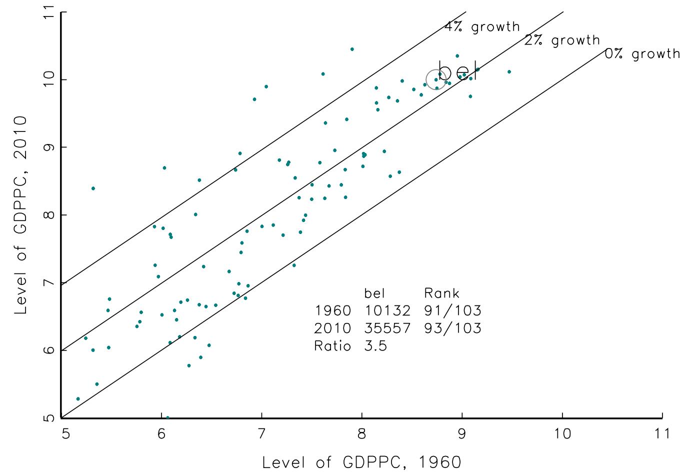


Figure 3: (ln) First Differences and five year MA: Belgium

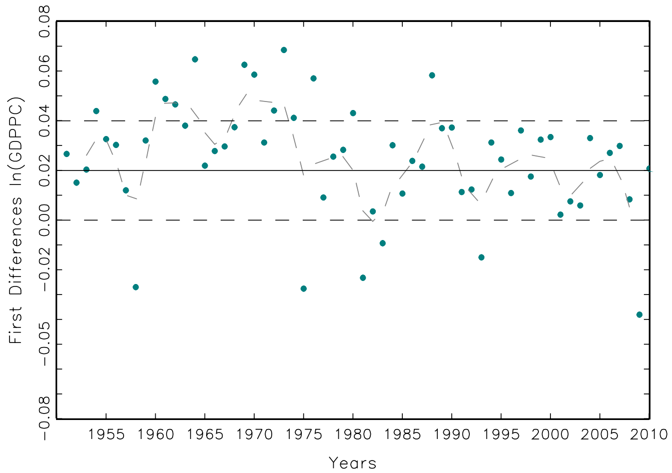
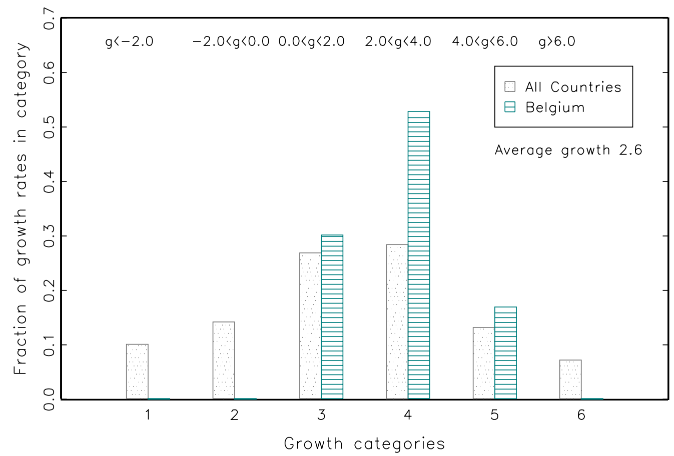


Figure 4: Distribution of all 8 year growth rates
Belgium vs. world



Benin

Figure 1: Overall, ten, and five year growth rates: Benin

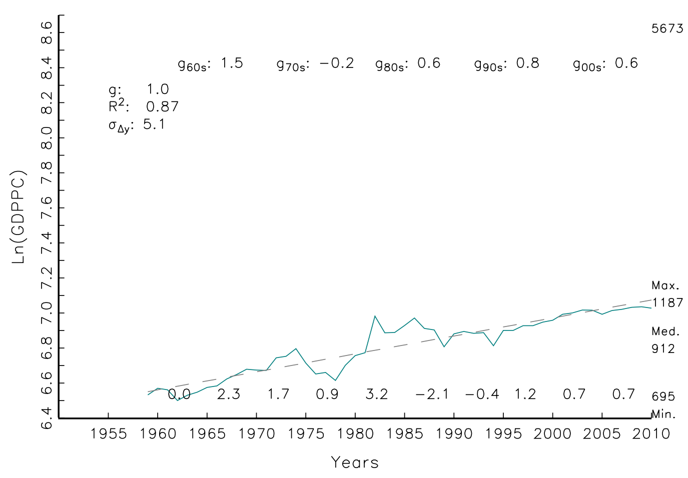


Figure 2: Initial and Final level of GDPPC: Benin

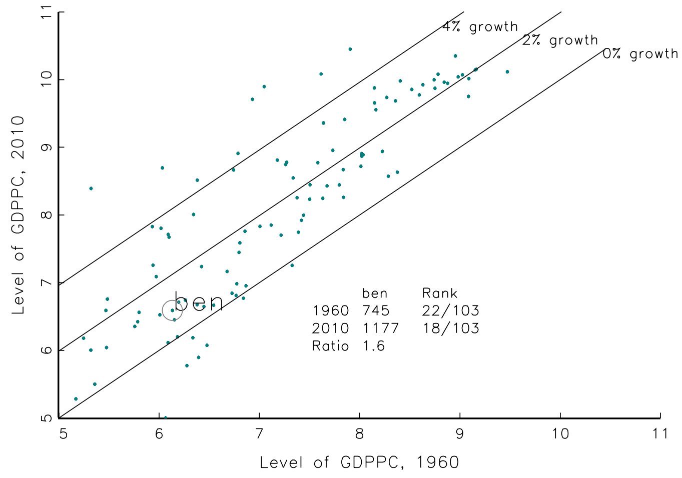


Figure 3: (ln) First Differences and five year MA: Benin

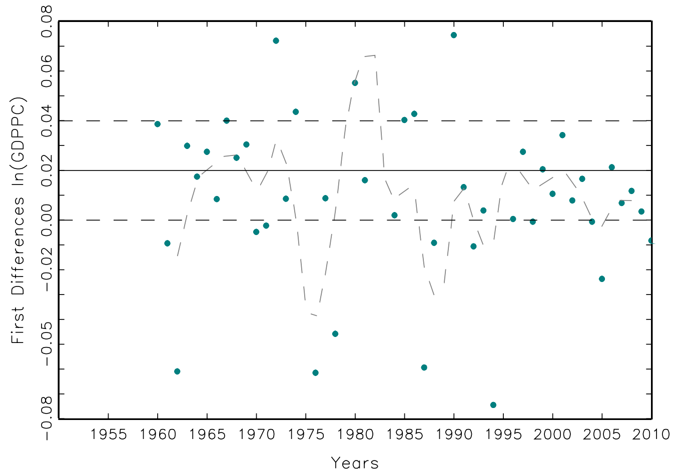
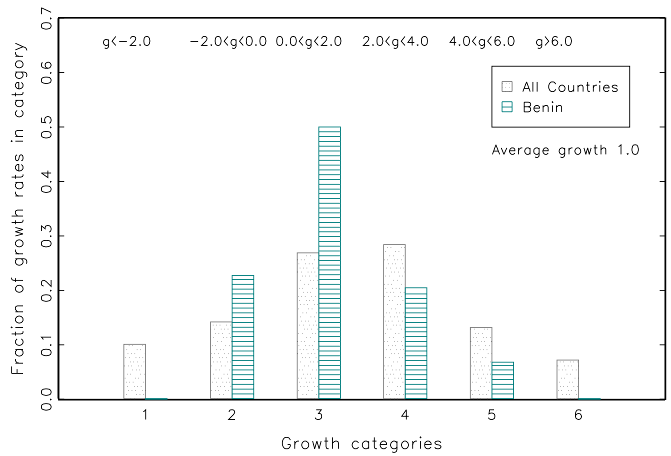


Figure 4: Distribution of all 8 year growth rates
Benin vs. world



Bolivia

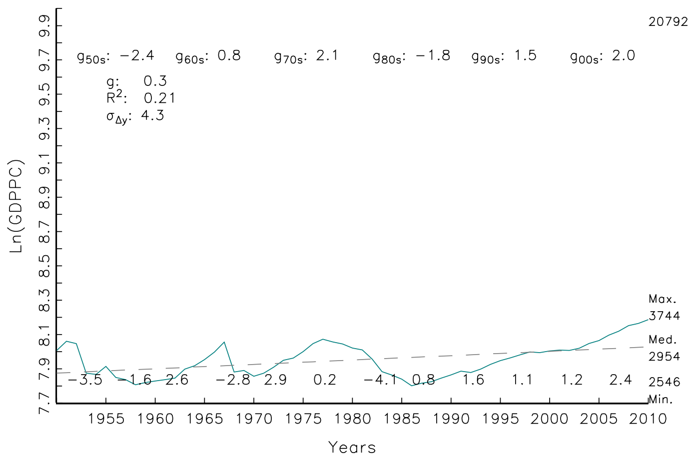


Figure 1: Overall, ten, and five year growth rates: Bolivia

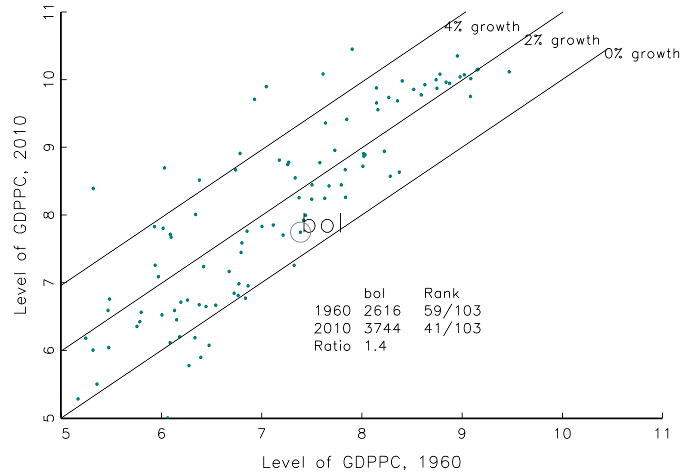


Figure 2: Initial and Final level of GDPPC: Bolivia

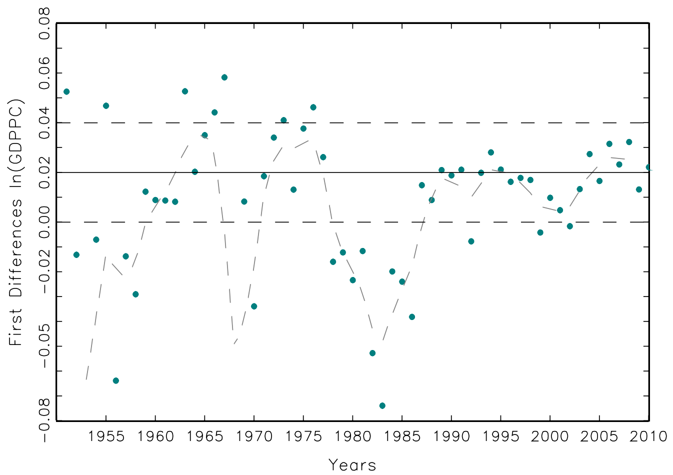


Figure 3: (ln) First Differences and five year MA: Bolivia

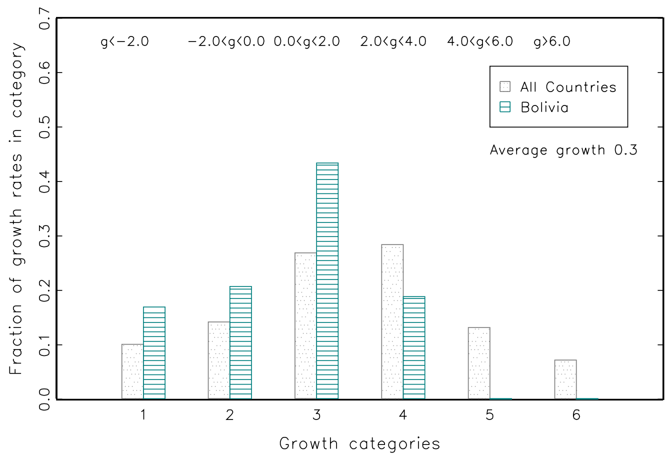


Figure 4: Distribution of all 8 year growth rates
Bolivia vs. world

Botswana

Figure 1: Overall, ten, and five year growth rates: Botswana

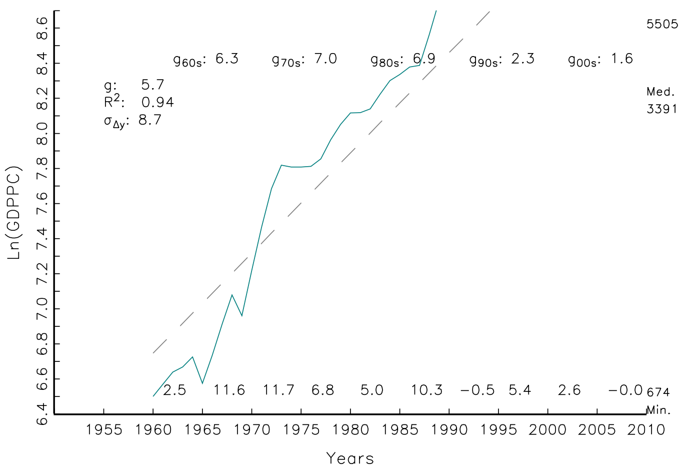


Figure 2: Initial and Final level of GDPPC: Botswana

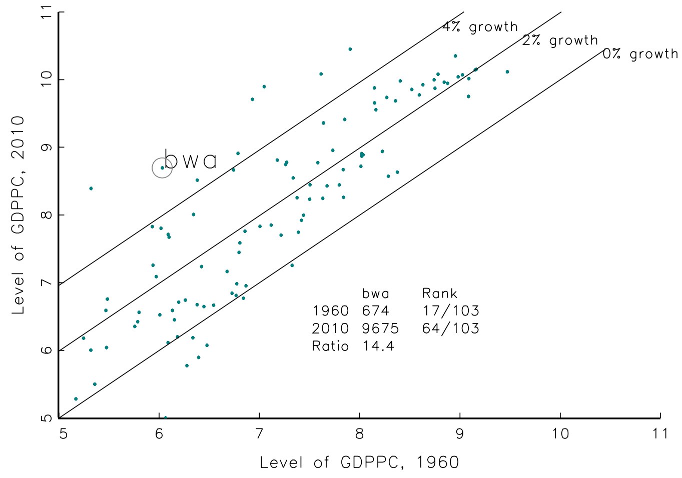


Figure 3: (ln) First Differences and five year MA: Botswana

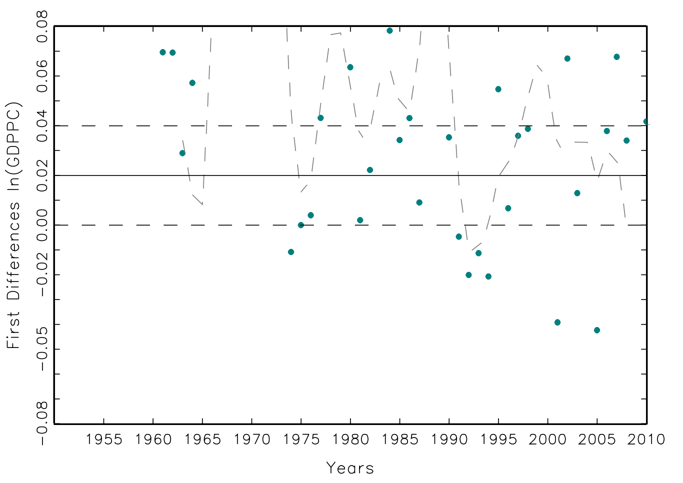
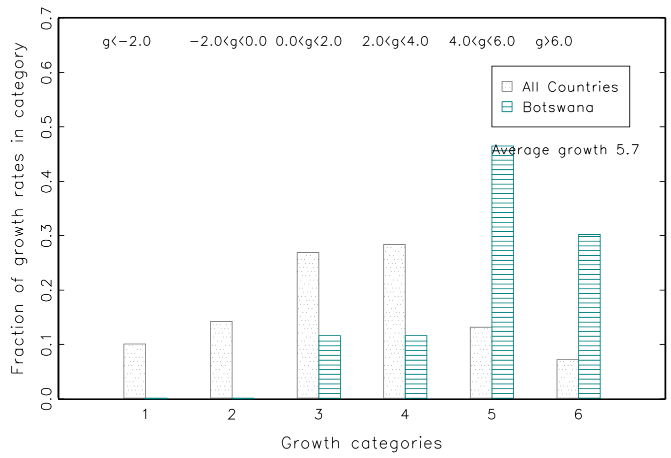


Figure 4: Distribution of all 8 year growth rates Botswana vs. world



Brazil

Figure 1: Overall, ten, and five year growth rates: Brazil

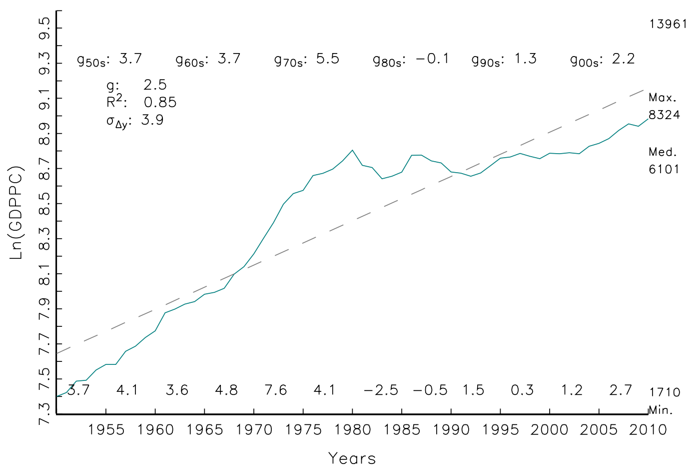


Figure 2: Initial and Final level of GDPPC: Brazil

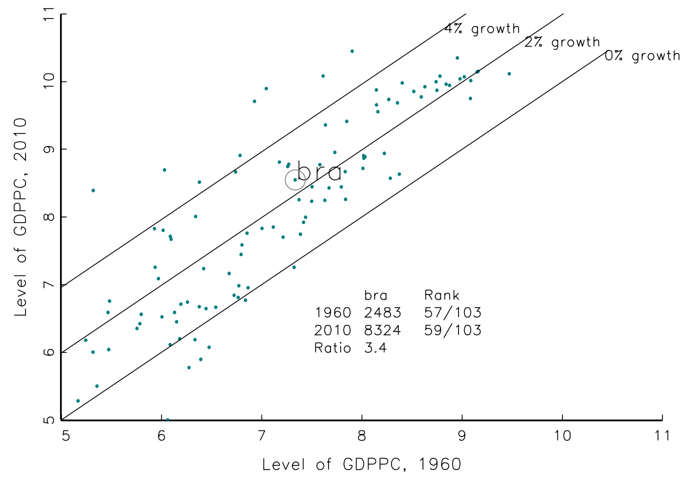


Figure 3: (ln) First Differences and five year MA: Brazil

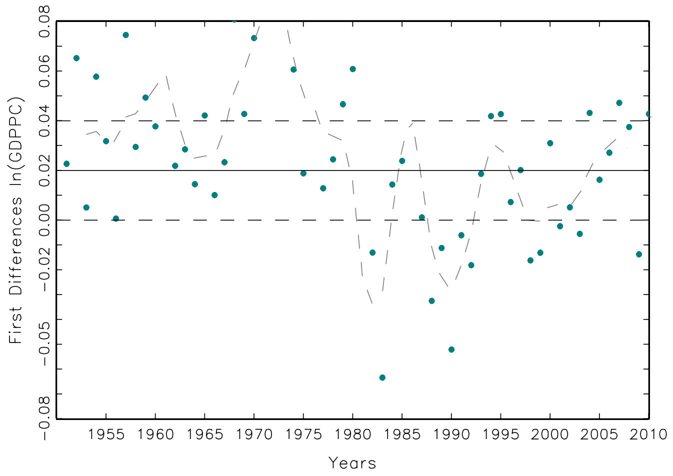
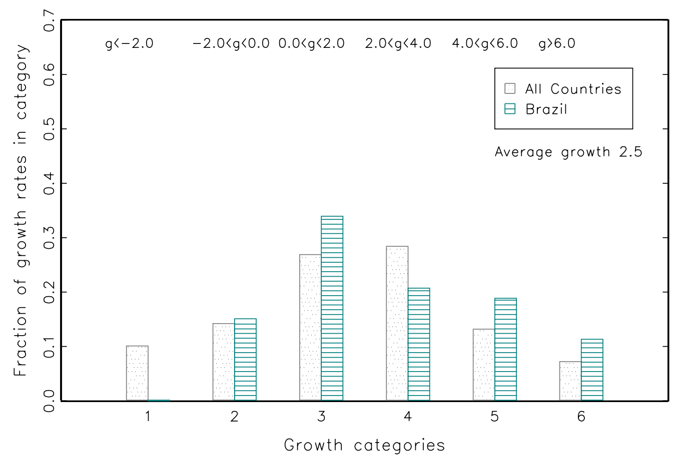


Figure 4: Distribution of all 8 year growth rates
Brazil vs. world



Bulgaria

Figure 1: Overall, ten, and five year growth rates: Bulgaria

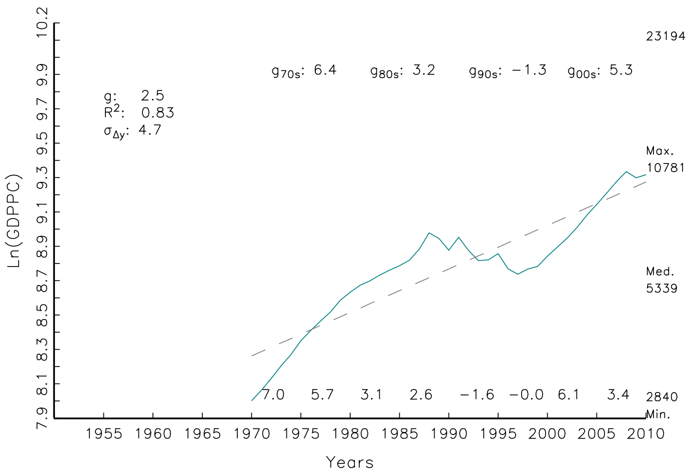


Figure 2: Initial and Final level of GDPPC: Bulgaria

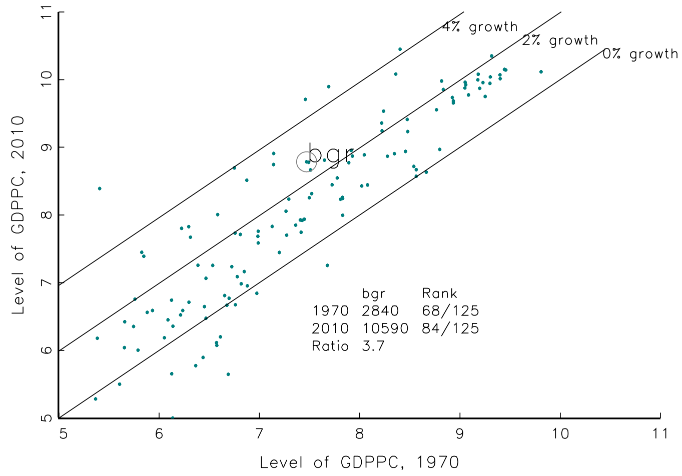


Figure 3: (ln) First Differences and five year MA: Bulgaria

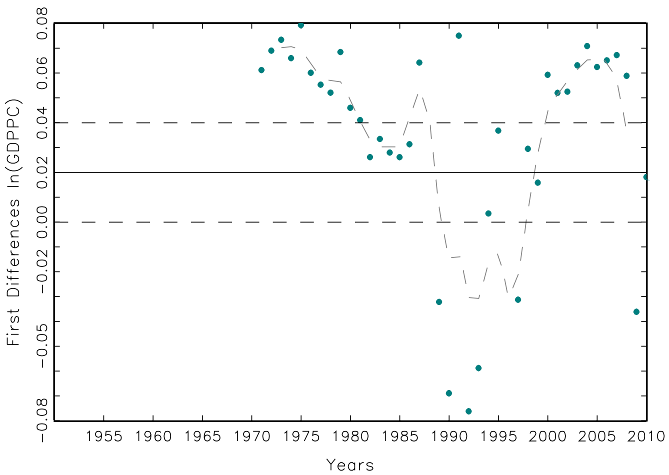
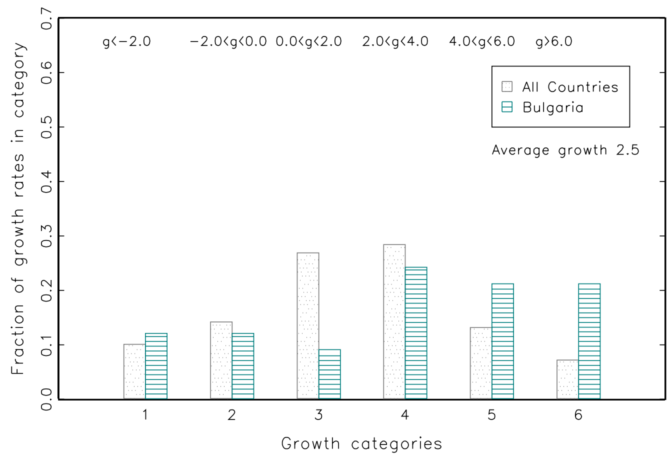


Figure 4: Distribution of all 8 year growth rates
Bulgaria vs. world



Burkina Faso

Figure 1: Overall, ten, and five year growth rates: Burkina Faso

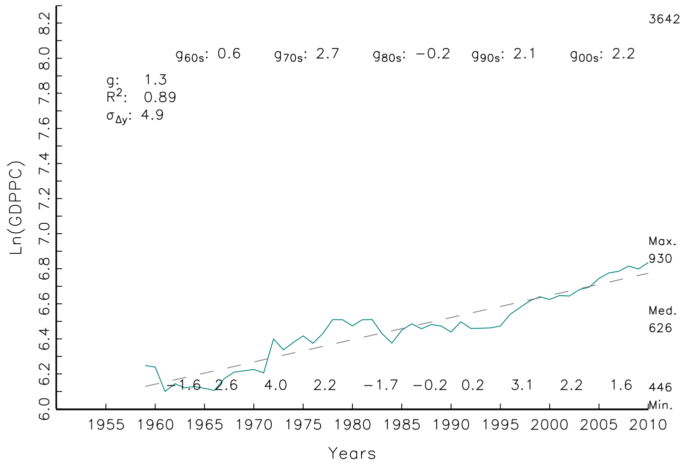


Figure 2: Initial and Final level of GDPPC: Burkina Faso

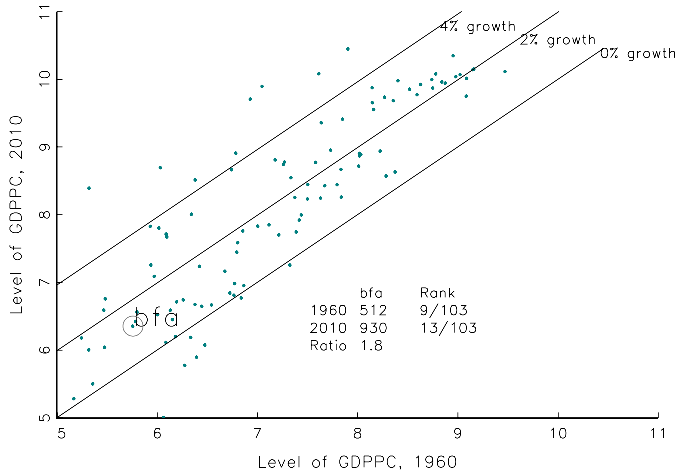


Figure 3: (ln) First Differences and five year MA: Burkina Faso

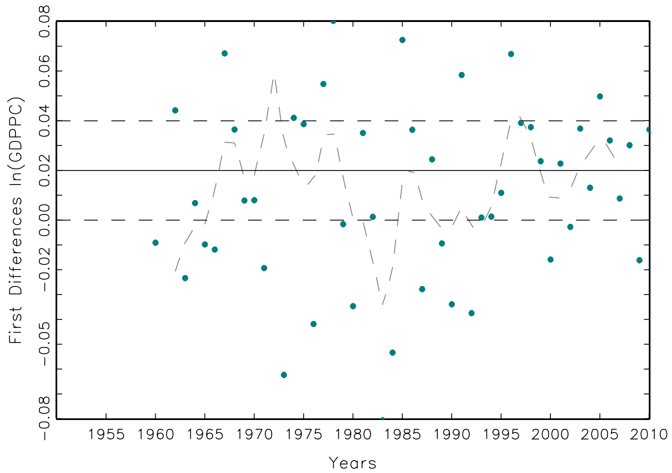
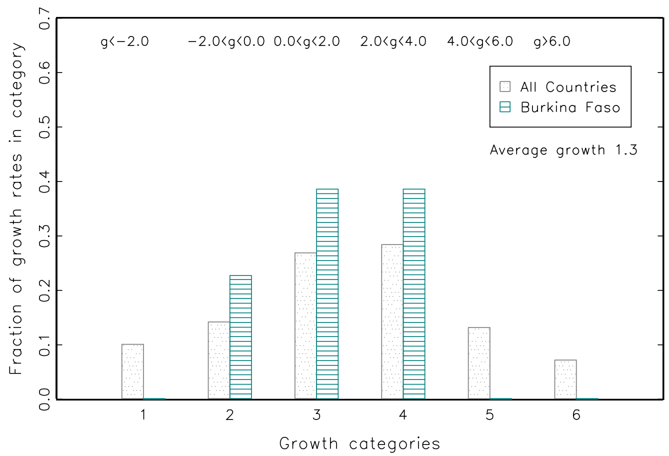


Figure 4: Distribution of all 8 year growth rates
Burkina Faso vs. world



Burundi

Figure 1: Overall, ten, and five year growth rates: Burundi

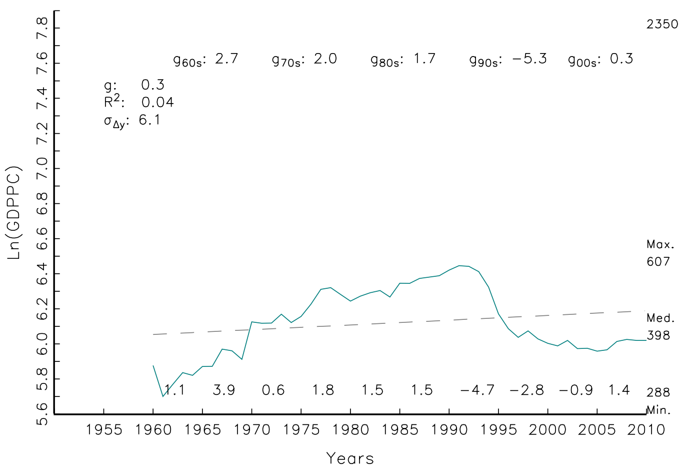


Figure 2: Initial and Final level of GDPPC: Burundi

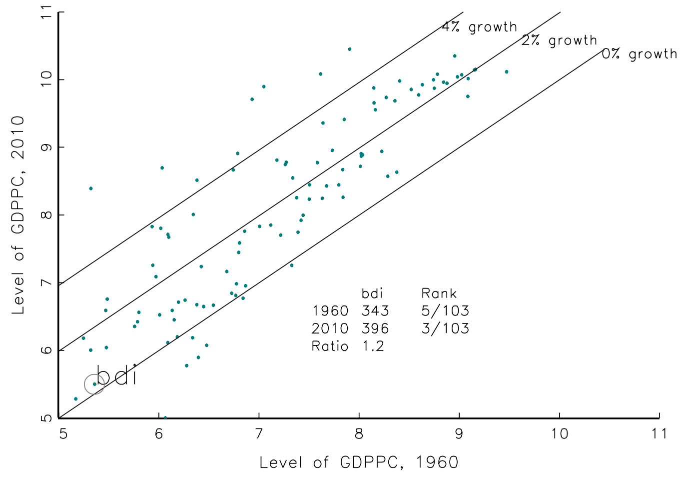


Figure 3: (ln) First Differences and five year MA: Burundi

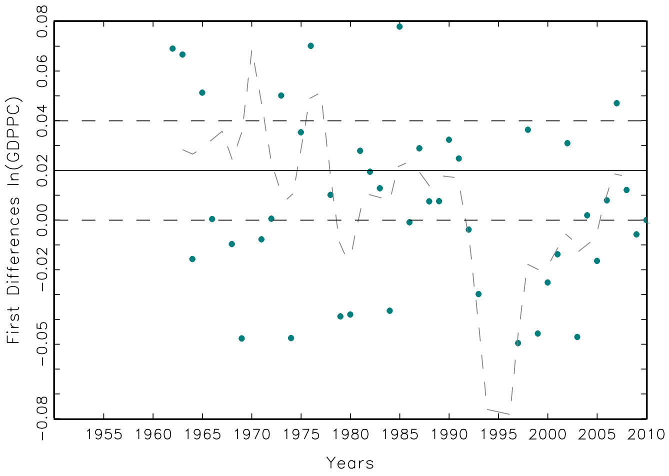
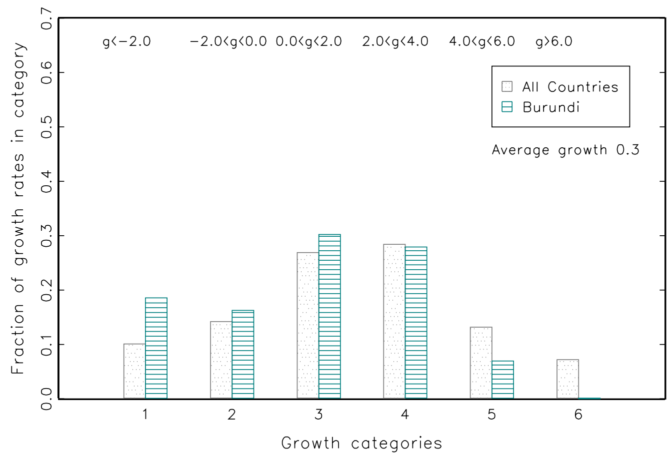


Figure 4: Distribution of all 8 year growth rates
Burundi vs. world



Cambodia

Figure 1: Overall, ten, and five year growth rates: Cambodia

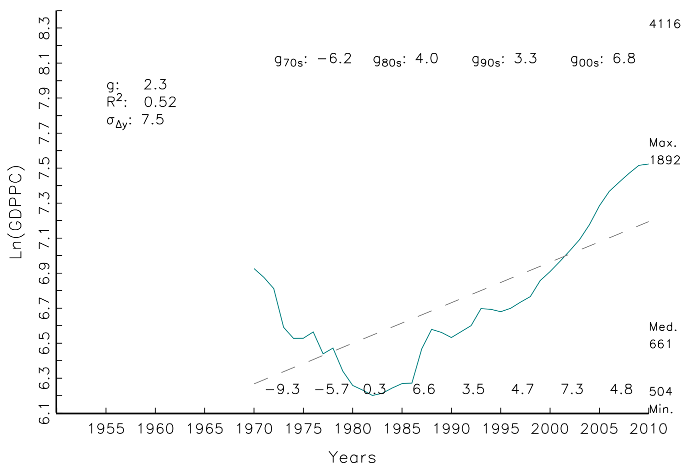


Figure 2: Initial and Final level of GDPPC: Cambodia

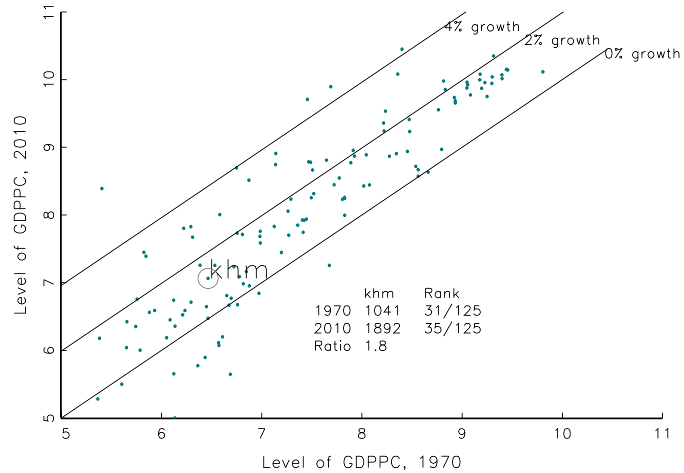


Figure 3: (ln) First Differences and five year MA: Cambodia

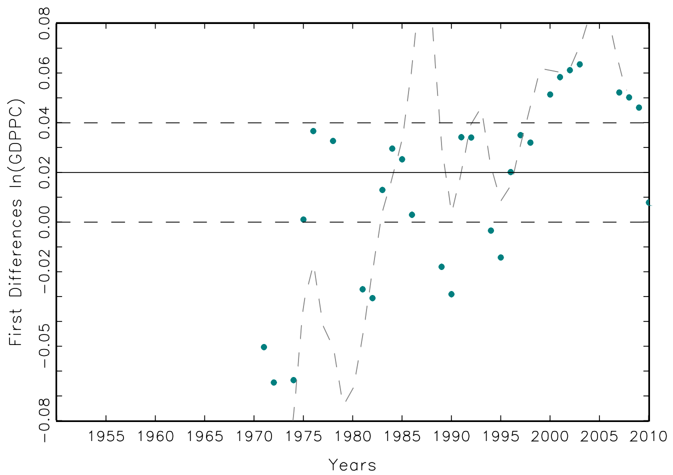
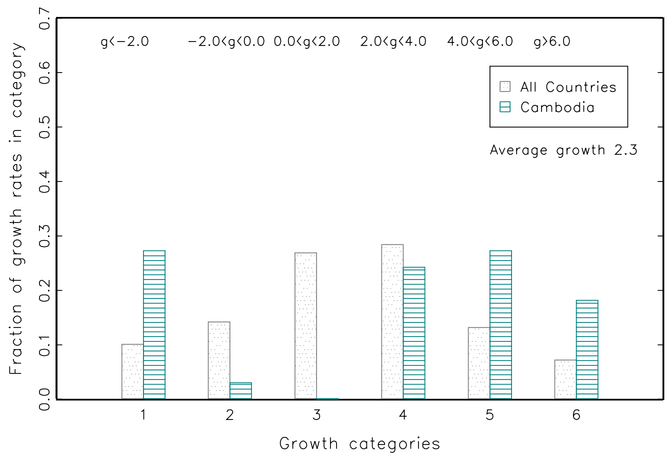


Figure 4: Distribution of all 8 year growth rates
Cambodia vs. world



Cameroon

Figure 1: Overall, ten, and five year growth rates: Cameroon

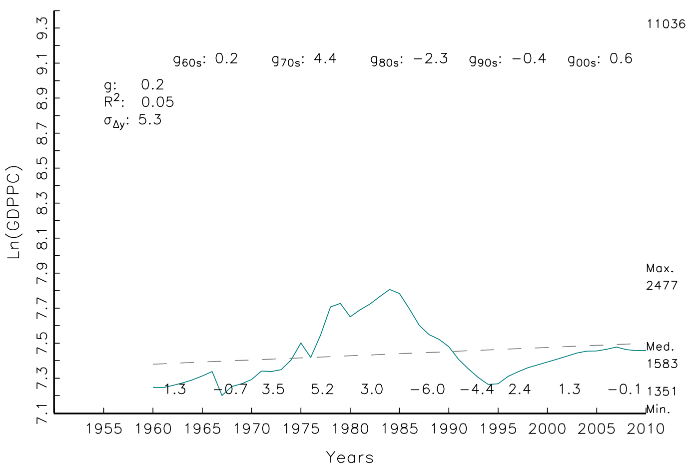


Figure 2: Initial and Final level of GDPPC: Cameroon

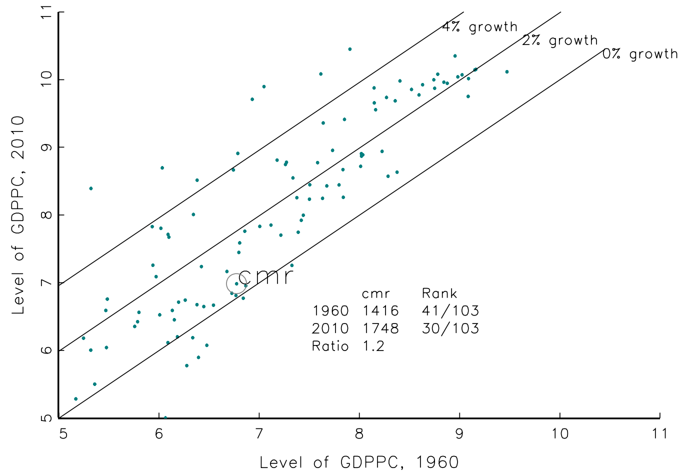


Figure 3: (ln) First Differences and five year MA: Cameroon

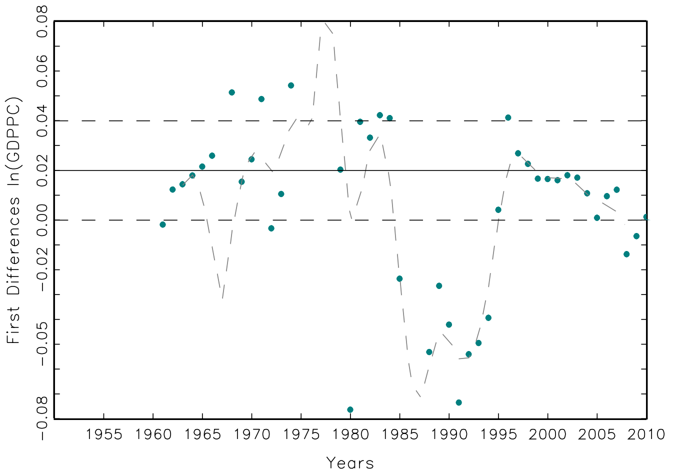
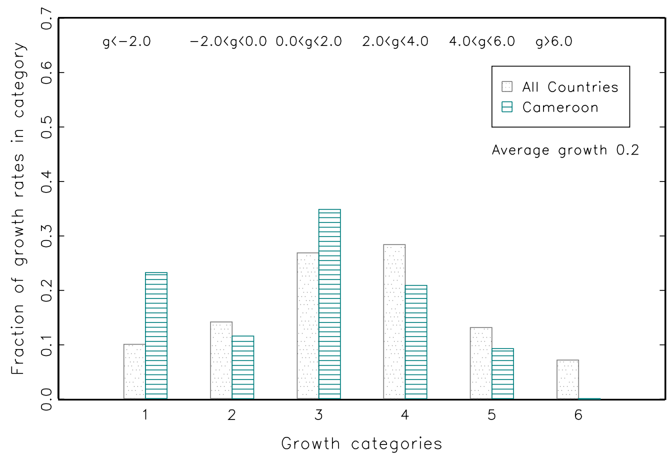


Figure 4: Distribution of all 8 year growth rates
Cameroon vs. world



Canada

Figure 1: Overall, ten, and five year growth rates: Canada

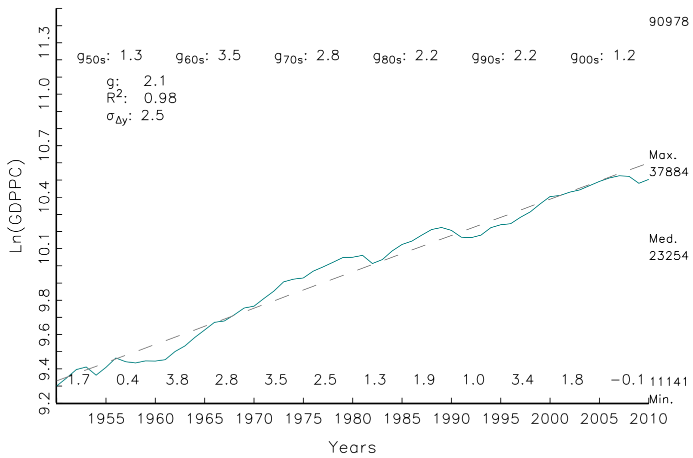


Figure 2: Initial and Final level of GDPPC: Canada

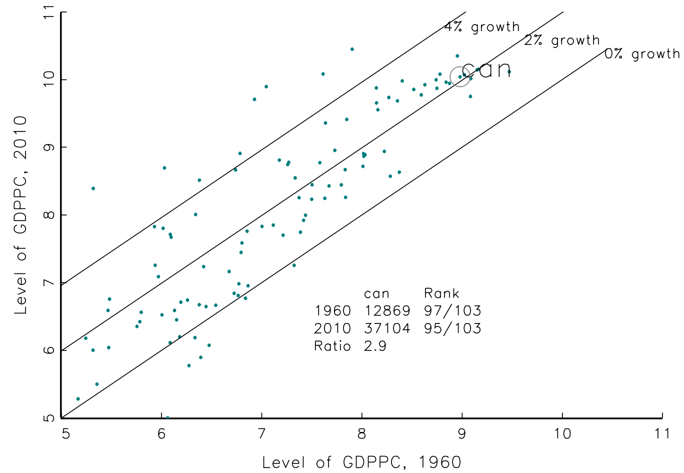


Figure 3: (ln) First Differences and five year MA: Canada

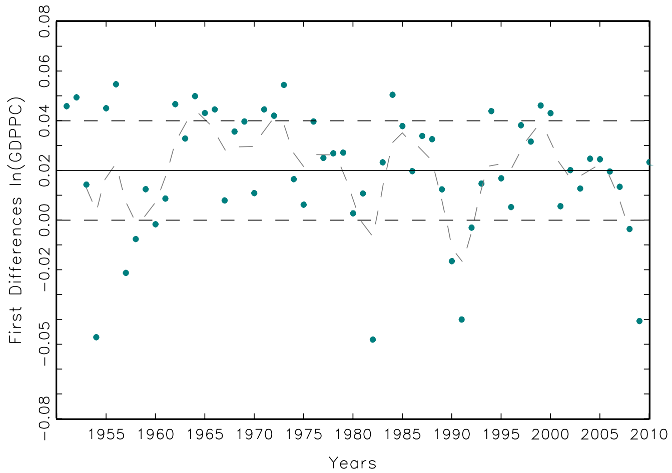
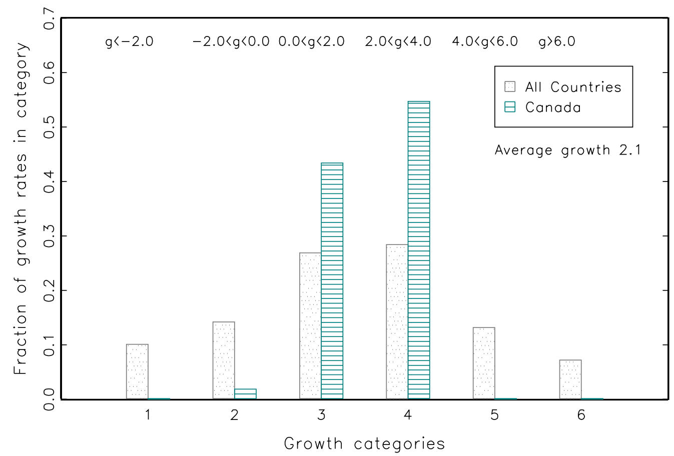


Figure 4: Distribution of all 8 year growth rates
Canada vs. world



Central African Republic

Figure 1: Overall, ten, and five year growth rates: Central African Republic

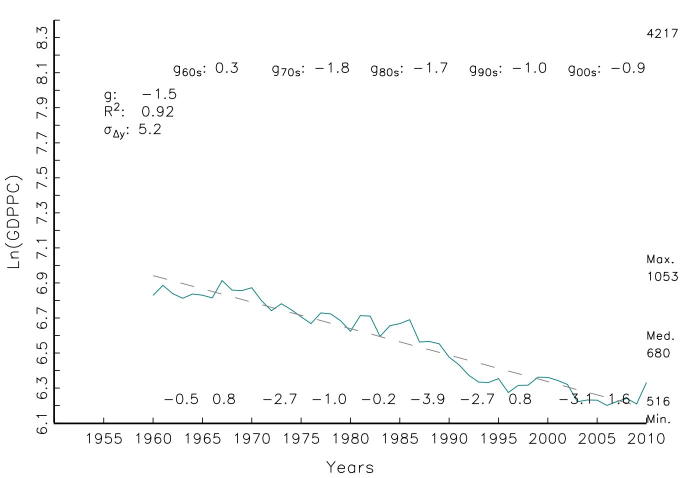


Figure 2: Initial and Final level of GDPPC: Central African Republic

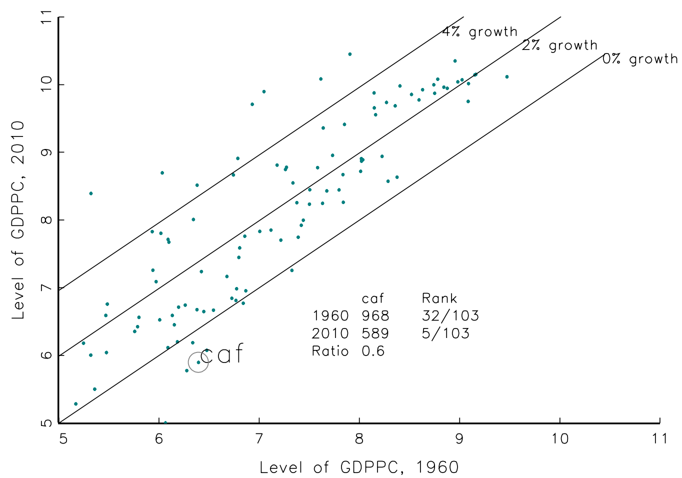


Figure 3: (ln) First Differences and five year MA: Central African Republic

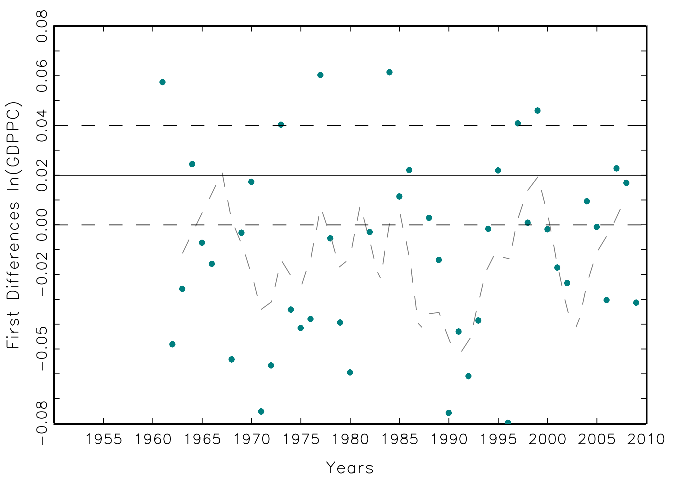
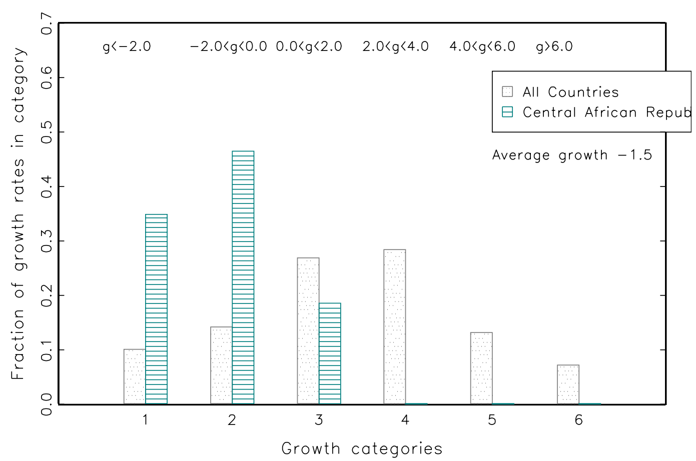


Figure 4: Distribution of all 8 year growth rates
Central African Republic vs. world



Chad

Figure 1: Overall, ten, and five year growth rates: Chad

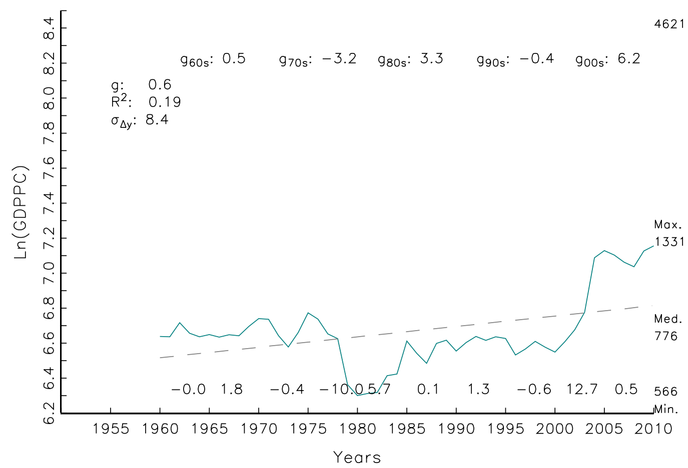


Figure 2: Initial and Final level of GDPPC: Chad

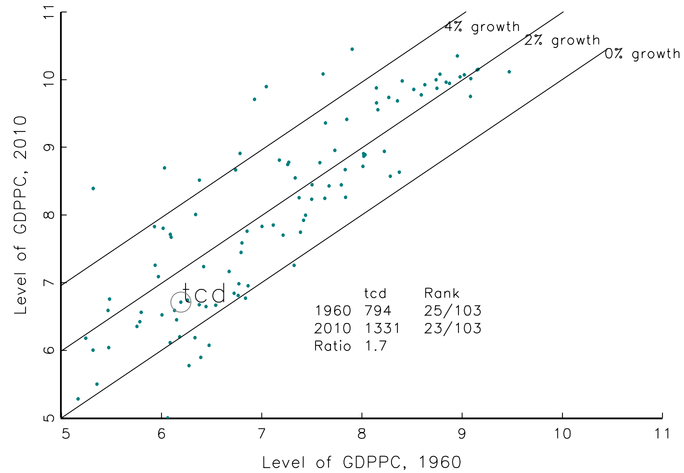


Figure 3: (ln) First Differences and five year MA: Chad

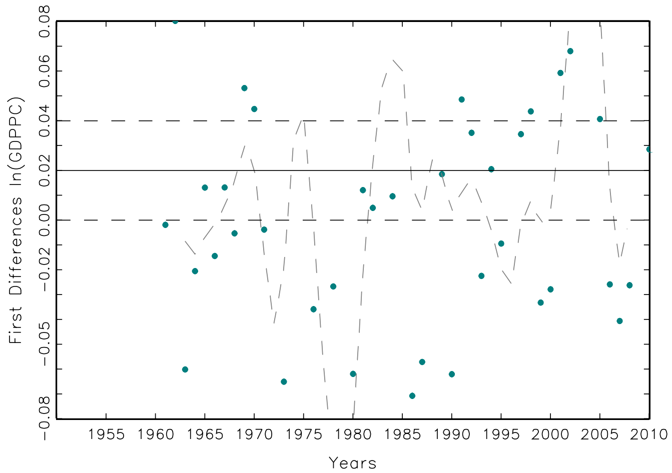
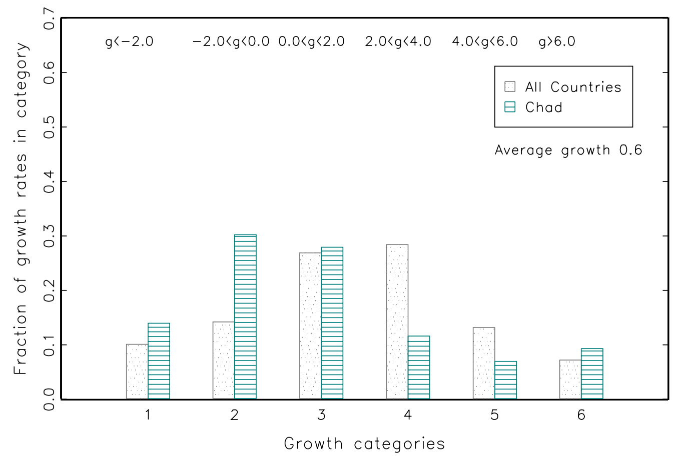


Figure 4: Distribution of all 8 year growth rates
Chad vs. world



Chile

Figure 1: Overall, ten, and five year growth rates: Chile

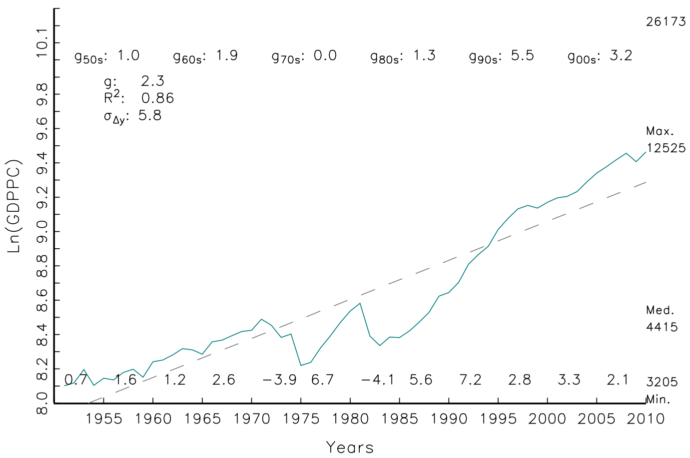


Figure 2: Initial and Final level of GDPPC: Chile

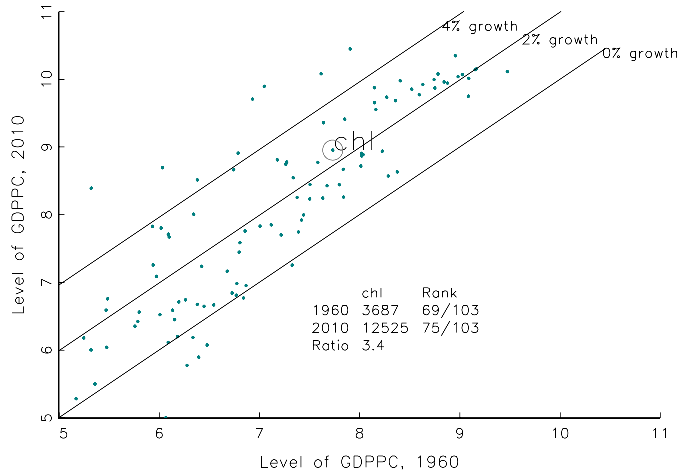


Figure 3: (ln) First Differences and five year MA: Chile

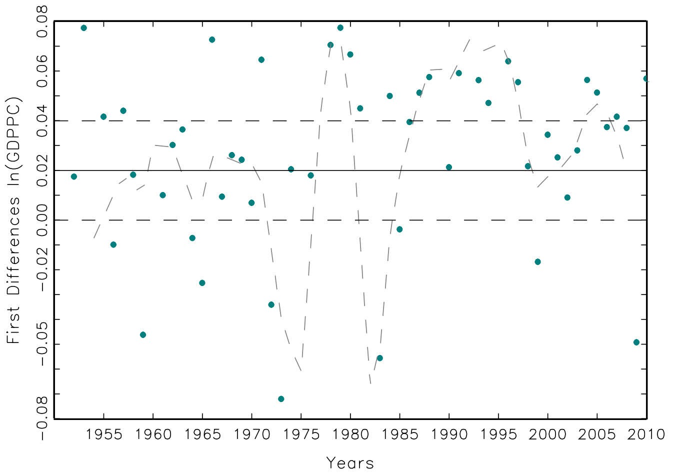
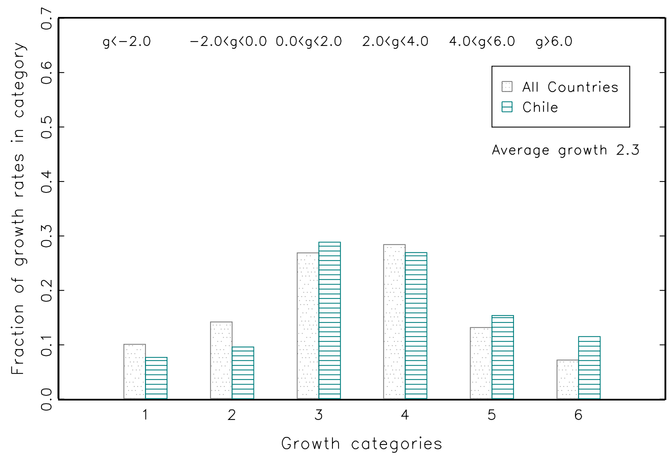


Figure 4: Distribution of all 8 year growth rates
Chile vs. world



China

Figure 1: Overall, ten, and five year growth rates: China Version 1

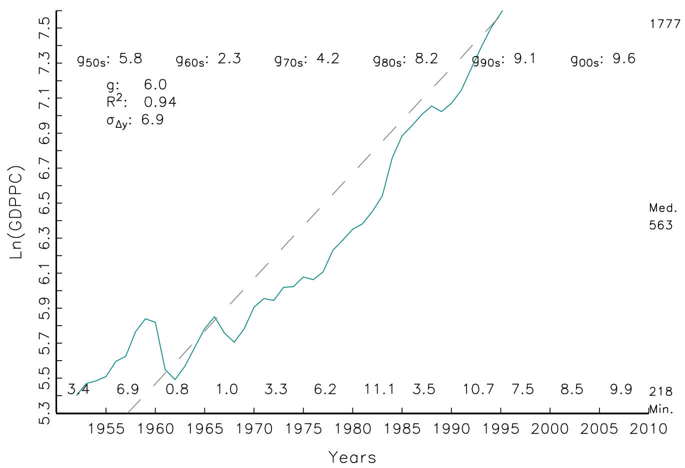


Figure 2: Initial and Final level of GDPPC: China Version 1

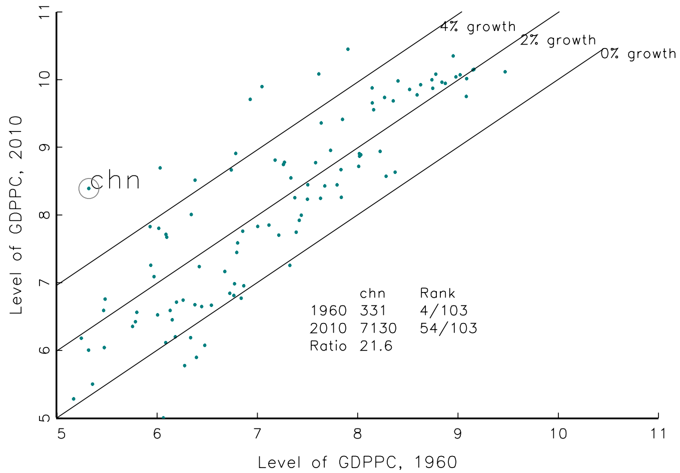


Figure 3: (ln) First Differences and five year MA: China Version 1

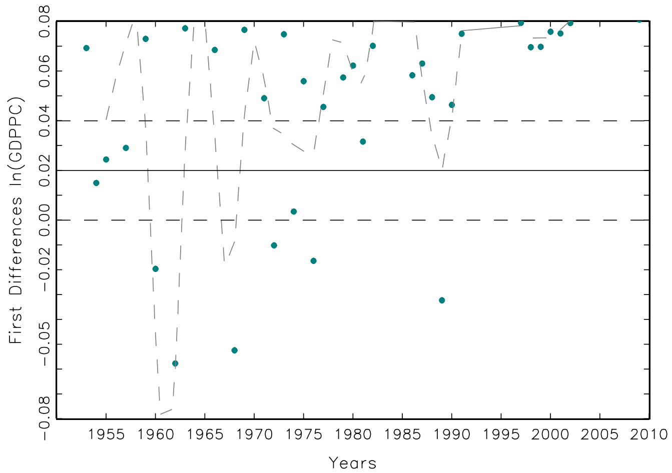
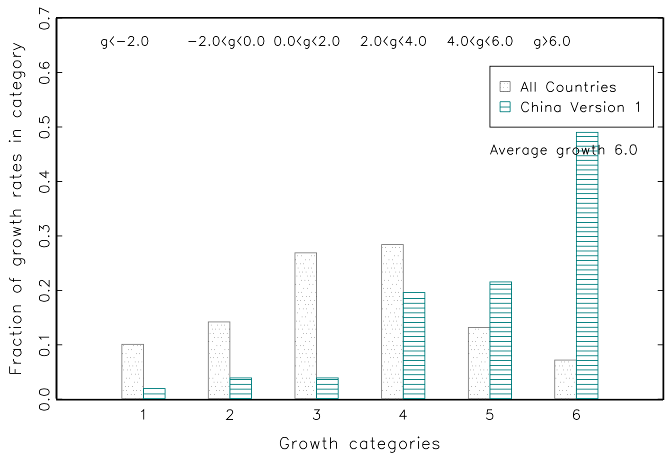


Figure 4: Distribution of all 8 year growth rates
China Version 1 vs. world



Colombia

Figure 1: Overall, ten, and five year growth rates: Colombia

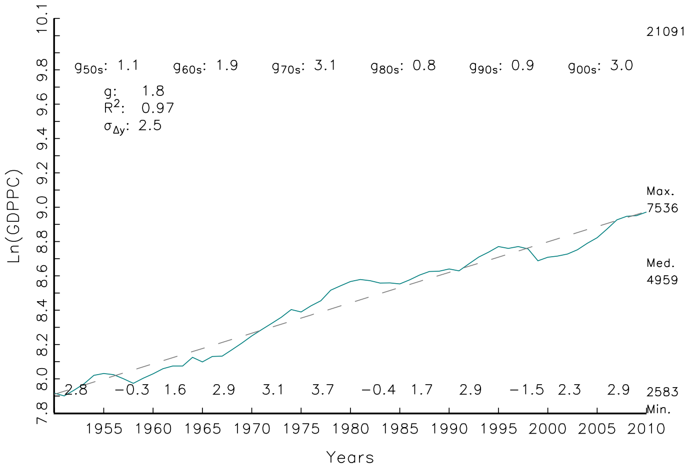


Figure 2: Initial and Final level of GDPPC: Colombia

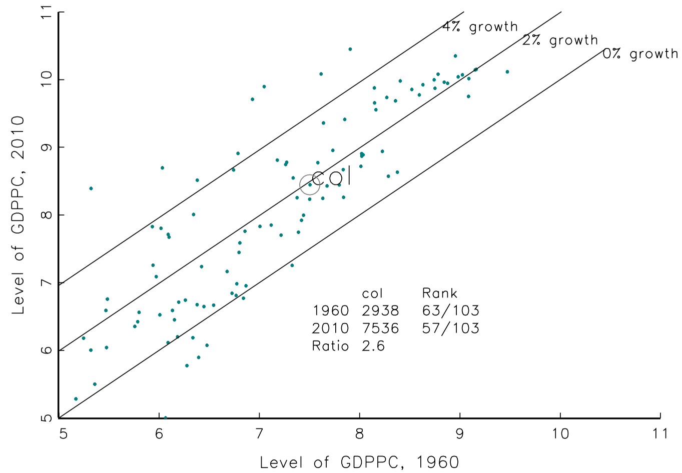


Figure 3: (ln) First Differences and five year MA: Colombia

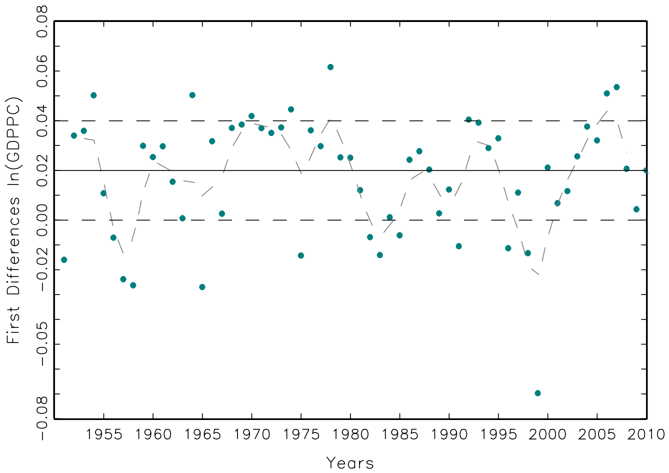
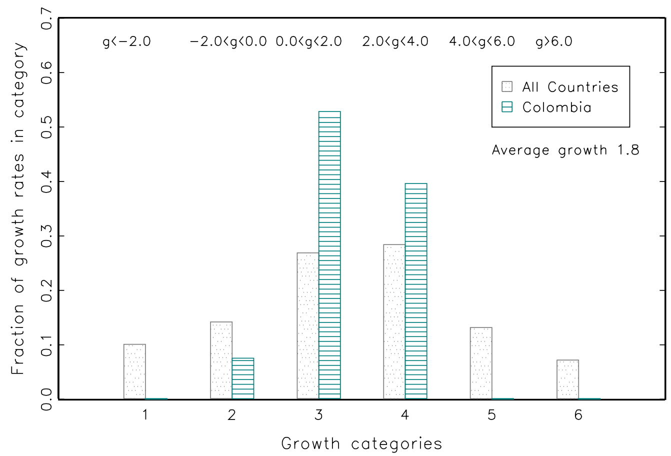


Figure 4: Distribution of all 8 year growth rates
Colombia vs. world



Congo, Rep.

Figure 1: Overall, ten, and five year growth rates: Congo, Republic of

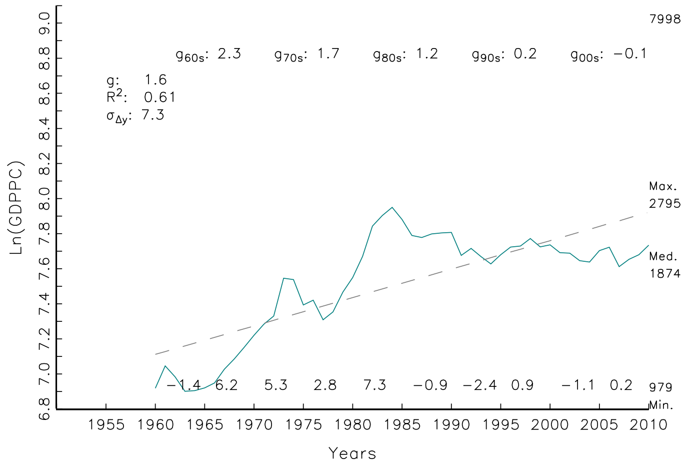


Figure 2: Initial and Final level of GDPPC: Congo, Republic of

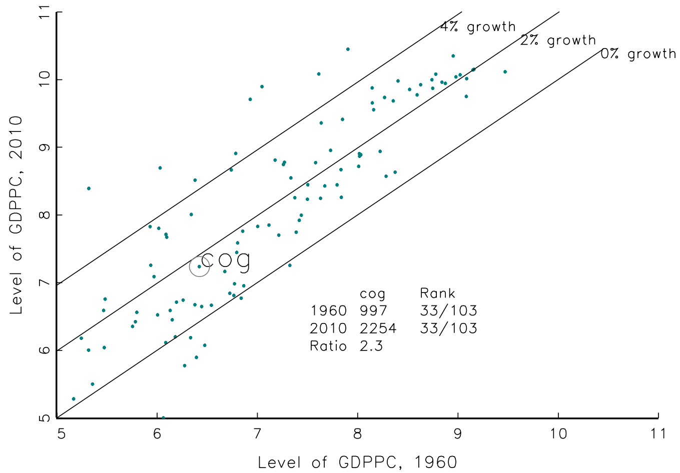


Figure 3: (ln) First Differences and five year MA: Congo, Republic of

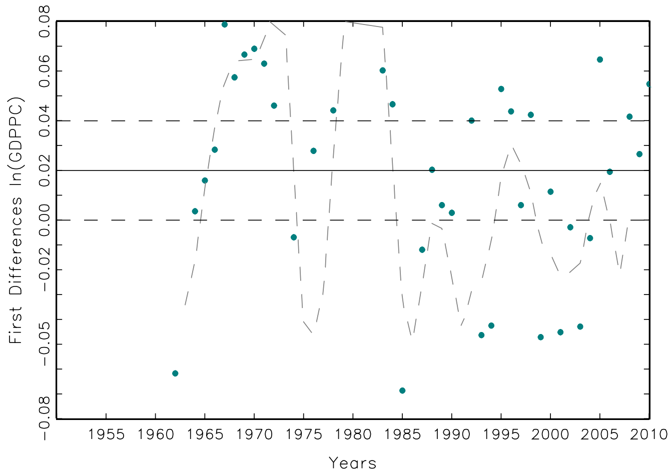
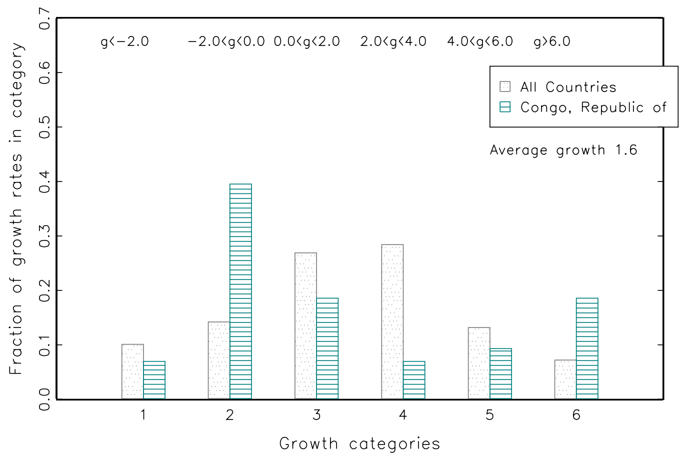


Figure 4: Distribution of all 8 year growth rates
Congo, Republic of vs. world



Congo, Dem Rep.

Figure 1: Overall, ten, and five year growth rates: Congo, Dem. Rep.

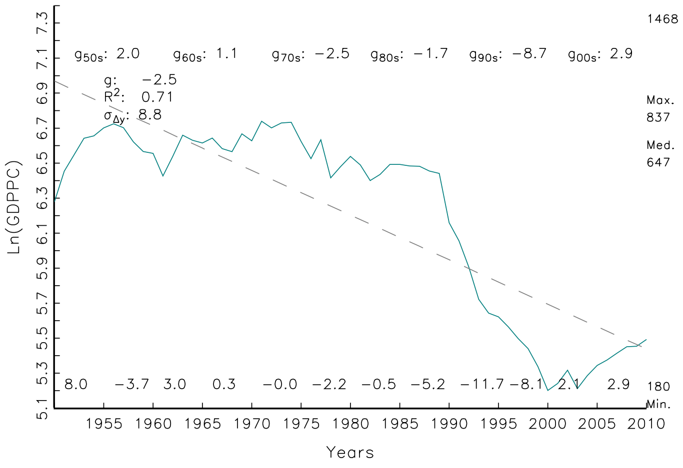


Figure 2: Initial and Final level of GDPPC: Congo, Dem. Rep.

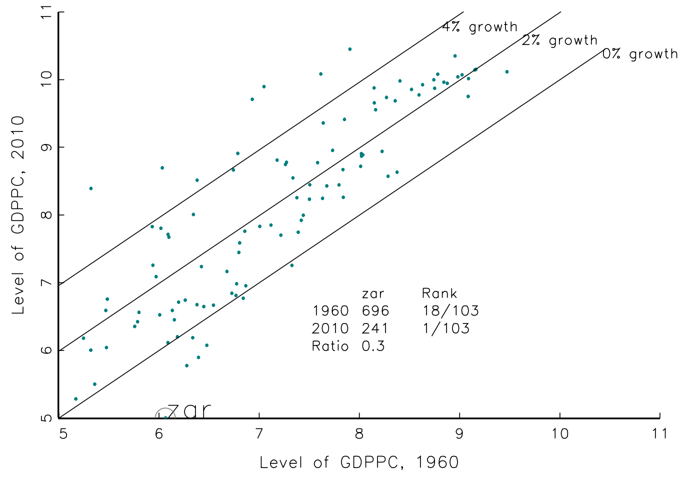


Figure 3: (ln) First Differences and five year MA: Congo, Dem. Rep.

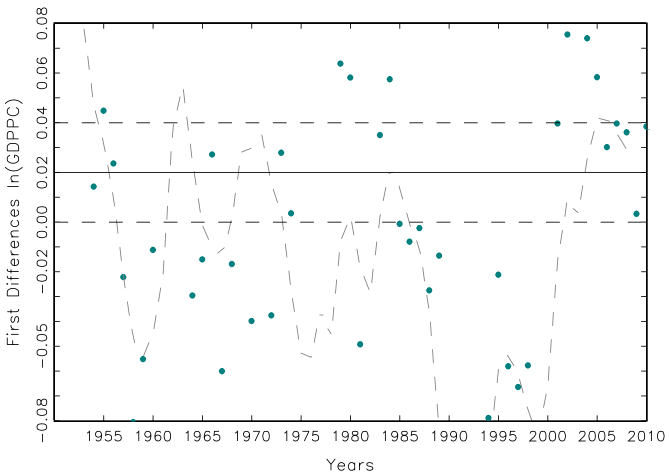
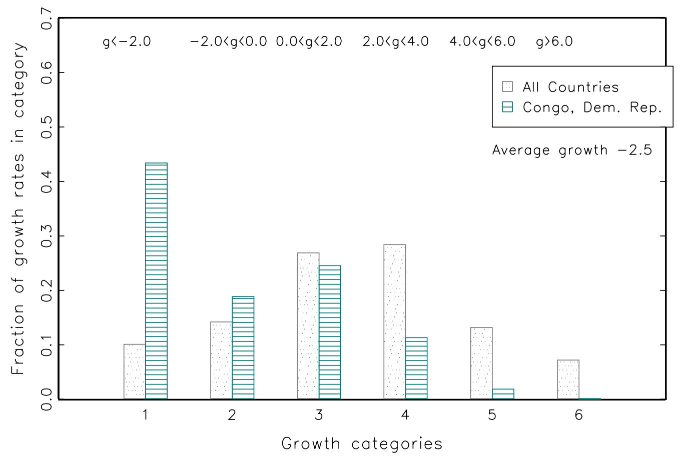


Figure 4: Distribution of all 8 year growth rates
Congo, Dem. Rep. vs. world



Costa Rica

Figure 1: Overall, ten, and five year growth rates: Costa Rica

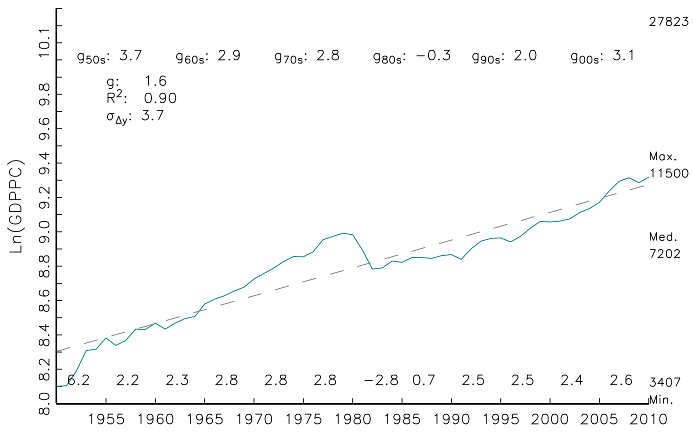


Figure 2: Initial and Final level of GDPPC: Costa Rica

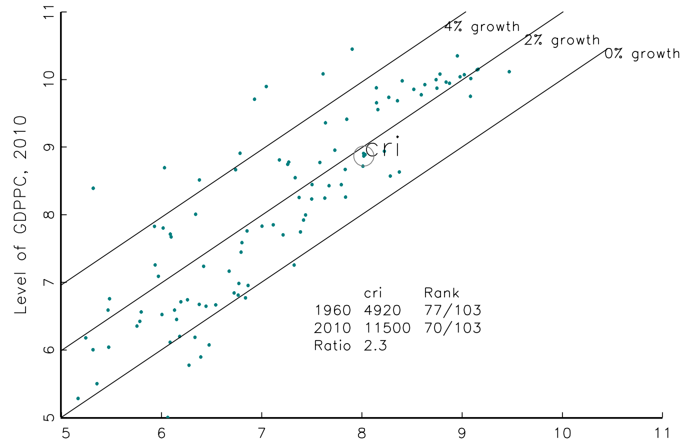


Figure 3: (ln) First Differences and five year MA: Costa Rica

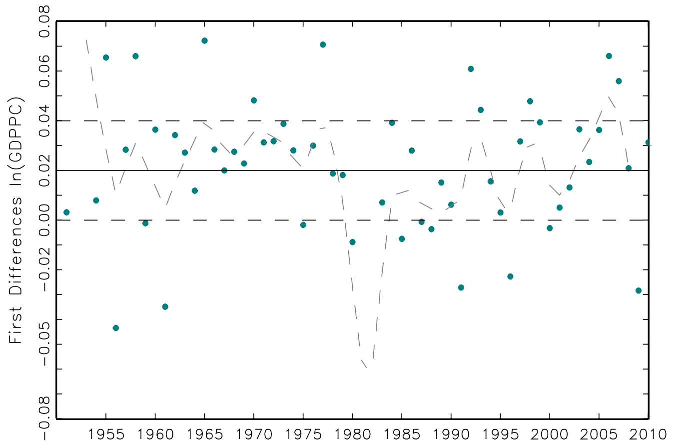
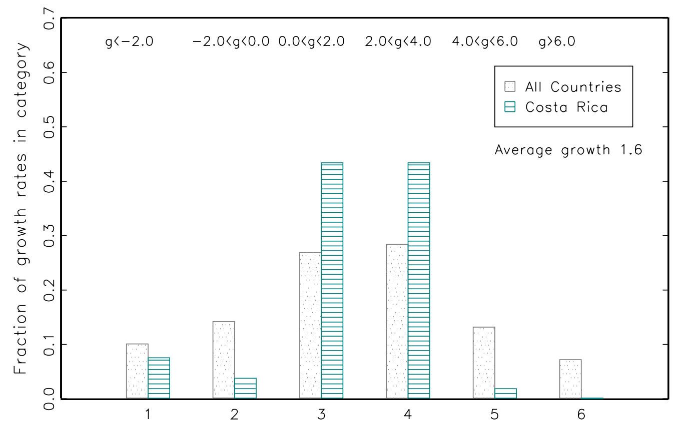


Figure 4: Distribution of all 8 year growth rates Costa Rica vs. world



Côte d'Ivoire

Figure 1: Overall, ten, and five year growth rates: Cote d'Ivoire

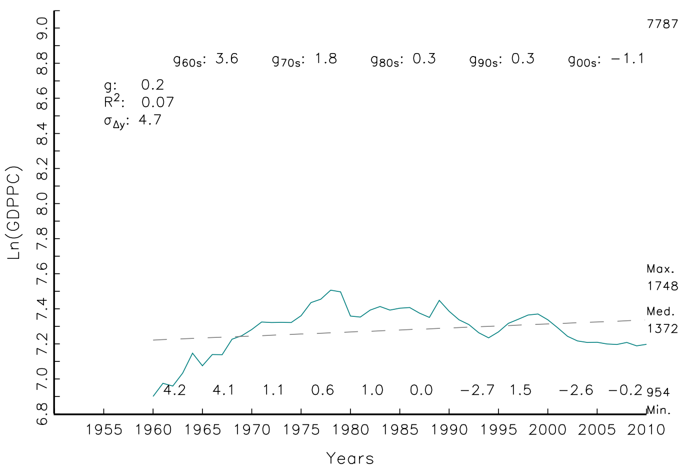


Figure 2: Initial and Final level of GDPPC: Cote d'Ivoire

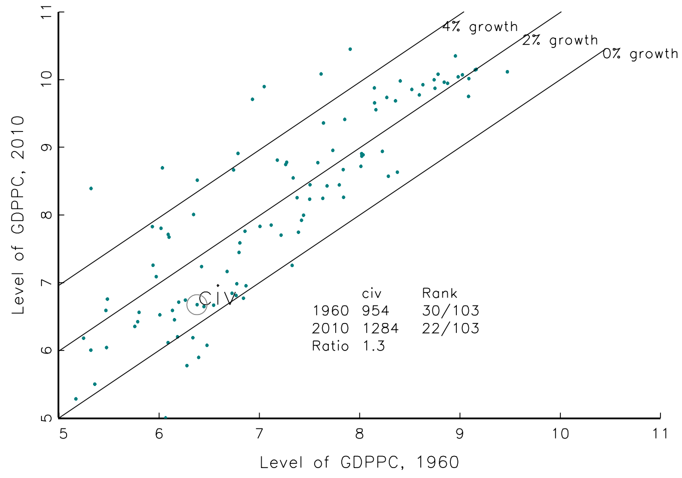


Figure 3: (ln) First Differences and five year MA: Cote d'Ivoire

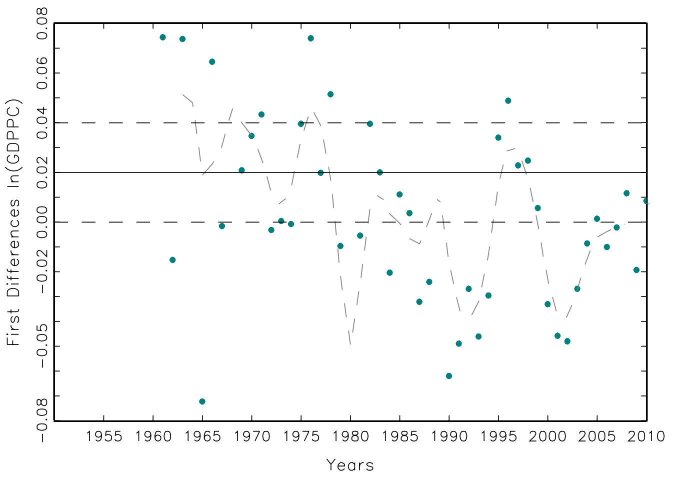
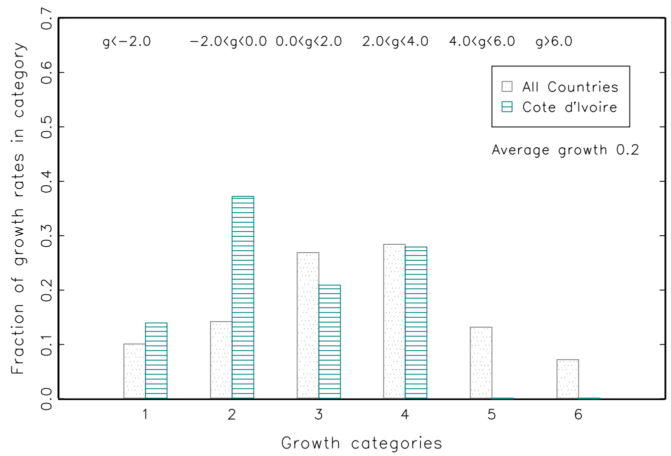


Figure 4: Distribution of all 8 year growth rates
Cote d'Ivoire vs. world



Cuba

Figure 1: Overall, ten, and five year growth rates: Cuba

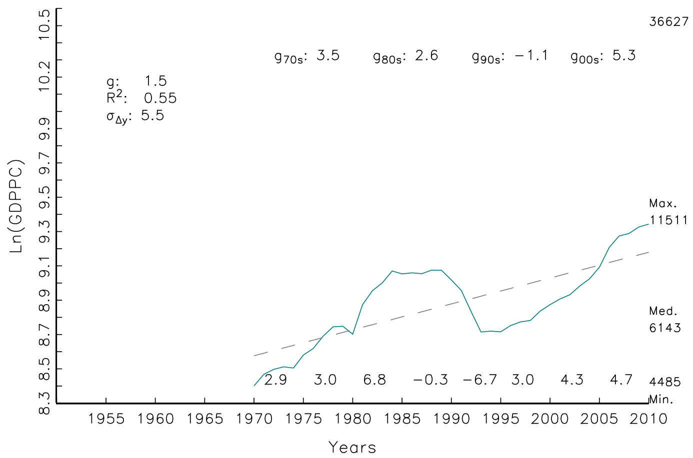


Figure 2: Initial and Final level of GDPPC: Cuba

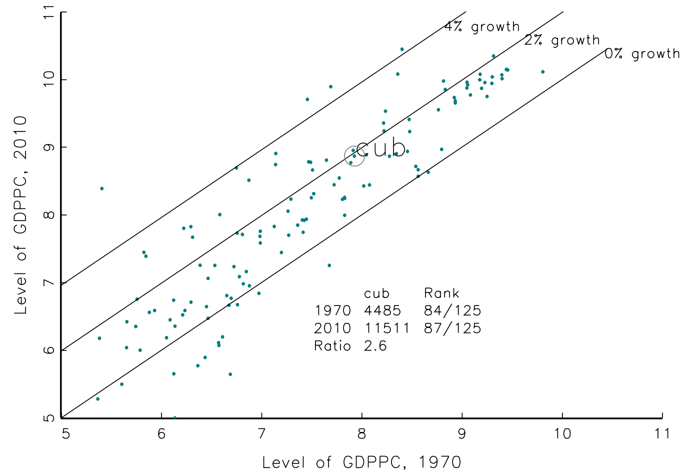


Figure 3: (ln) First Differences and five year MA: Cuba

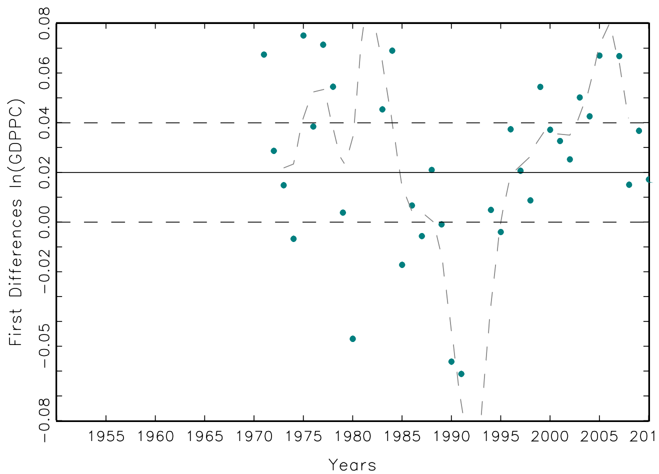
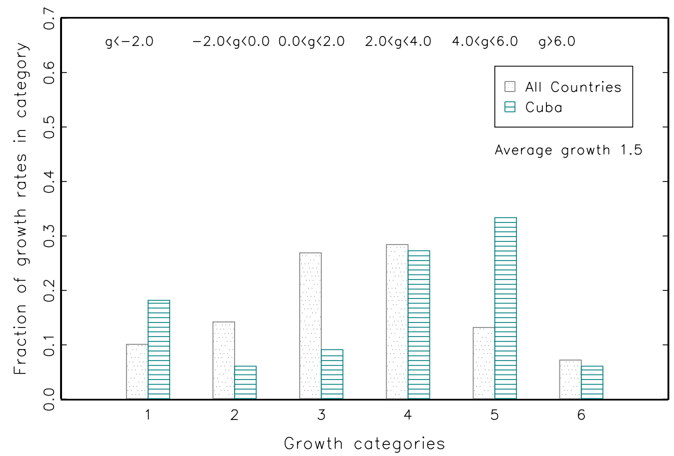


Figure 4: Distribution of all 8 year growth rates
Cuba vs. world



Cyprus

Figure 1: Overall, ten, and five year growth rates: Cyprus

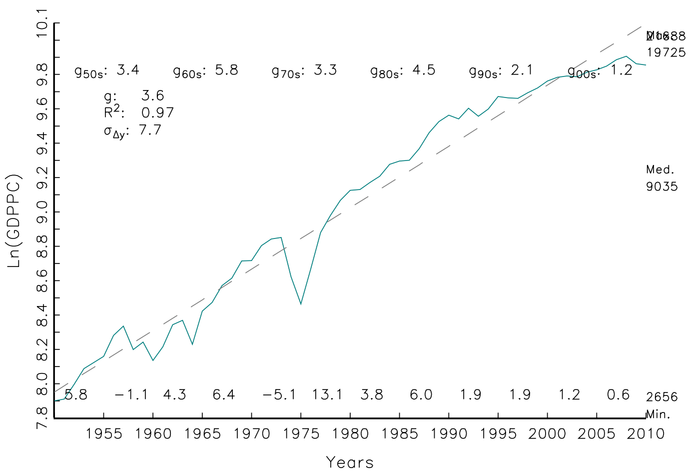


Figure 2: Initial and Final level of GDPPC: Cyprus

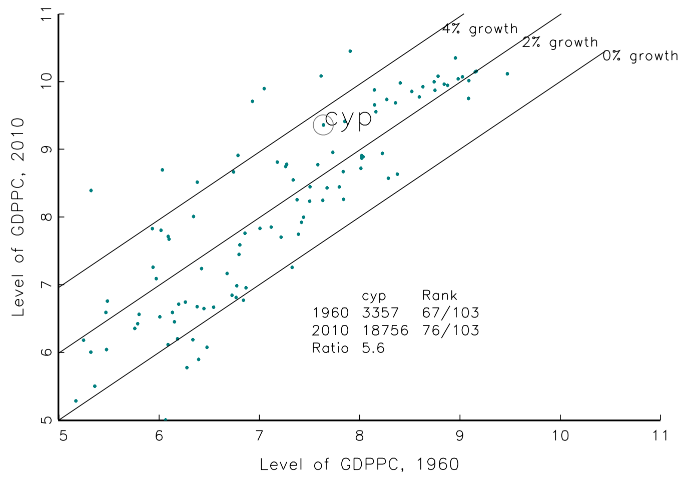


Figure 3: (ln) First Differences and five year MA: Cyprus

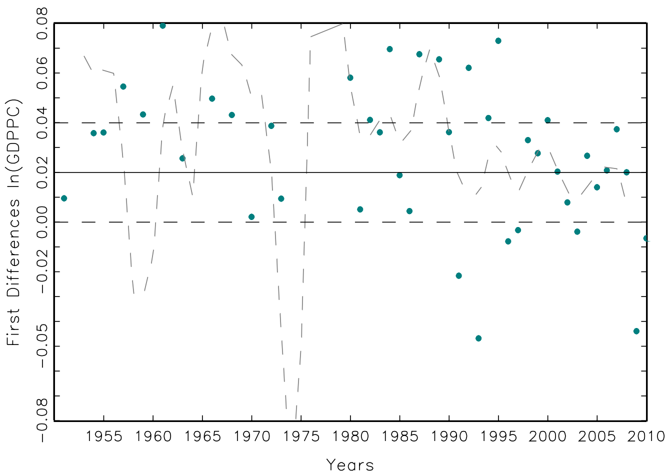
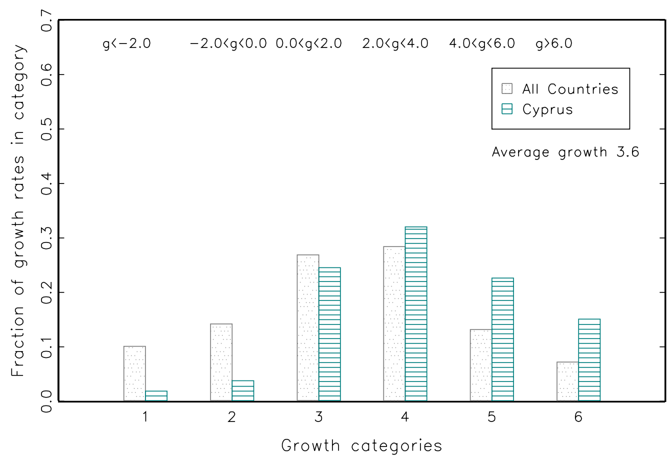


Figure 4: Distribution of all 8 year growth rates
Cyprus vs. world



Denmark

Figure 1: Overall, ten, and five year growth rates: Denmark

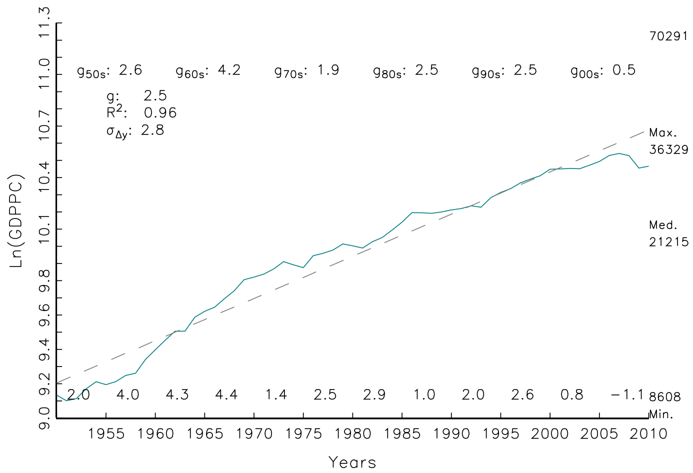


Figure 2: Initial and Final level of GDPPC: Denmark

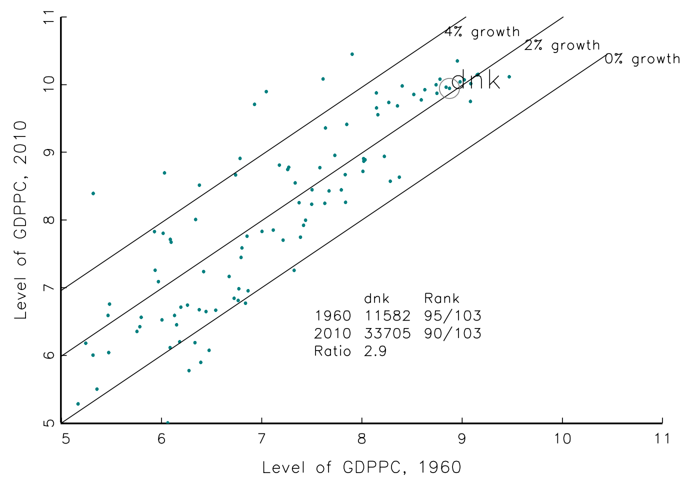


Figure 3: (ln) First Differences and five year MA: Denmark

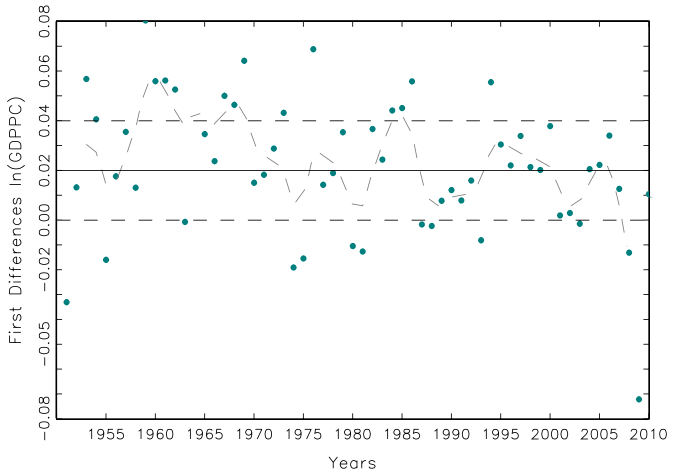
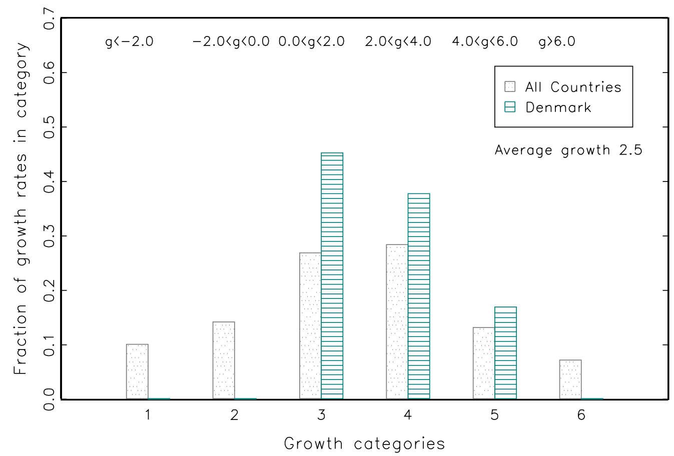


Figure 4: Distribution of all 8 year growth rates Denmark vs. world



Dominican Republic

Figure 1: Overall, ten, and five year growth rates: Dominican Republic

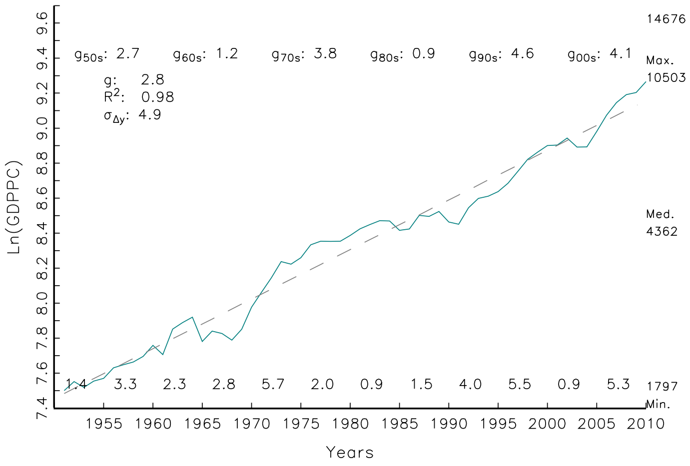


Figure 2: Initial and Final level of GDPPC: Dominican Republic

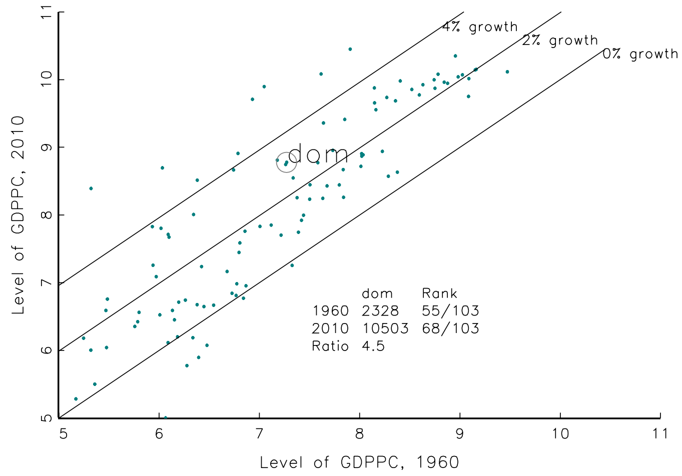


Figure 3: (ln) First Differences and five year MA: Dominican Republic

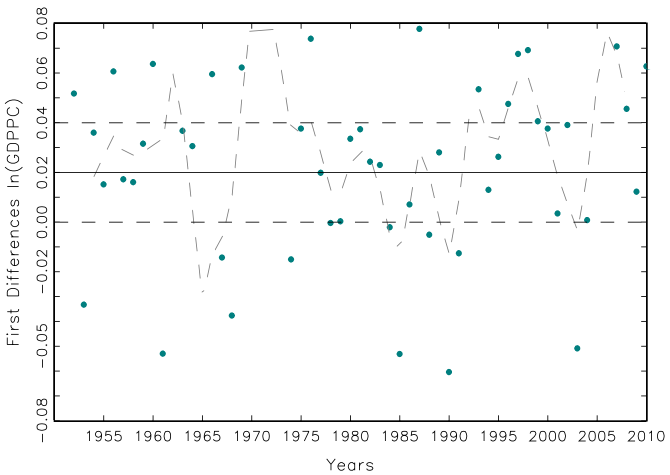
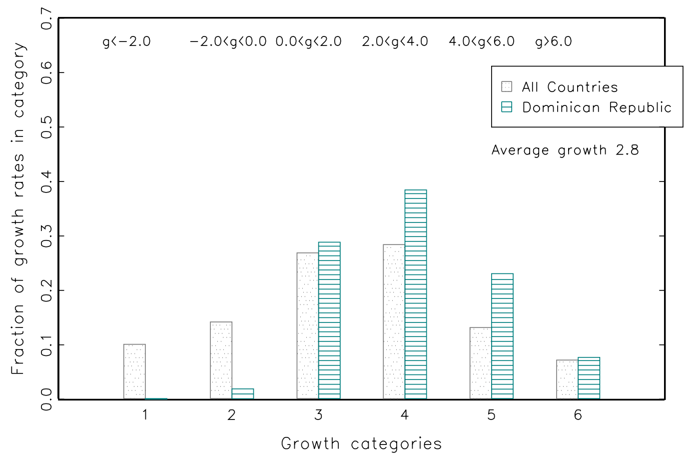


Figure 4: Distribution of all 8 year growth rates
Dominican Republic vs. world



Ecuador

Figure 1: Overall, ten, and five year growth rates: Ecuador

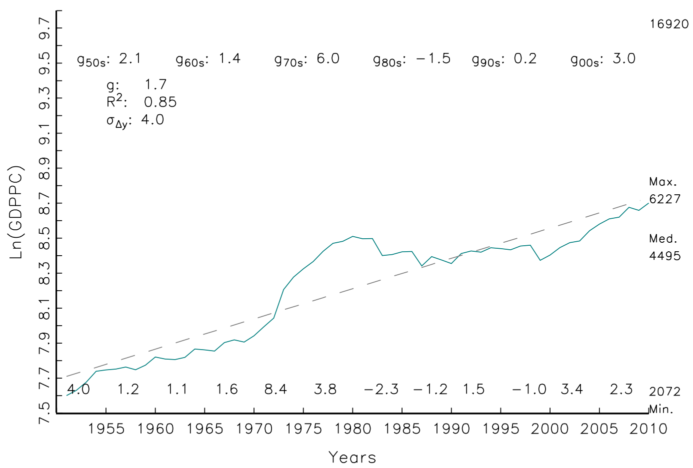


Figure 2: Initial and Final level of GDPPC: Ecuador

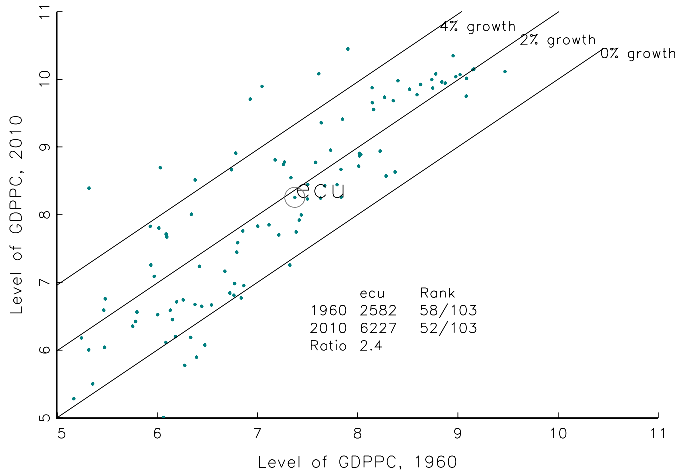


Figure 3: (ln) First Differences and five year MA: Ecuador

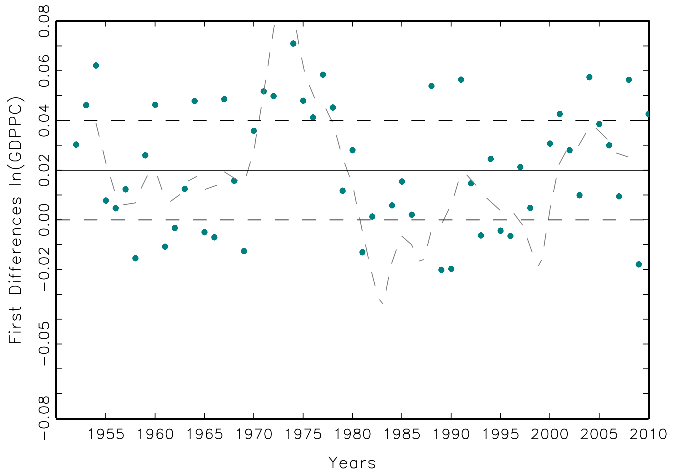
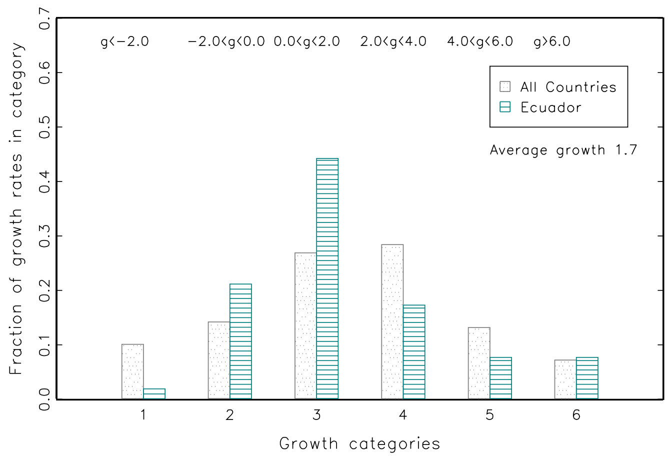


Figure 4: Distribution of all 8 year growth rates
Ecuador vs. world



Egypt, Arab Rep.

Figure 1: Overall, ten, and five year growth rates: Egypt

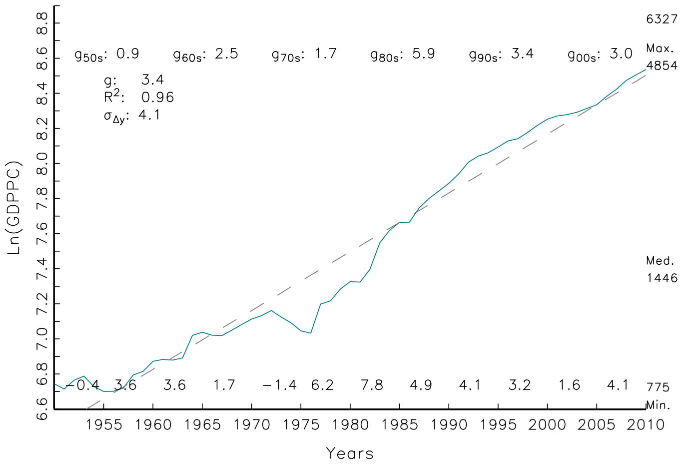


Figure 2: Initial and Final level of GDPPC: Egypt

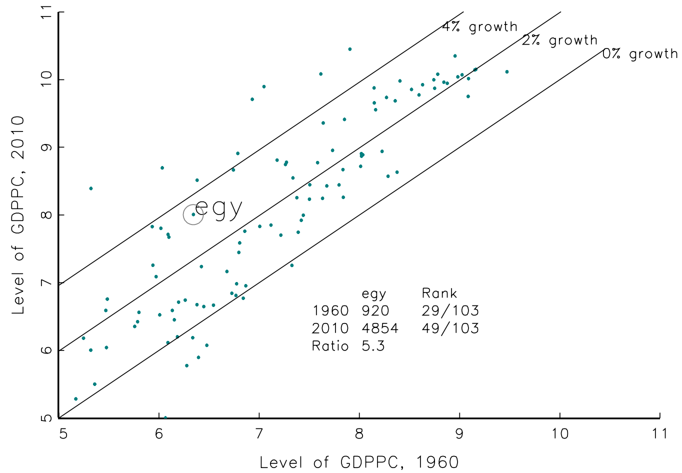


Figure 3: (ln) First Differences and five year MA: Egypt

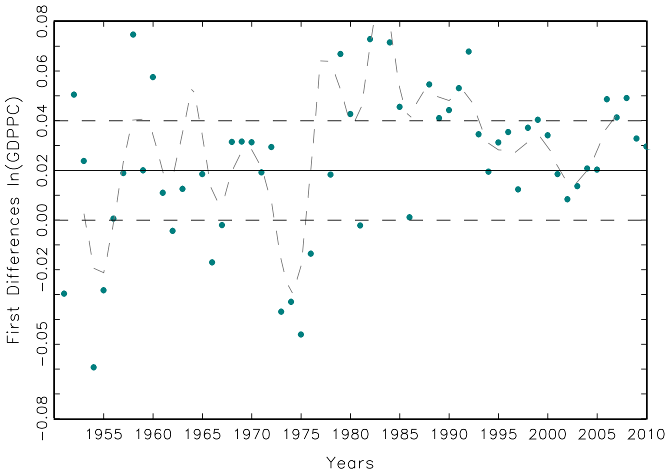
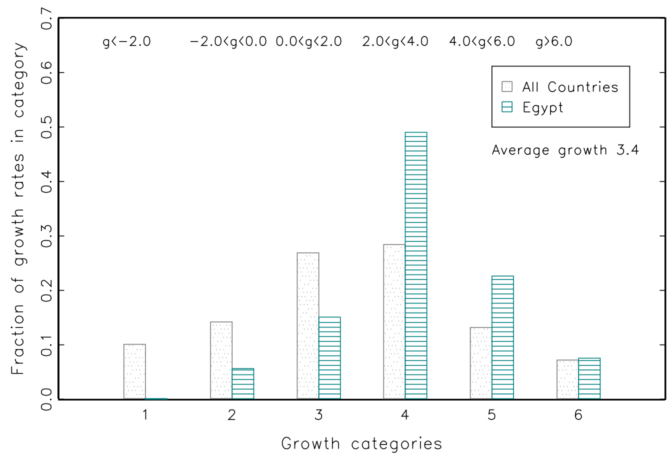


Figure 4: Distribution of all 8 year growth rates
Egypt vs. world



El Salvador

Figure 1: Overall, ten, and five year growth rates: El Salvador

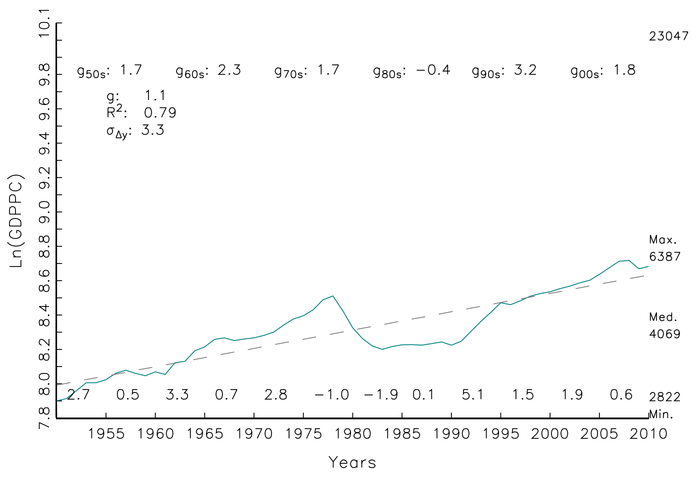


Figure 2: Initial and Final level of GDPPC: El Salvador

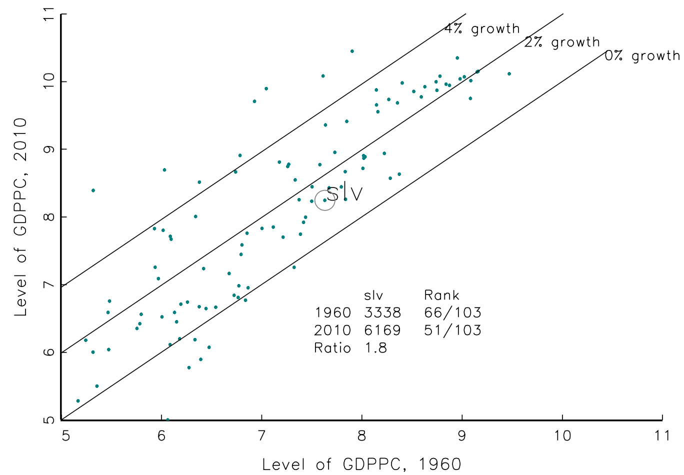


Figure 3: (ln) First Differences and five year MA: El Salvador

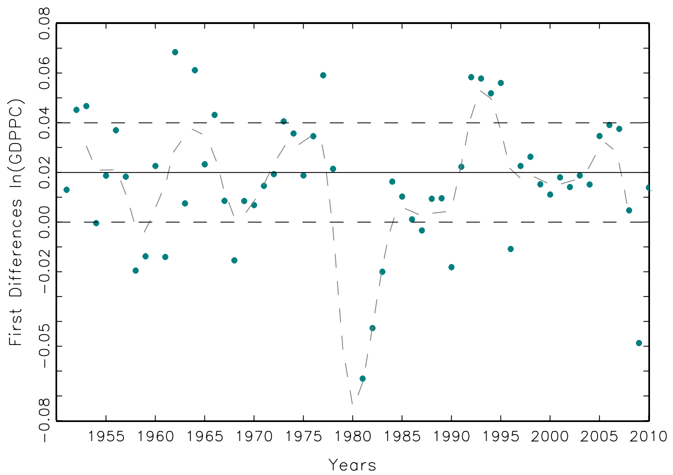
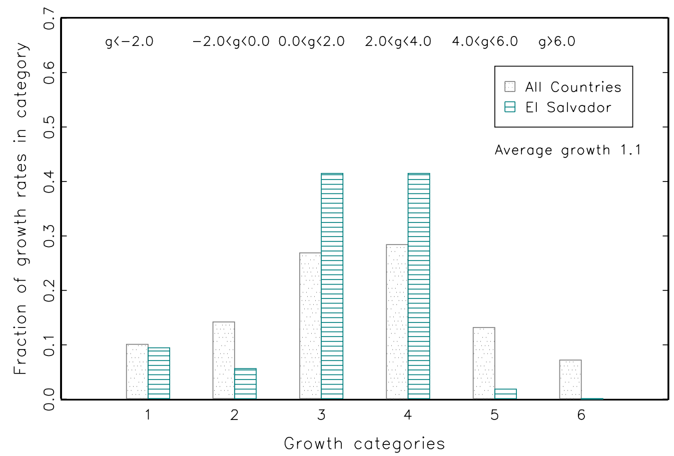


Figure 4: Distribution of all 8 year growth rates
El Salvador vs. world



Ethiopia

Figure 1: Overall, ten, and five year growth rates: Ethiopia

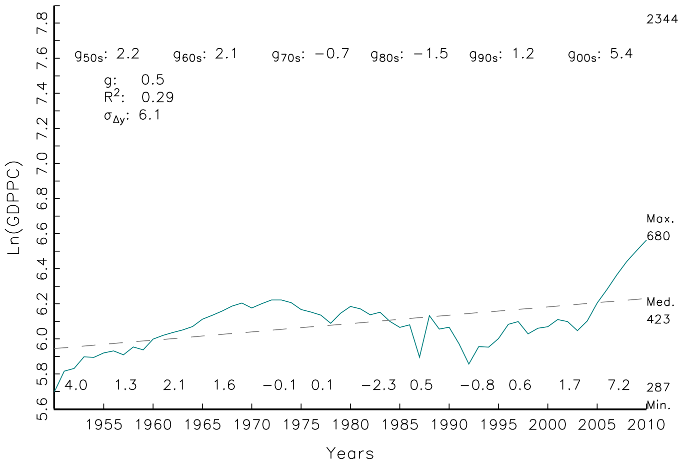


Figure 2: Initial and Final level of GDPPC: Ethiopia

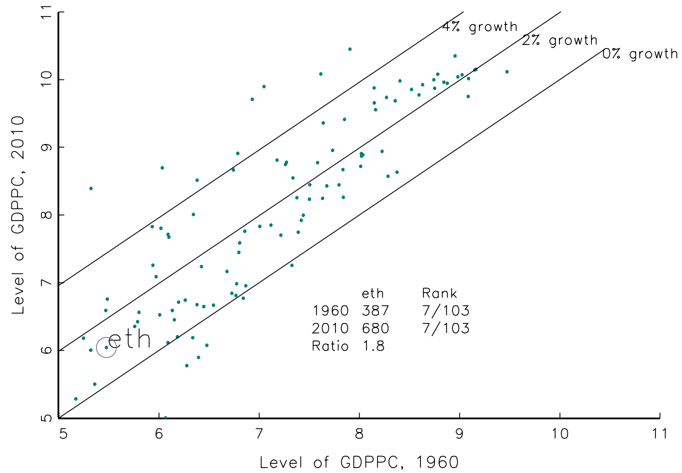


Figure 3: (ln) First Differences and five year MA: Ethiopia

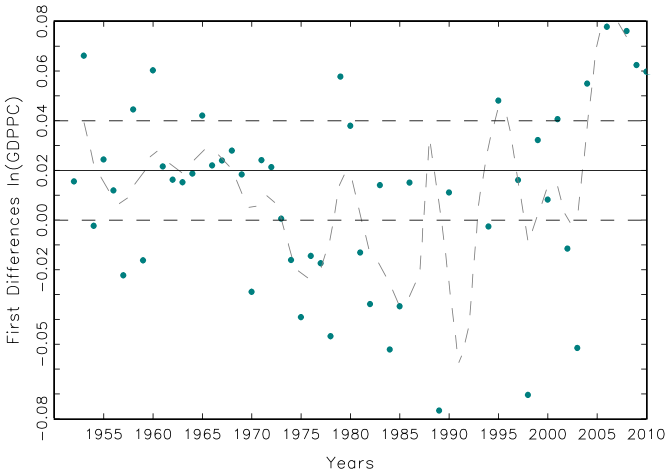
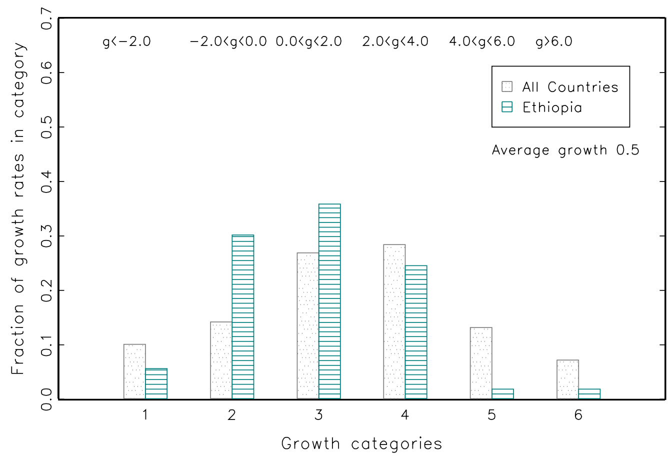


Figure 4: Distribution of all 8 year growth rates
Ethiopia vs. world



Fiji

Figure 1: Overall, ten, and five year growth rates: Fiji

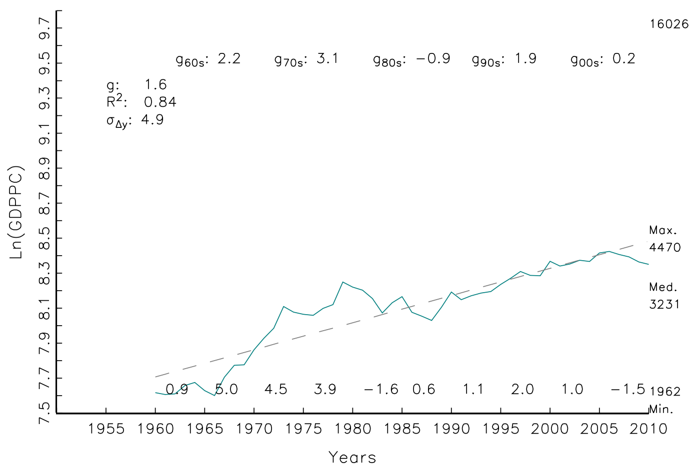


Figure 2: Initial and Final level of GDPPC: Fiji

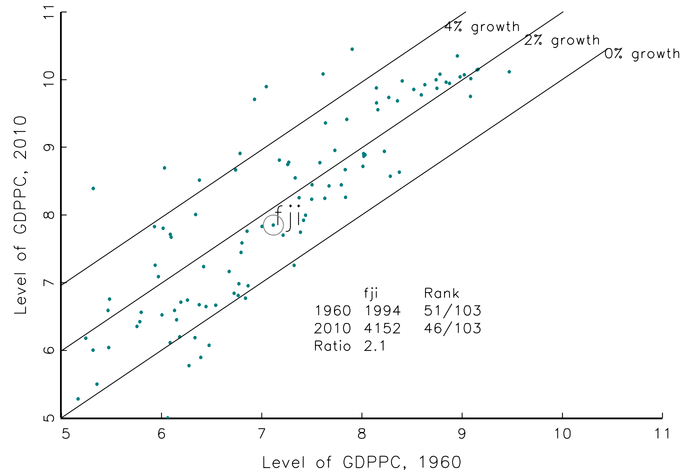


Figure 3: (ln) First Differences and five year MA: Fiji

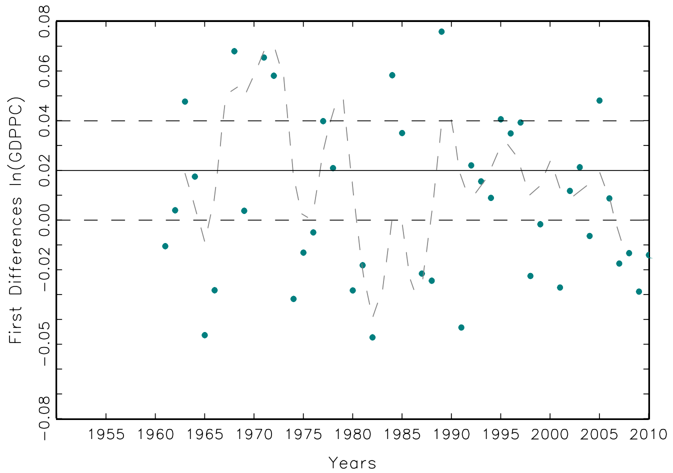
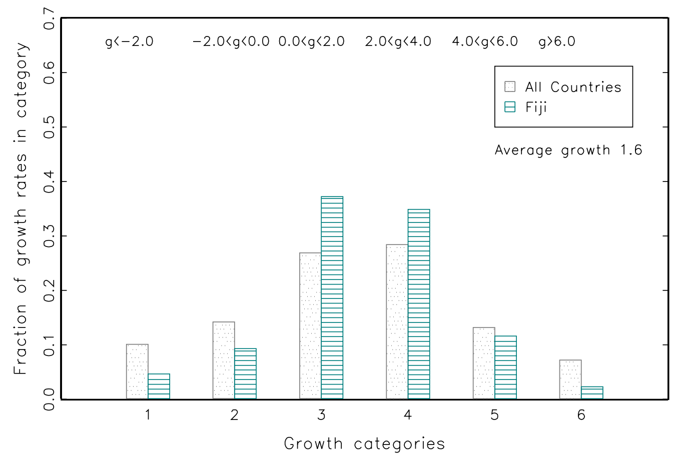


Figure 4: Distribution of all 8 year growth rates
Fiji vs. world



Finland

Figure 1: Overall, ten, and five year growth rates: Finland

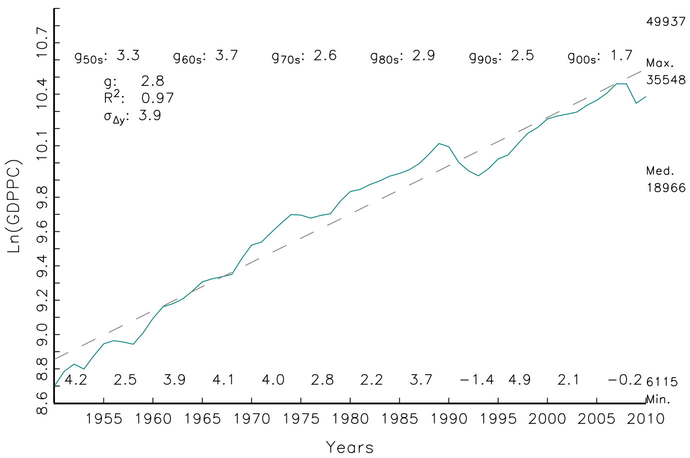


Figure 2: Initial and Final level of GDPPC: Finland

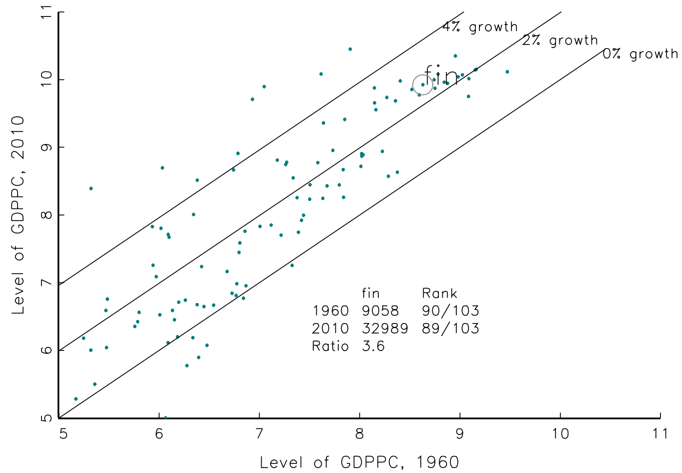


Figure 3: (ln) First Differences and five year MA: Finland

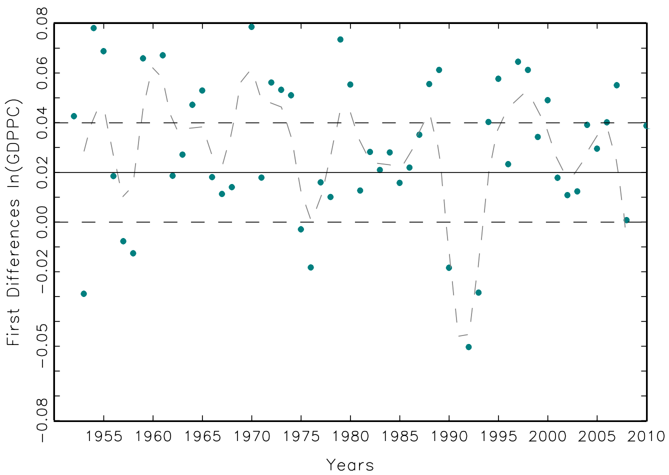
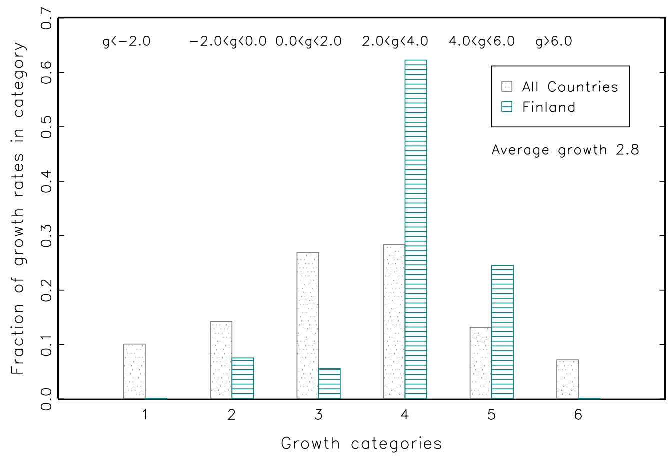


Figure 4: Distribution of all 8 year growth rates Finland vs. world



France

Figure 1: Overall, ten, and five year growth rates: France

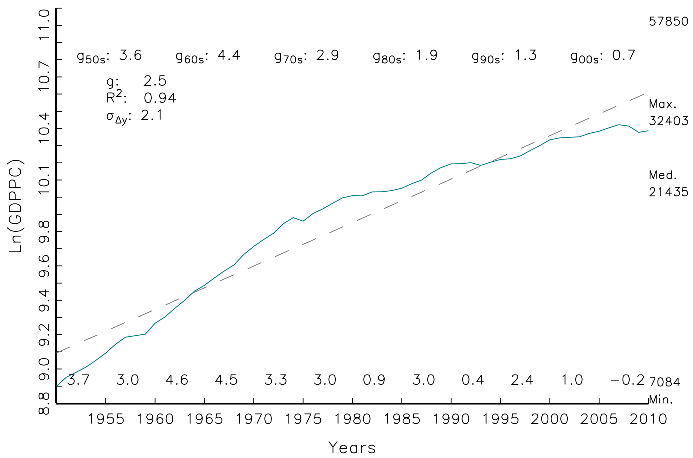


Figure 2: Initial and Final level of GDPPC: France

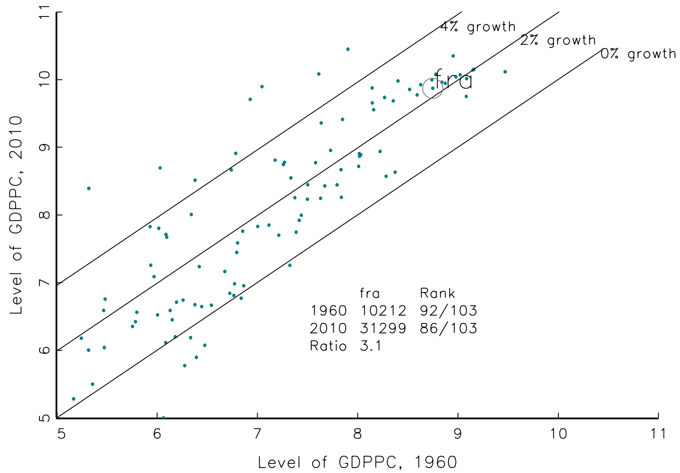


Figure 3: (ln) First Differences and five year MA: France

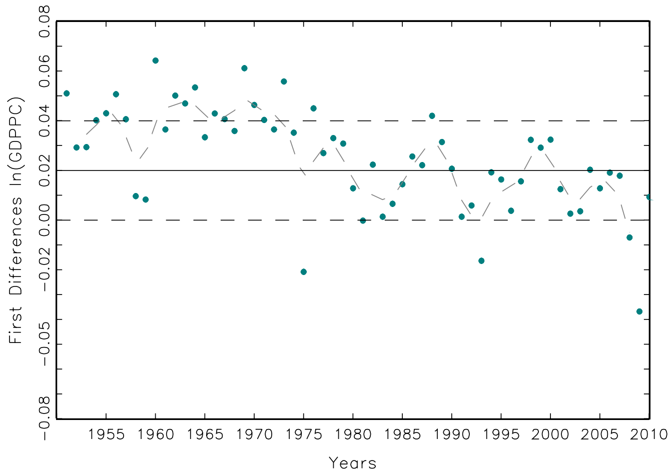
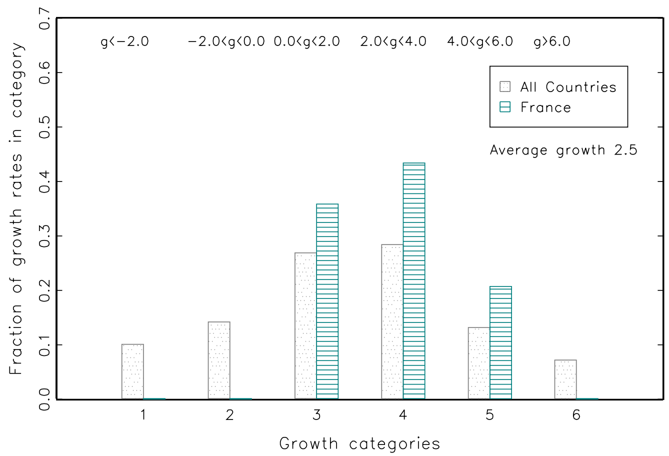


Figure 4: Distribution of all 8 year growth rates
France vs. world



Gabon

Figure 1: Overall, ten, and five year growth rates: Gabon

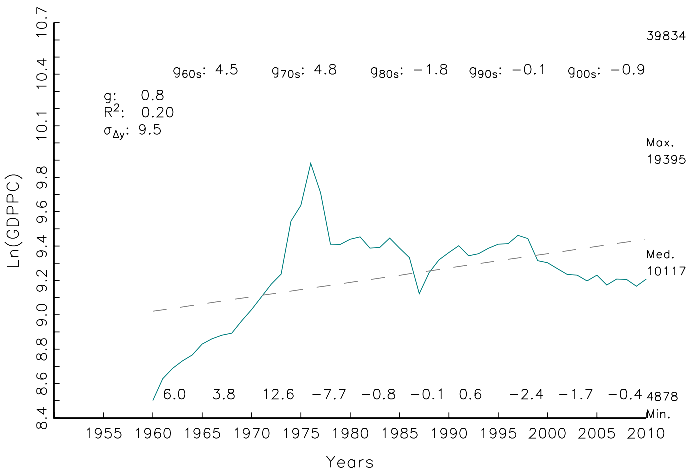


Figure 2: Initial and Final level of GDPPC: Gabon

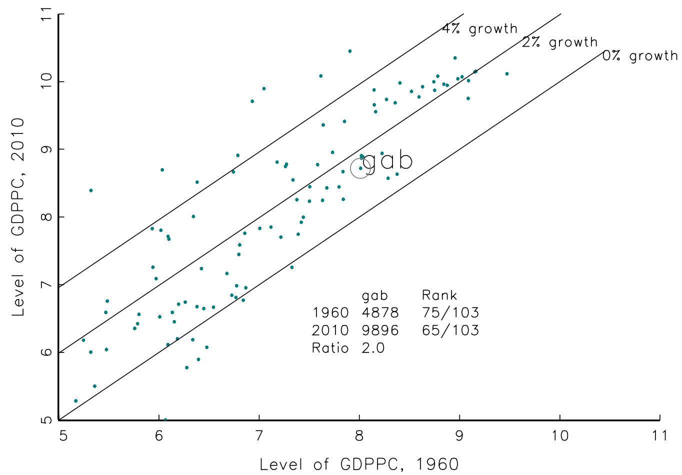


Figure 3: (ln) First Differences and five year MA: Gabon

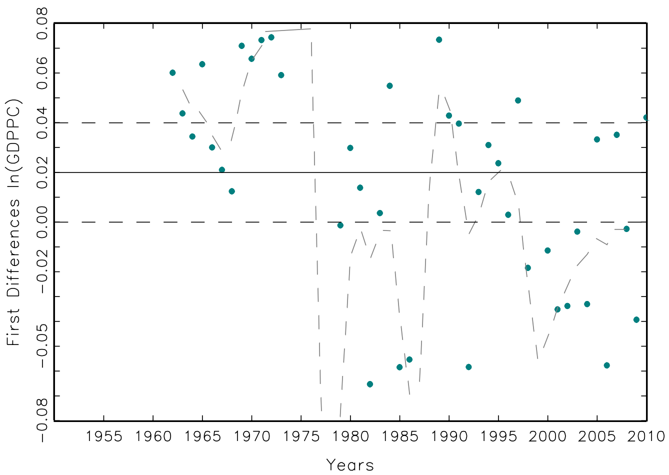
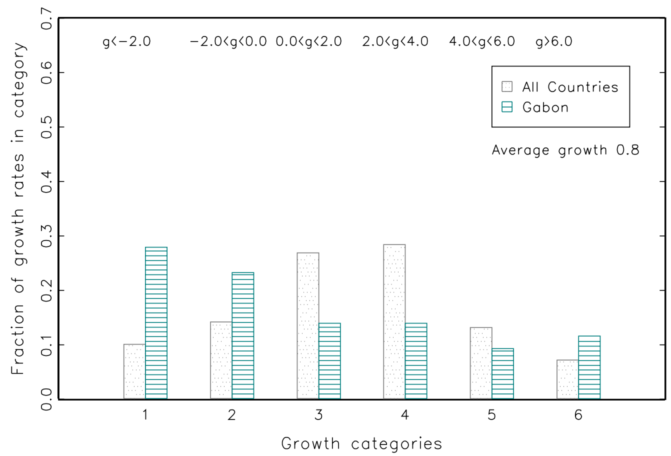


Figure 4: Distribution of all 8 year growth rates
Gabon vs. world



Gambia, The

Figure 1: Overall, ten, and five year growth rates: Gambia, The

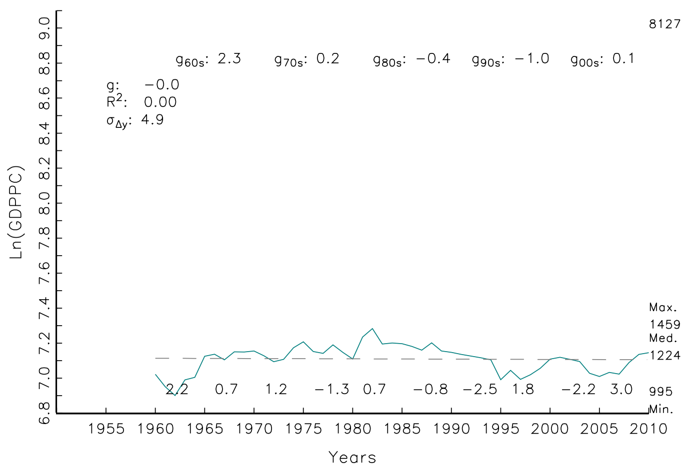


Figure 2: Initial and Final level of GDPPC: Gambia, The

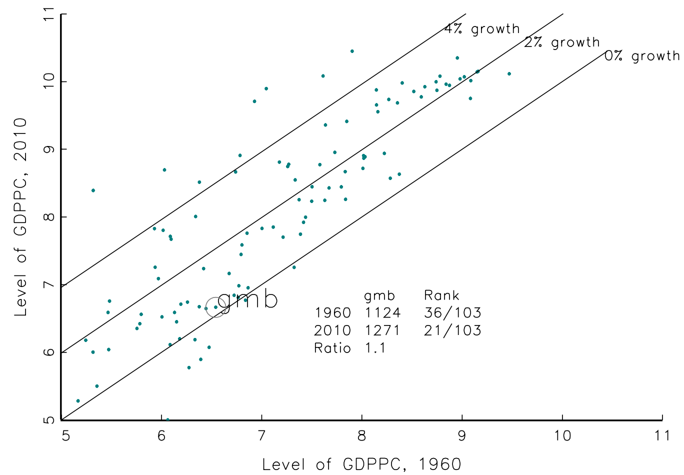


Figure 3: (ln) First Differences and five year MA: Gambia, The

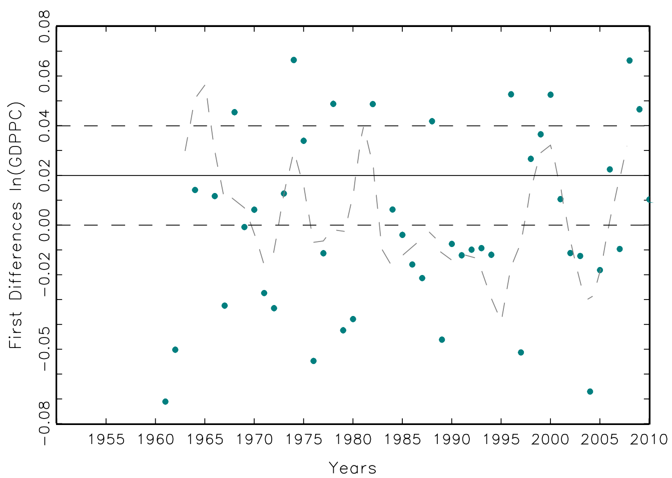
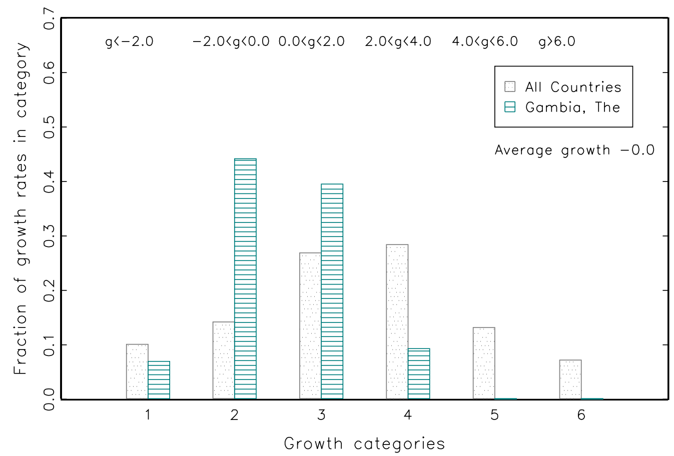


Figure 4: Distribution of all 8 year growth rates
Gambia, The vs. world



Germany

Figure 1: Overall, ten, and five year growth rates: Germany

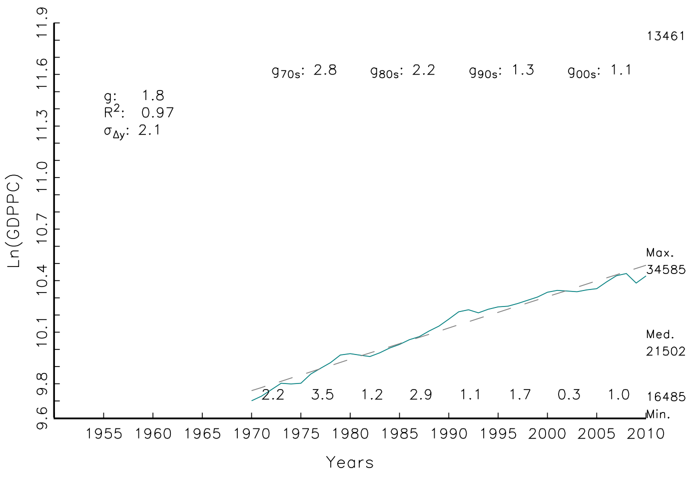


Figure 2: Initial and Final level of GDPPC: Germany

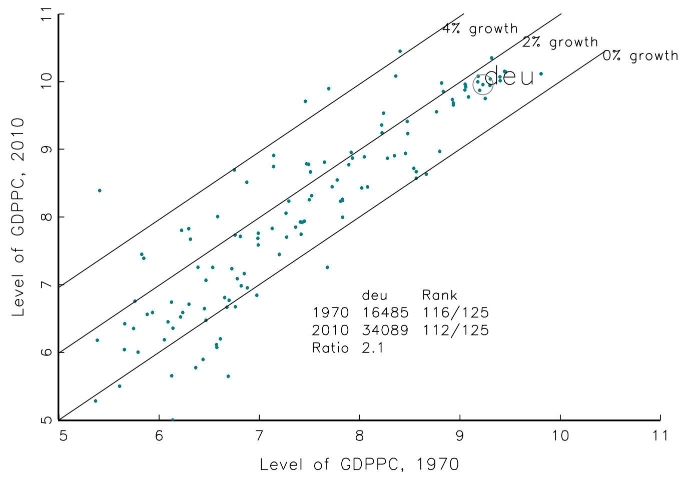


Figure 3: (ln) First Differences and five year MA: Germany

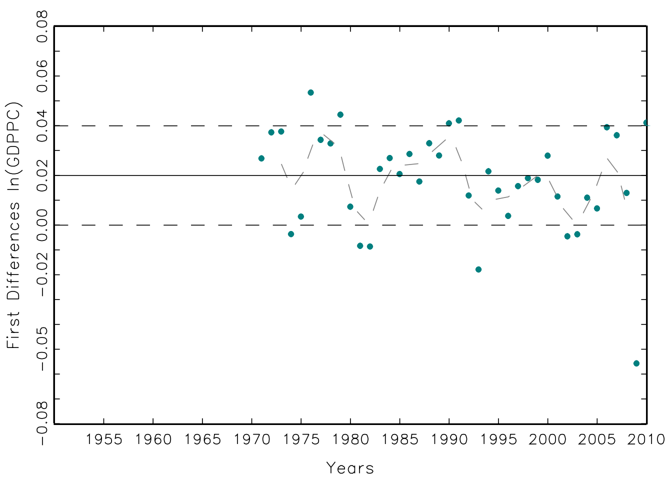
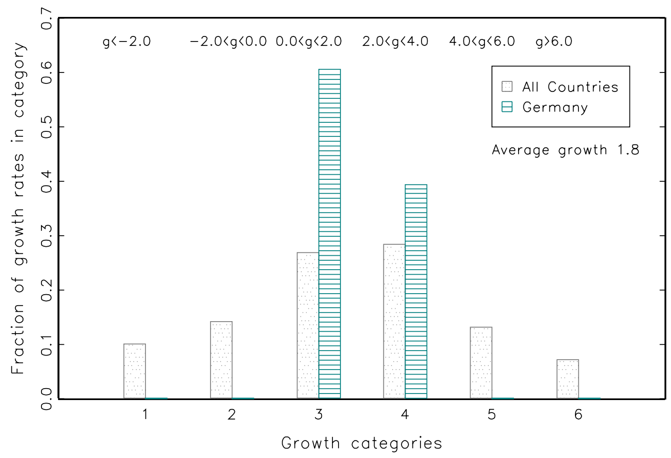


Figure 4: Distribution of all 8 year growth rates
Germany vs. world



Ghana

Figure 1: Overall, ten, and five year growth rates: Ghana

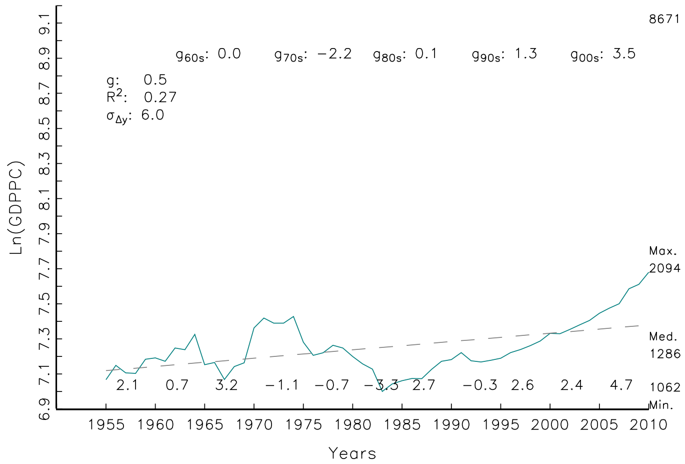


Figure 2: Initial and Final level of GDPPC: Ghana

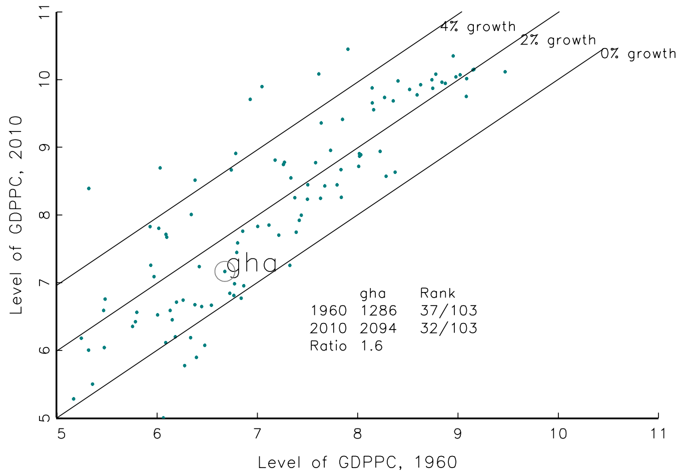


Figure 3: (ln) First Differences and five year MA: Ghana

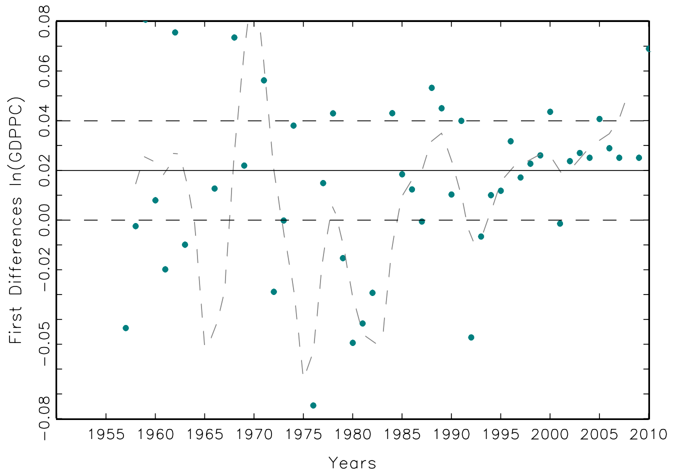
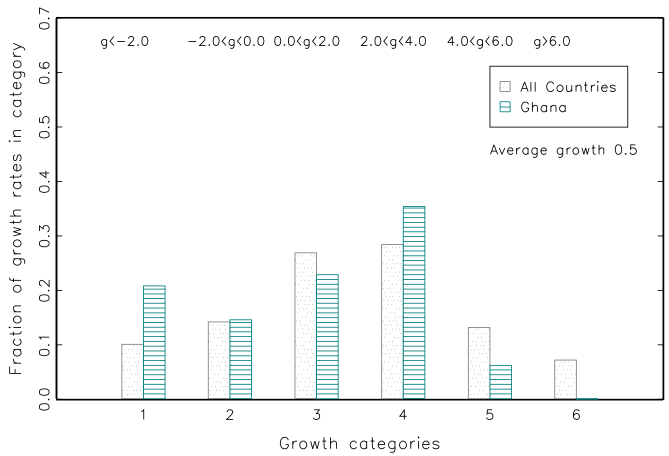


Figure 4: Distribution of all 8 year growth rates Ghana vs. world



Greece

Figure 1: Overall, ten, and five year growth rates: Greece

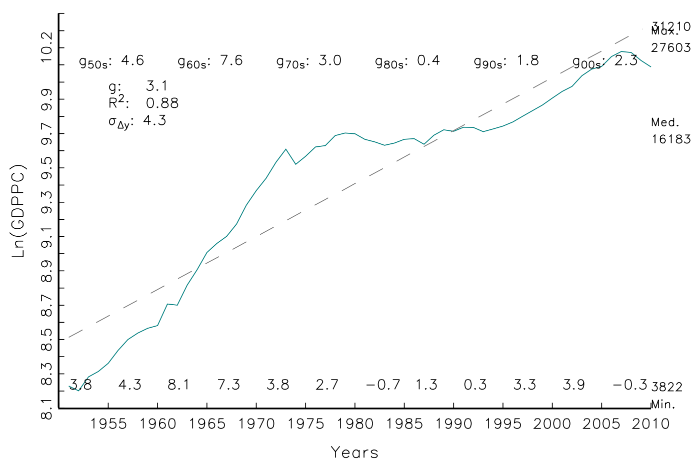


Figure 2: Initial and Final level of GDPPC: Greece

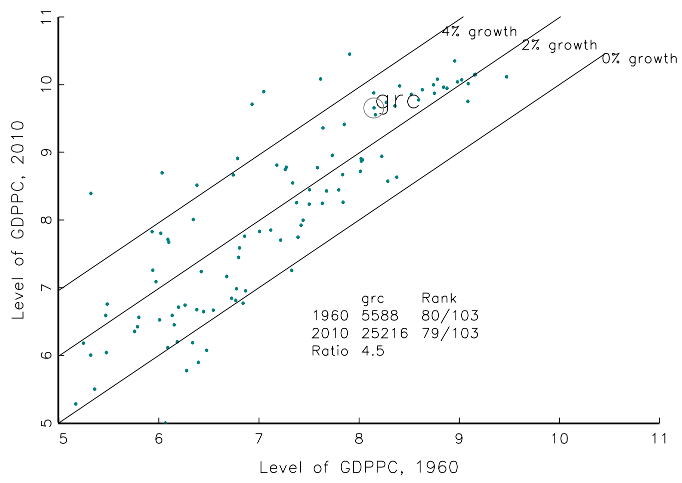


Figure 3: (ln) First Differences and five year MA: Greece

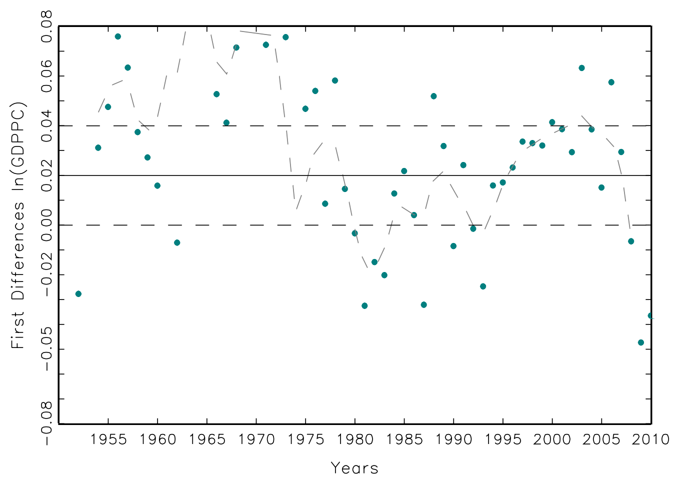
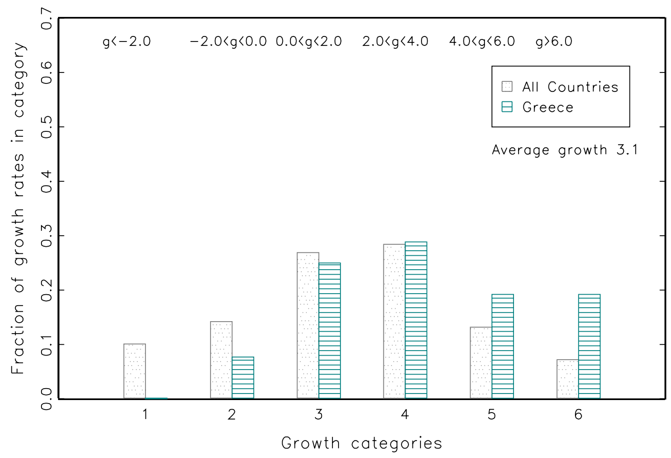


Figure 4: Distribution of all 8 year growth rates
Greece vs. world



Guatemala

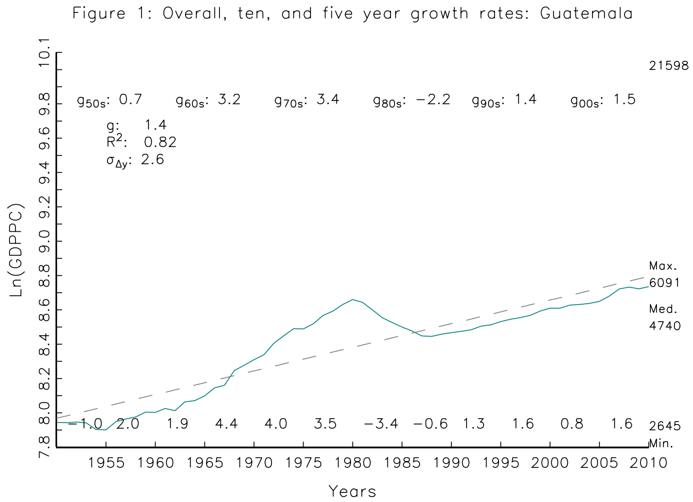


Figure 1: Overall, ten, and five year growth rates: Guatemala
Ln(GDPPC)
Years
g50s: 0.7 g60s: 3.2 g70s: 3.4 g80s: −2.2 g90s: 1.4 g00s: 1.5
g: 1.4
R2: 0.82
σΔy: 2.6
21598
Max. 6091
Med. 4740
2645 Min.

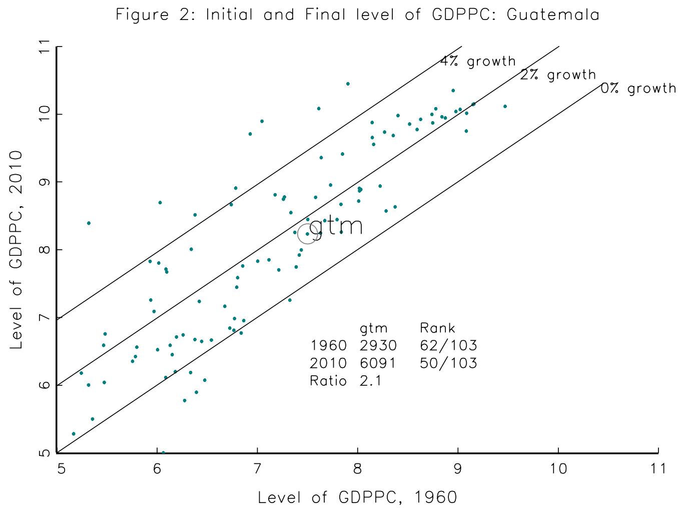


Figure 2: Initial and Final level of GDPPC: Guatemala
Level of GDPPC, 2010
Level of GDPPC, 1960
4% growth
2% growth
0% growth
gtm
gtm Rank
1960 2930 62/103
2010 6091 50/103
Ratio 2.1

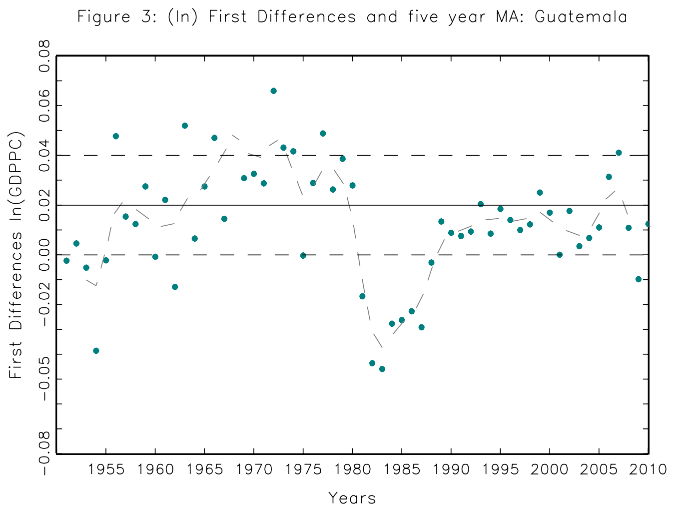


Figure 3: (ln) First Differences and five year MA: Guatemala
First Differences ln(GDPPC)
Years

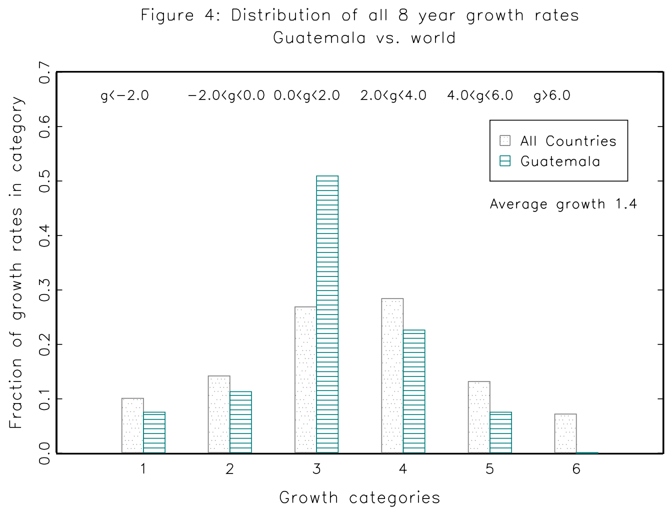


Figure 4: Distribution of all 8 year growth rates
Guatemala vs. world
Fraction of growth rates in category
Growth categories
g<−2.0 −2.0<g<0.0 0.0<g<2.0 2.0<g<4.0 4.0<g<6.0 g>6.0
All Countries
Guatemala
Average growth 1.4

Guinea

Figure 1: Overall, ten, and five year growth rates: Guinea

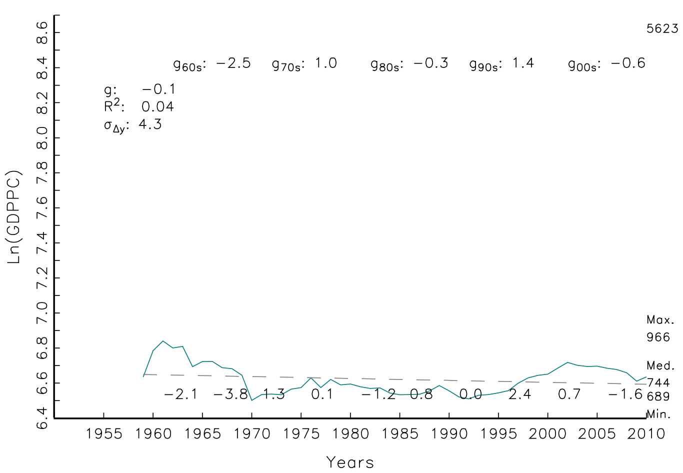


Figure 2: Initial and Final level of GDPPC: Guinea

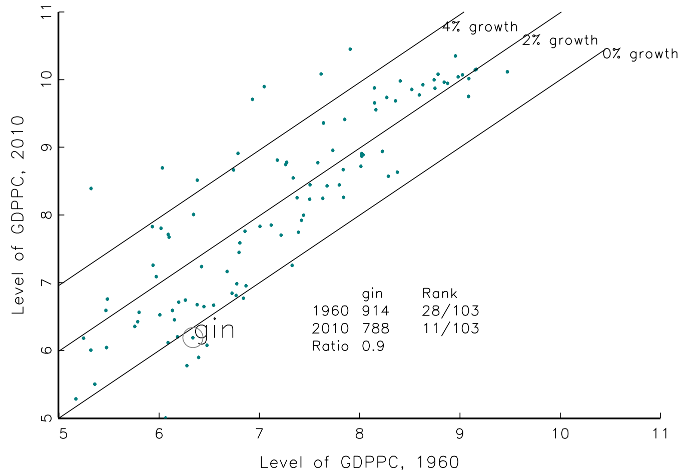


Figure 3: (ln) First Differences and five year MA: Guinea

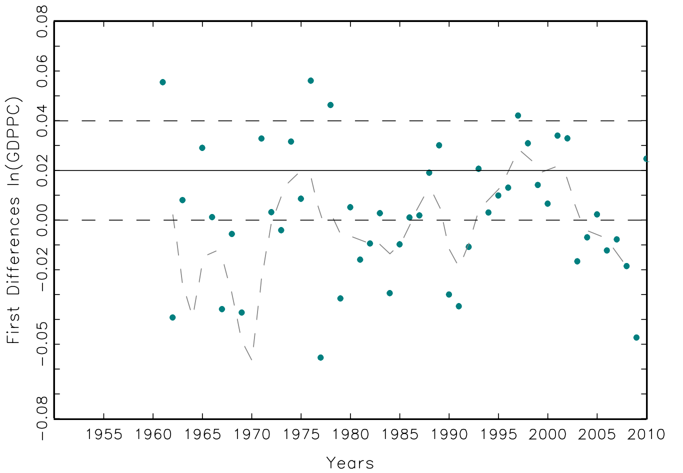
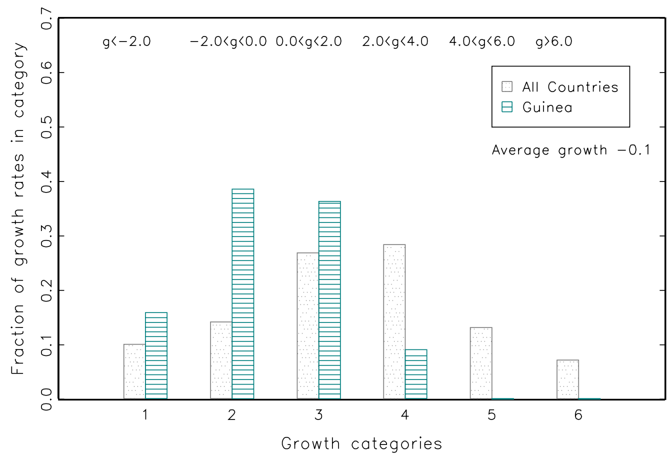


Figure 4: Distribution of all 8 year growth rates Guinea vs. world



Guinea-Bissau

Figure 1: Overall, ten, and five year growth rates: Guinea–Bissau

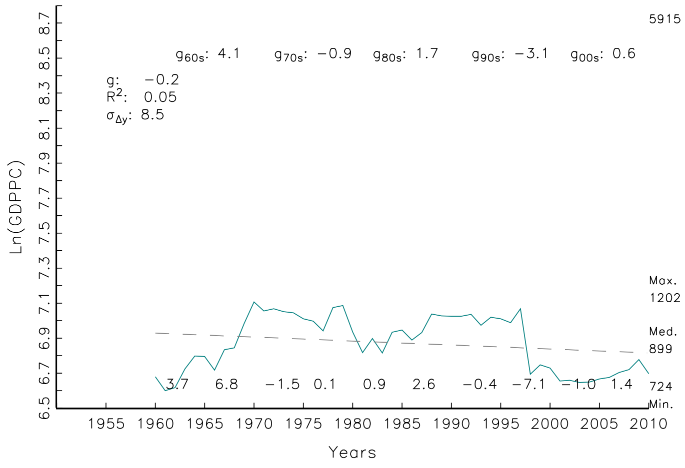


Figure 2: Initial and Final level of GDPPC: Guinea–Bissau

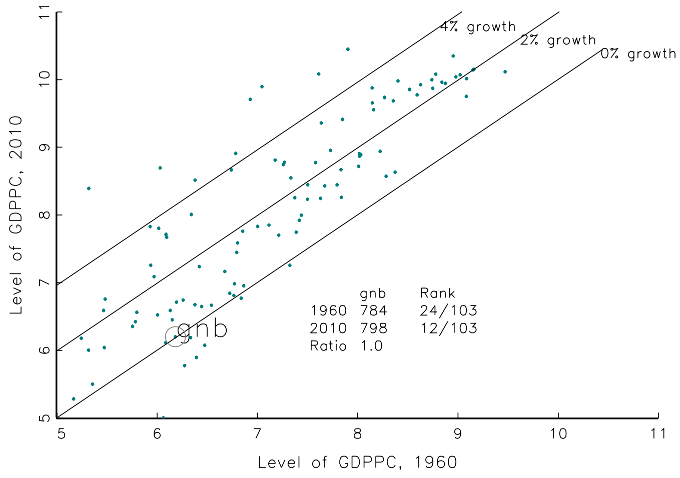


Figure 3: (ln) First Differences and five year MA: Guinea–Bissau

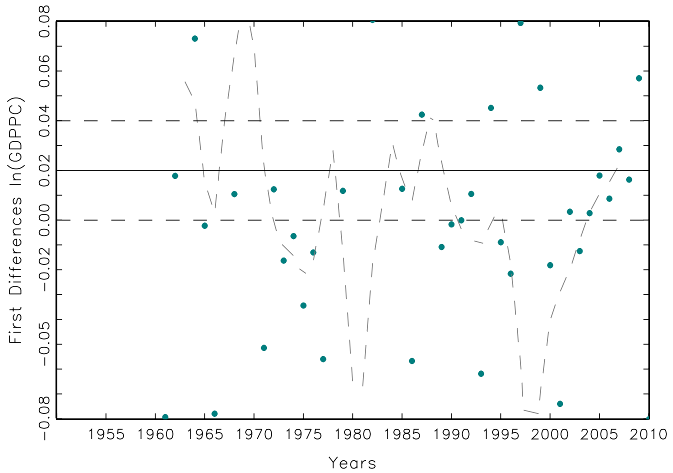
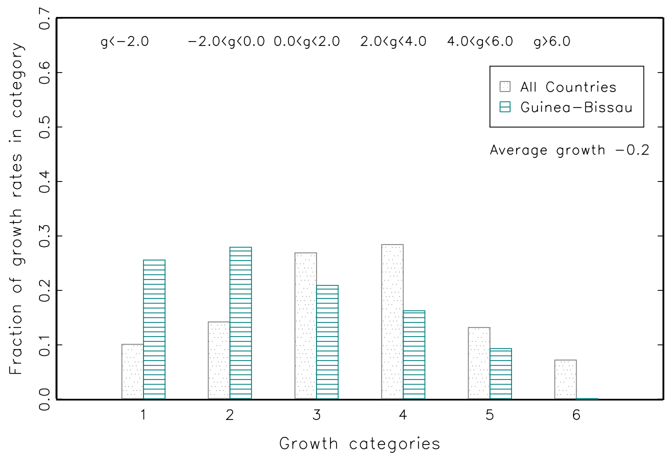


Figure 4: Distribution of all 8 year growth rates Guinea–Bissau vs. world



Guyana

Figure 1: Overall, ten, and five year growth rates: Guyana

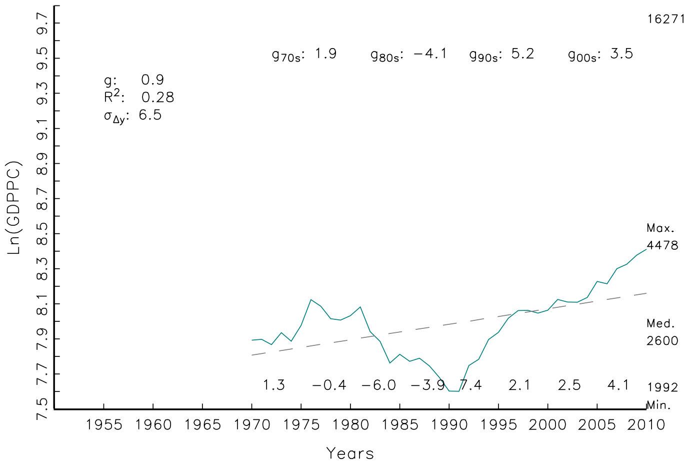


Figure 2: Initial and Final level of GDPPC: Guyana

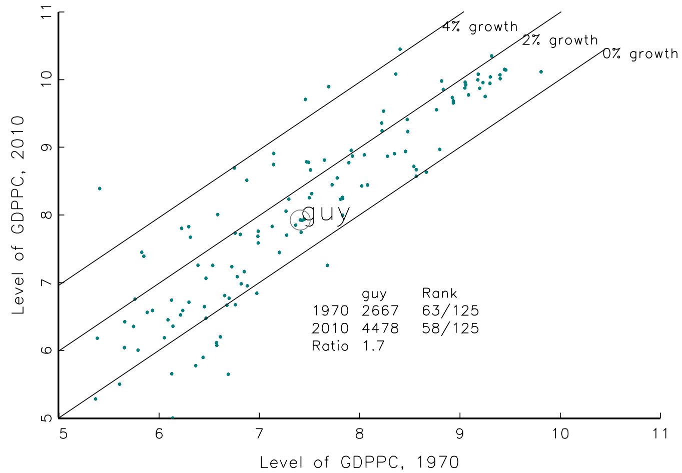


Figure 3: (ln) First Differences and five year MA: Guyana

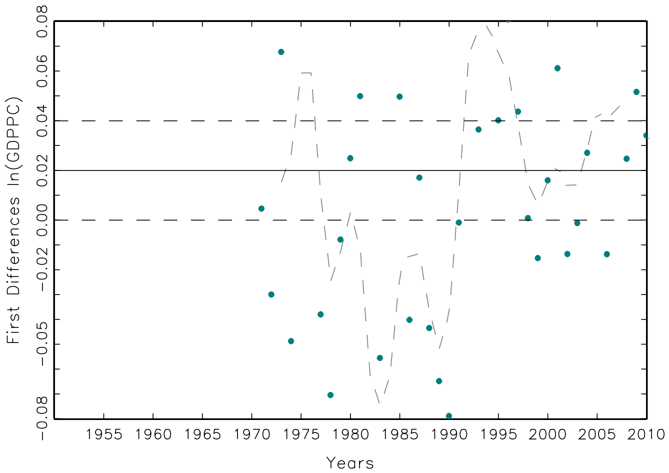
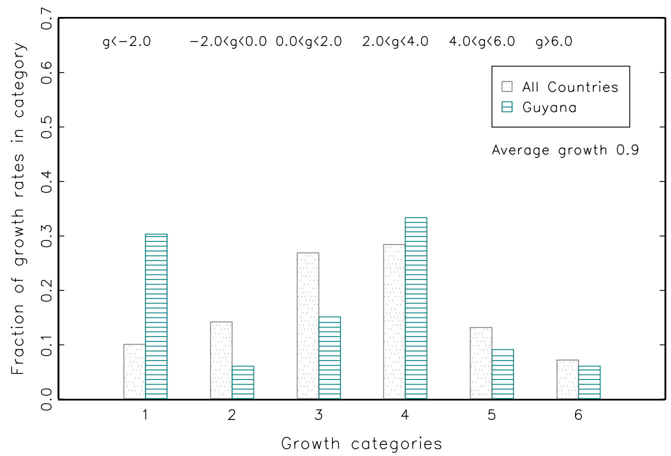


Figure 4: Distribution of all 8 year growth rates
Guyana vs. world



Haiti

Figure 1: Overall, ten, and five year growth rates: Haiti

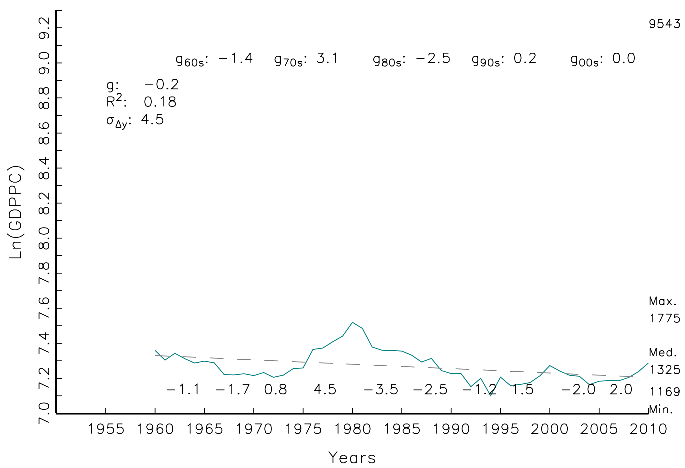


Figure 2: Initial and Final level of GDPPC: Haiti

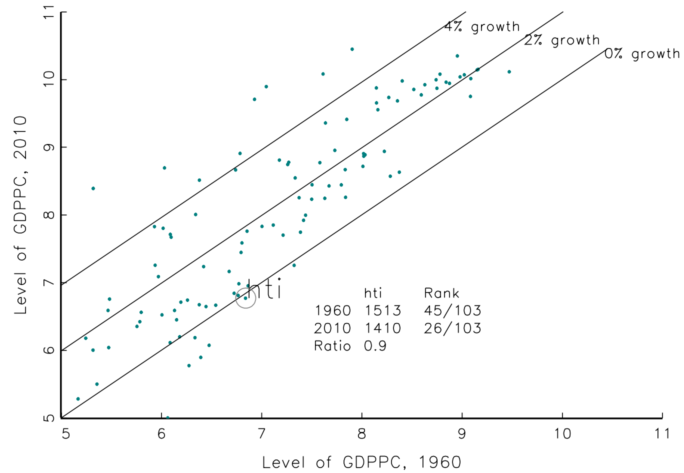


Figure 3: (ln) First Differences and five year MA: Haiti

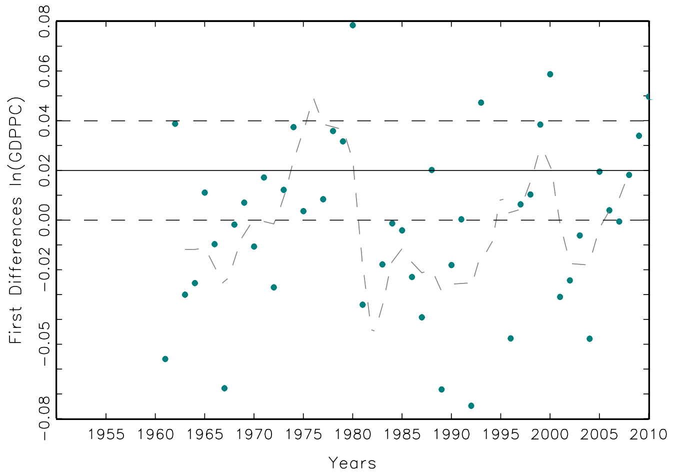
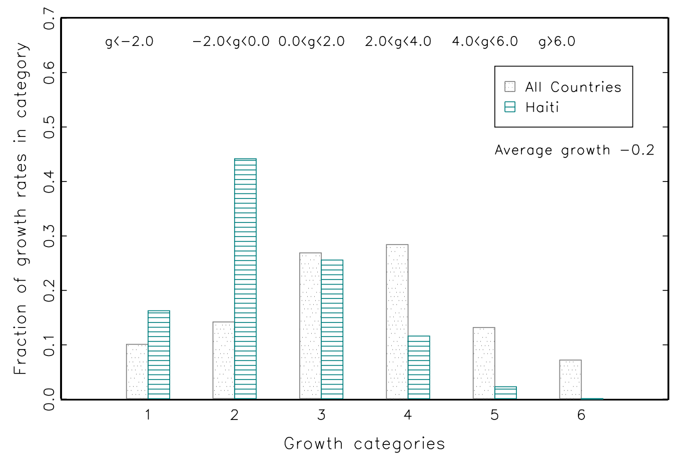


Figure 4: Distribution of all 8 year growth rates
Haiti vs. world



Honduras

Figure 1: Overall, ten, and five year growth rates: Honduras

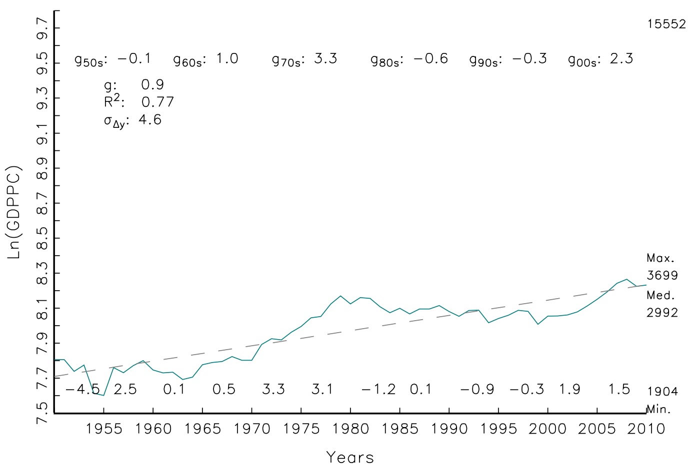


Figure 2: Initial and Final level of GDPPC: Honduras

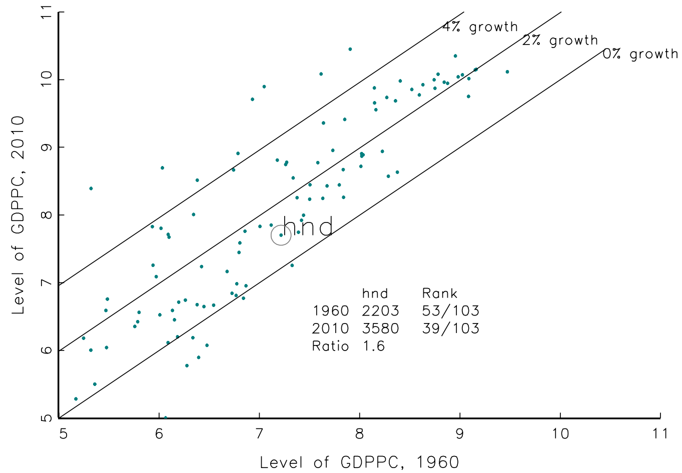


Figure 3: (ln) First Differences and five year MA: Honduras

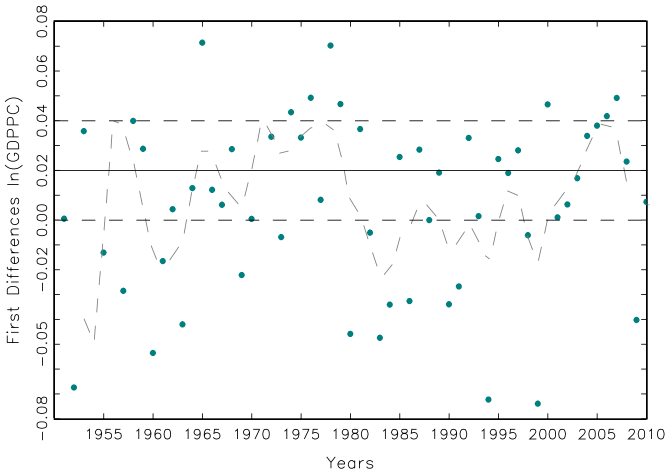
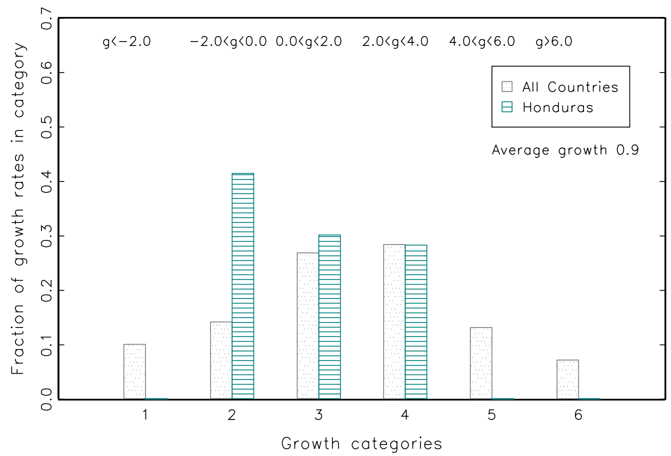


Figure 4: Distribution of all 8 year growth rates
Honduras vs. world



Hong Kong SAR, China

Figure 1: Overall, ten, and five year growth rates: Hong Kong

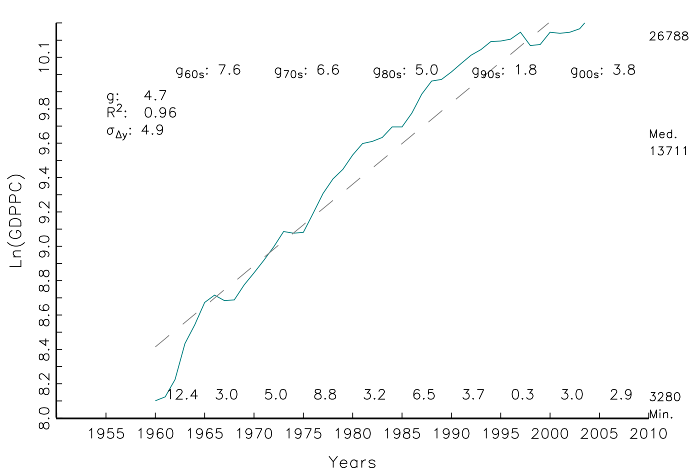


Figure 2: Initial and Final level of GDPPC: Hong Kong

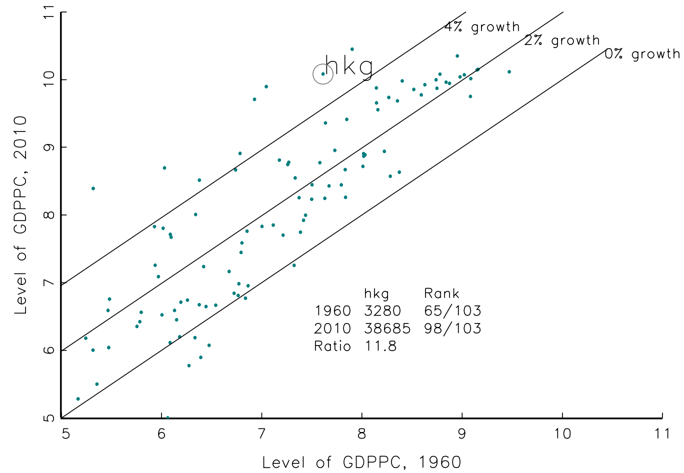


Figure 3: (ln) First Differences and five year MA: Hong Kong

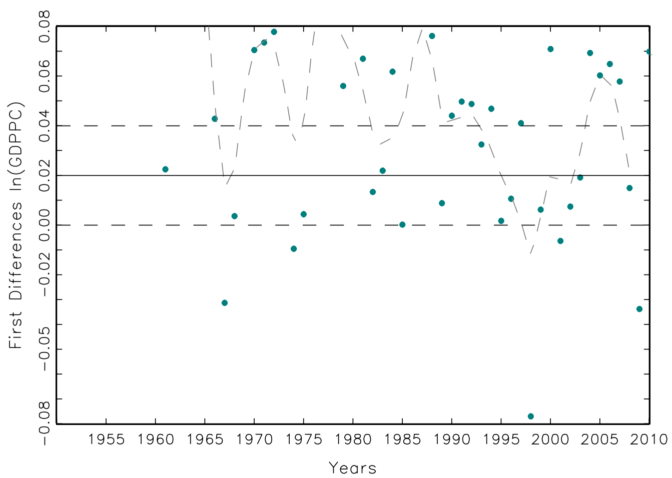
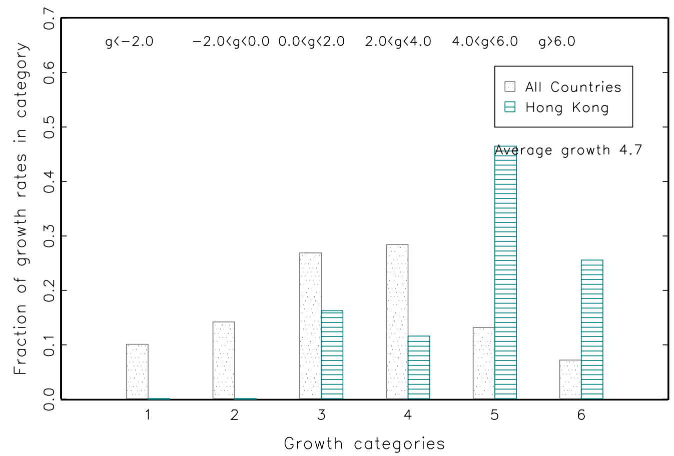


Figure 4: Distribution of all 8 year growth rates
Hong Kong vs. world



Hungary

Figure 1: Overall, ten, and five year growth rates: Hungary

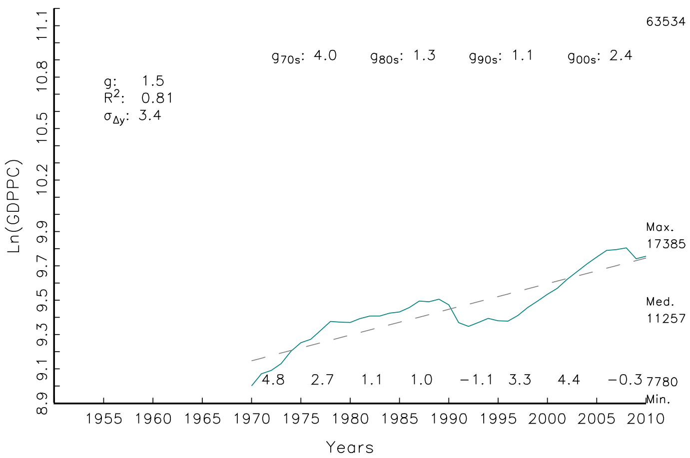


Figure 2: Initial and Final level of GDPPC: Hungary

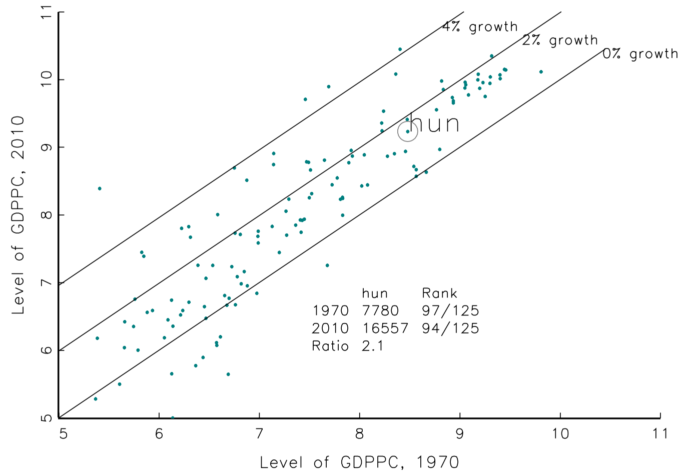


Figure 3: (ln) First Differences and five year MA: Hungary

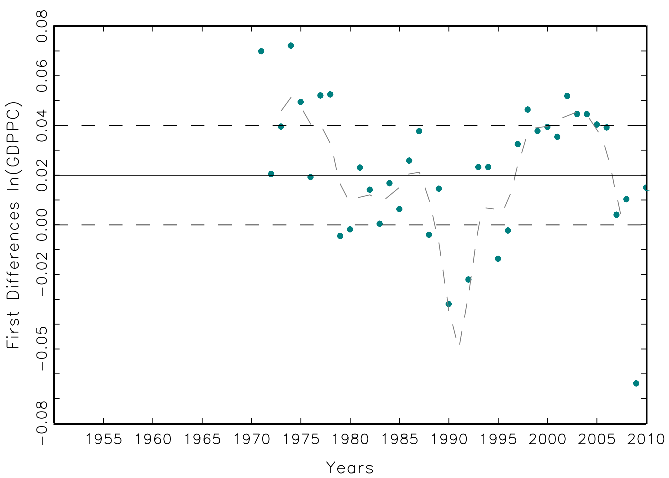
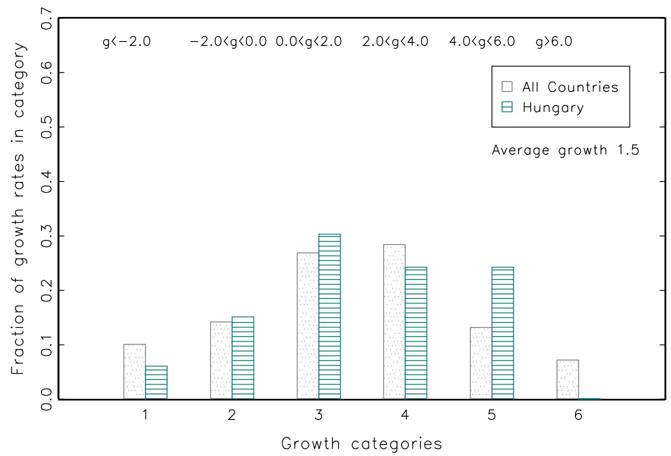


Figure 4: Distribution of all 8 year growth rates
Hungary vs. world



India

Figure 1: Overall, ten, and five year growth rates: India

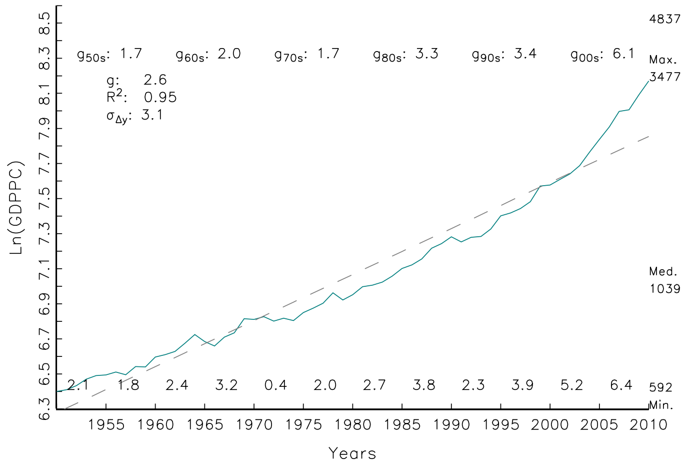


Figure 2: Initial and Final level of GDPPC: India

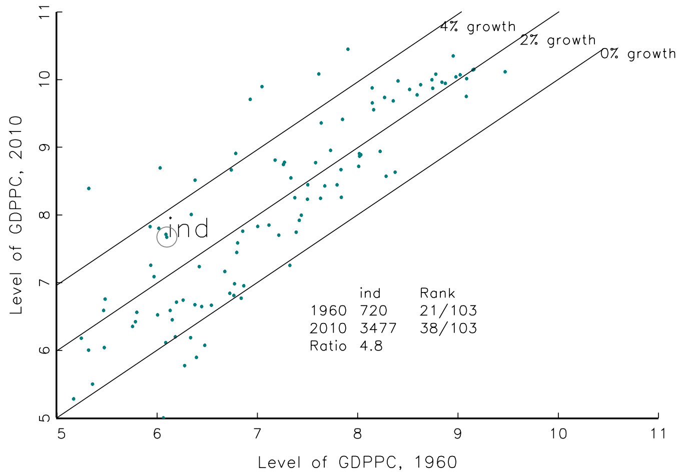


Figure 3: (ln) First Differences and five year MA: India

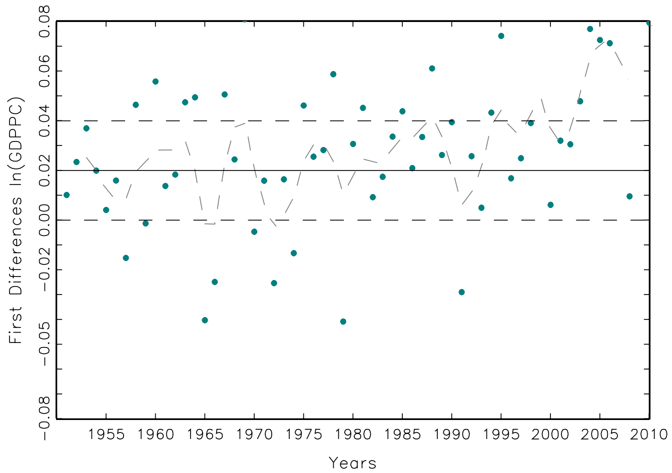
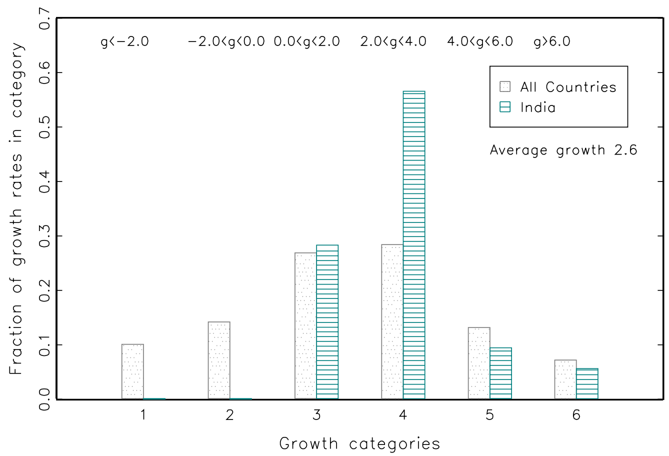


Figure 4: Distribution of all 8 year growth rates
India vs. world



Indonesia

Figure 1: Overall, ten, and five year growth rates: Indonesia

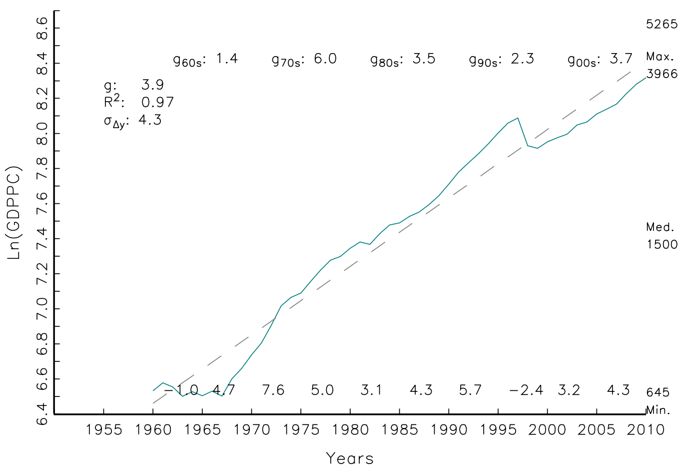


Figure 2: Initial and Final level of GDPPC: Indonesia

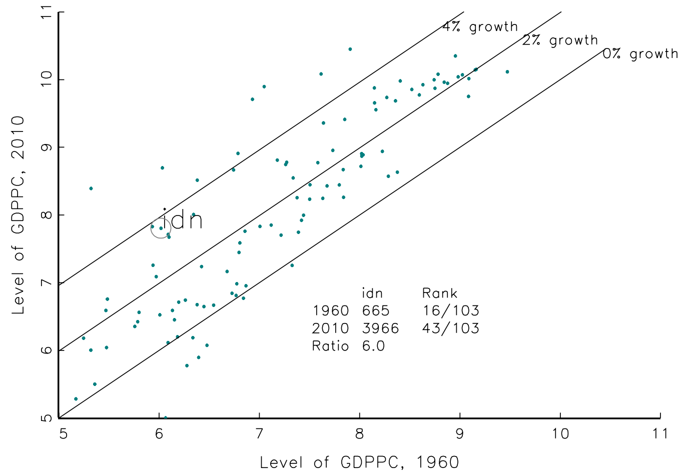


Figure 3: (ln) First Differences and five year MA: Indonesia

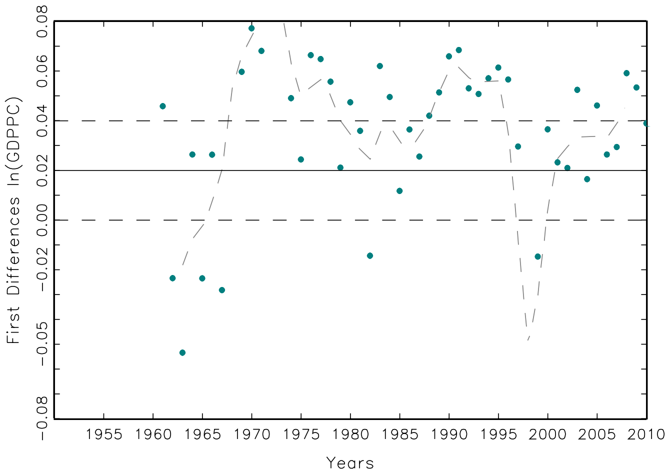
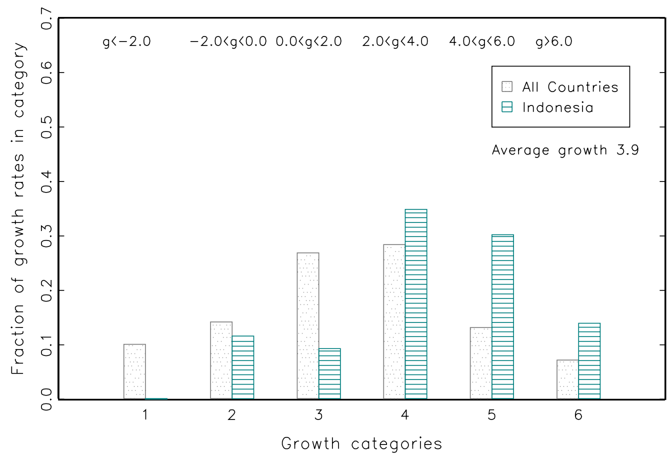


Figure 4: Distribution of all 8 year growth rates
Indonesia vs. world



Iran, Islamic Rep.

Figure 1: Overall, ten, and five year growth rates: Iran

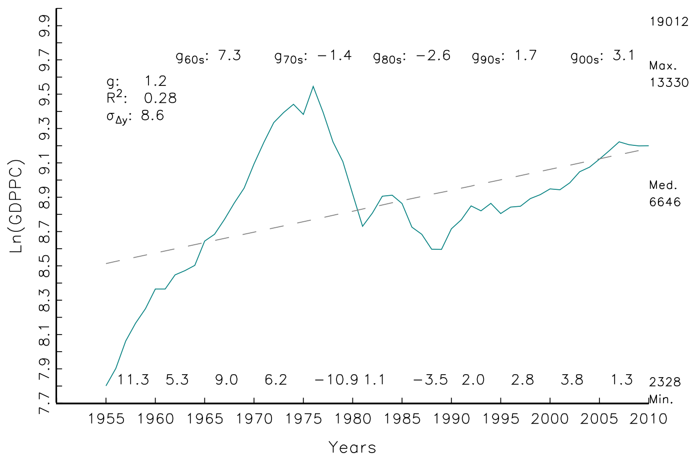


Figure 2: Initial and Final level of GDPPC: Iran

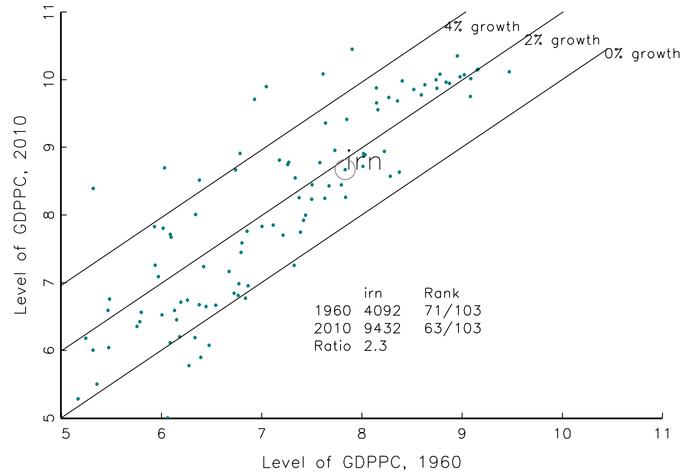


Figure 3: (ln) First Differences and five year MA: Iran

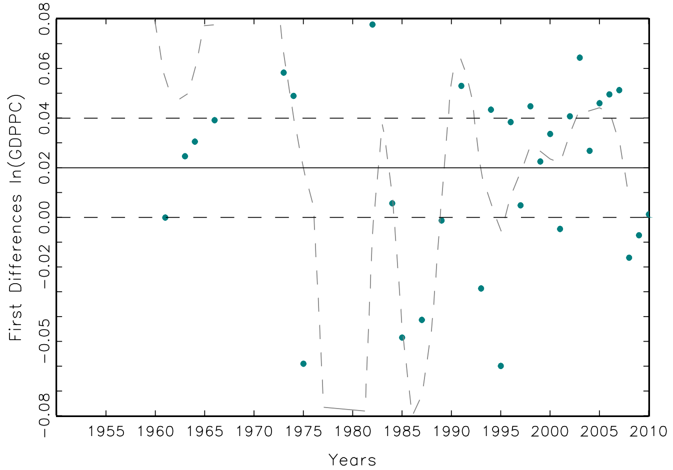
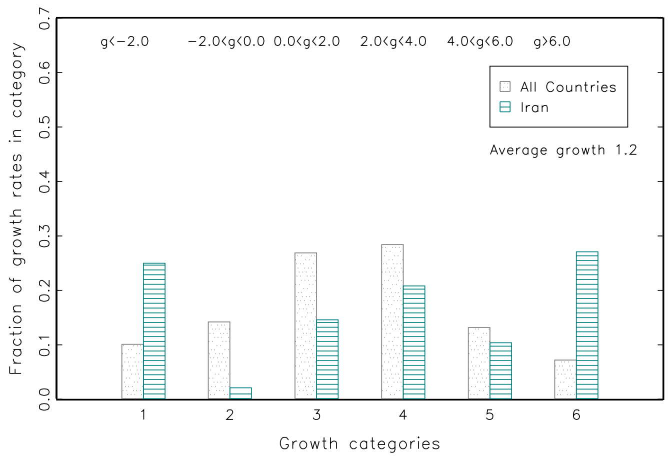


Figure 4: Distribution of all 8 year growth rates
Iran vs. world



Iraq

Figure 1: Overall, ten, and five year growth rates: Iraq

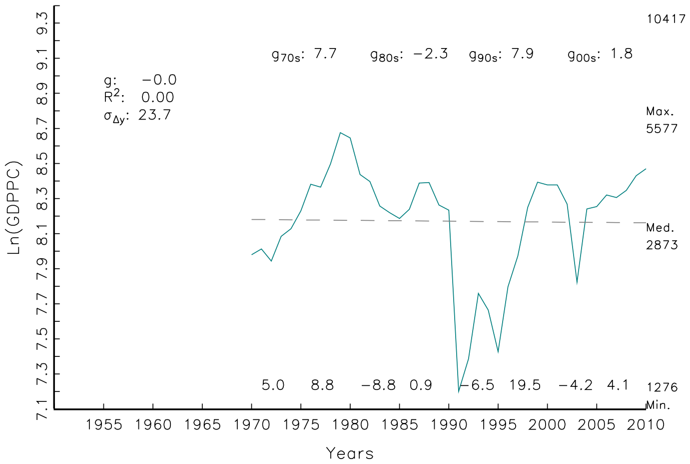


Figure 2: Initial and Final level of GDPPC: Iraq

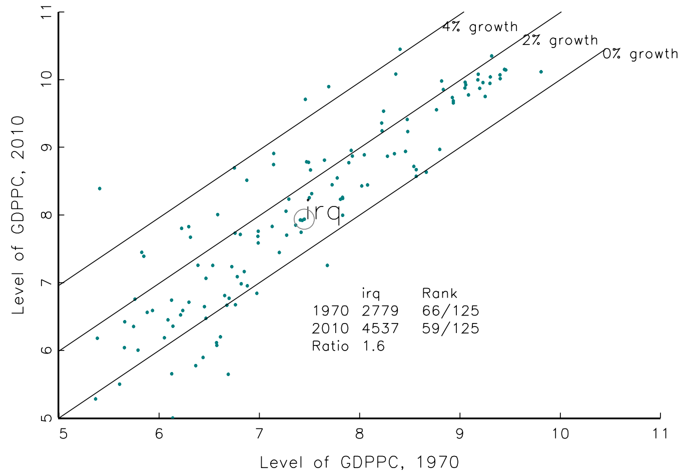


Figure 3: (ln) First Differences and five year MA: Iraq

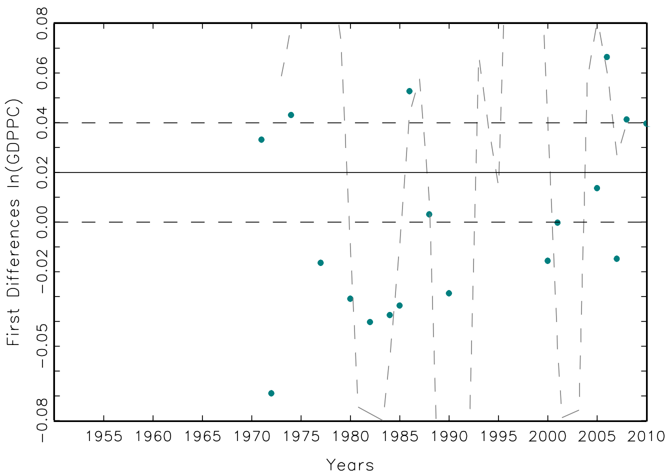
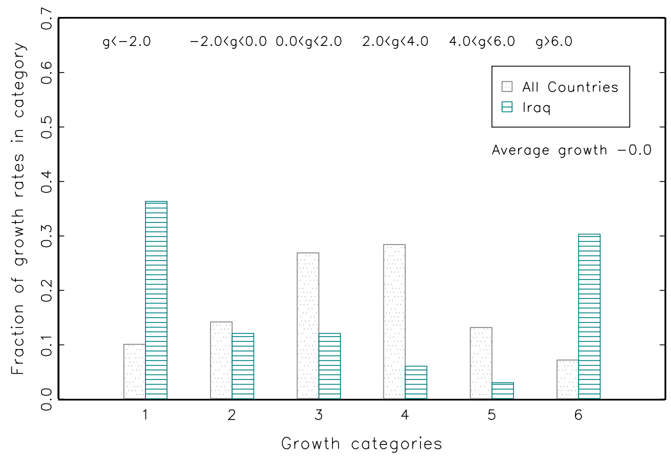


Figure 4: Distribution of all 8 year growth rates
Iraq vs. world



Ireland

Figure 1: Overall, ten, and five year growth rates: Ireland

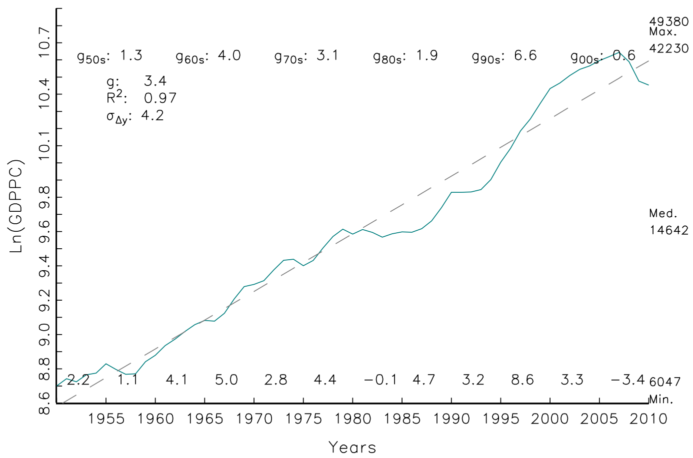


Figure 2: Initial and Final level of GDPPC: Ireland

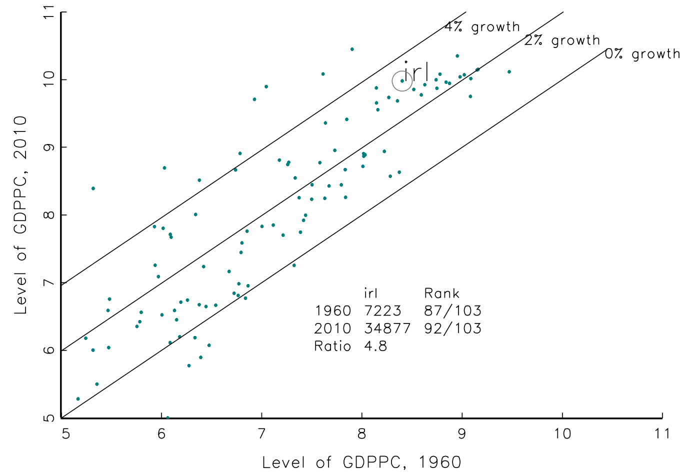


Figure 3: (ln) First Differences and five year MA: Ireland

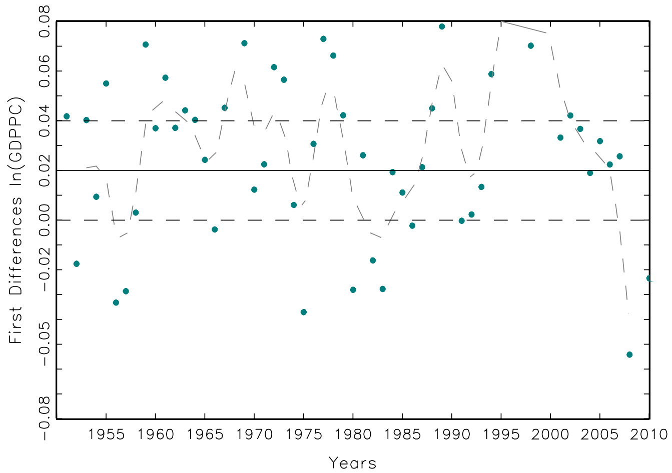
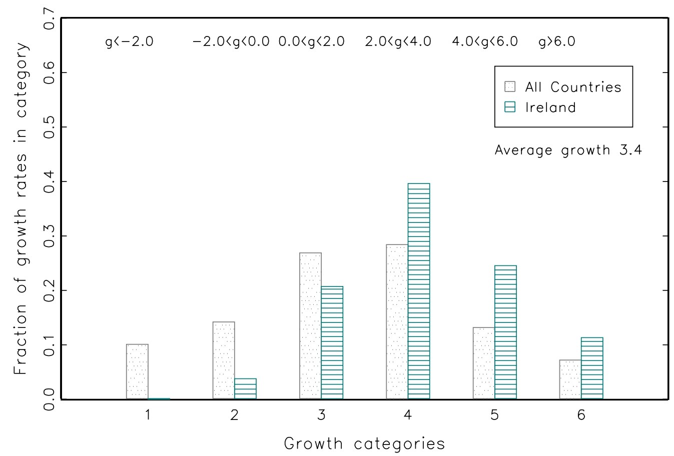


Figure 4: Distribution of all 8 year growth rates
Ireland vs. world



Israel

Figure 1: Overall, ten, and five year growth rates: Israel

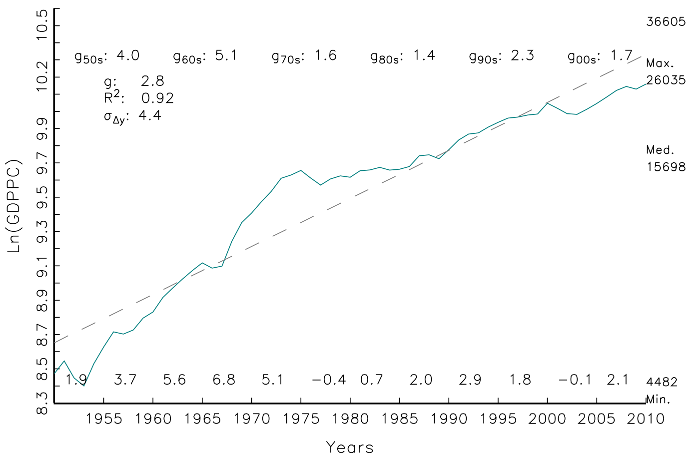


Figure 2: Initial and Final level of GDPPC: Israel

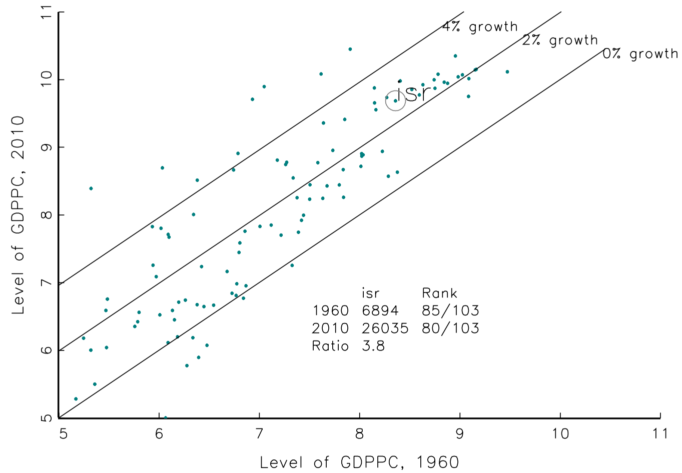


Figure 3: (ln) First Differences and five year MA: Israel

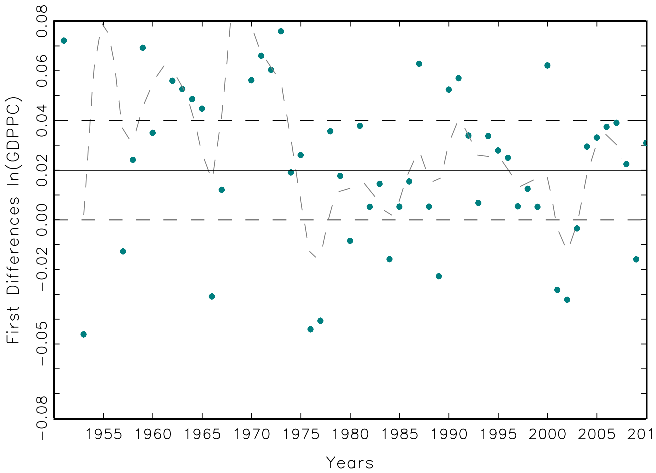
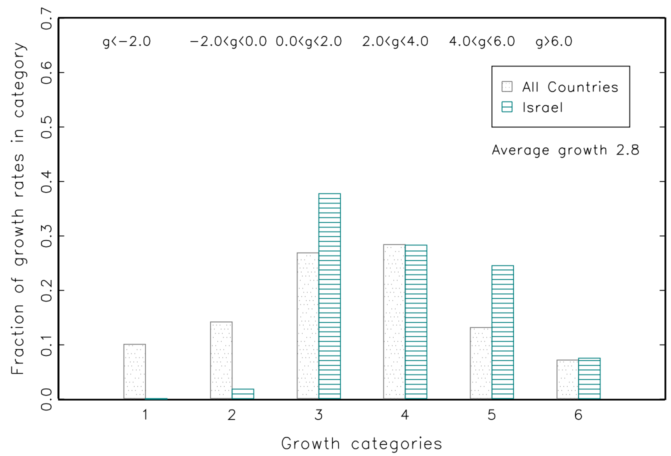


Figure 4: Distribution of all 8 year growth rates
Israel vs. world



Italy

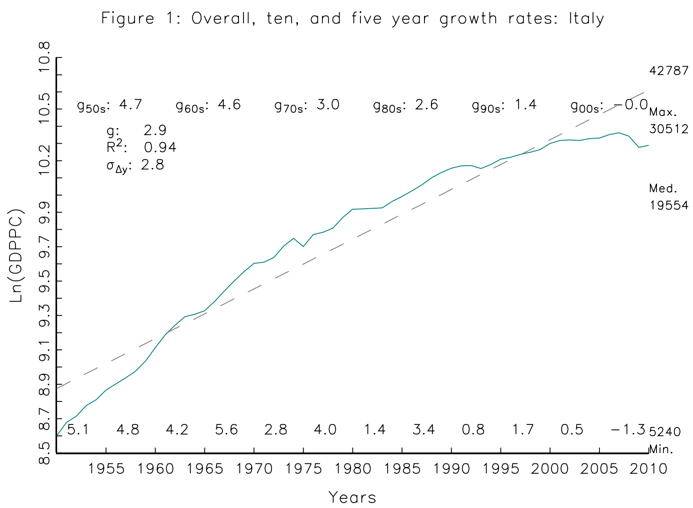


Figure 1: Overall, ten, and five year growth rates: Italy
g_{50s}: 4.7 g_{60s}: 4.6 g_{70s}: 3.0 g_{80s}: 2.6 g_{90s}: 1.4 g_{00s}: −0.0
g: 2.9
R^2: 0.94
$\sigma_{\Delta y}$: 2.8
42787
Max. 30512
Med. 19554
5240 Min.
5.1 4.8 4.2 5.6 2.8 4.0 1.4 3.4 0.8 1.7 0.5 −1.3
Ln(GDPPC)
Years

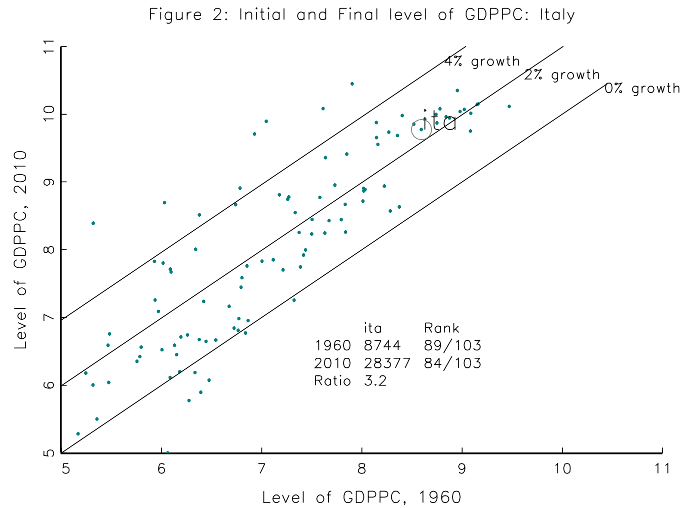


Figure 2: Initial and Final level of GDPPC: Italy
4% growth
2% growth
0% growth
ita Rank
1960 8744 89/103
2010 28377 84/103
Ratio 3.2
Level of GDPPC, 2010
Level of GDPPC, 1960

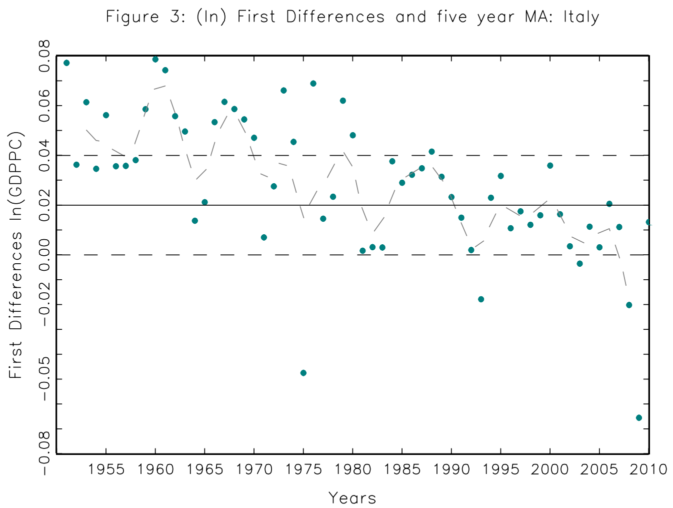


Figure 3: (ln) First Differences and five year MA: Italy
First Differences ln(GDPPC)
Years

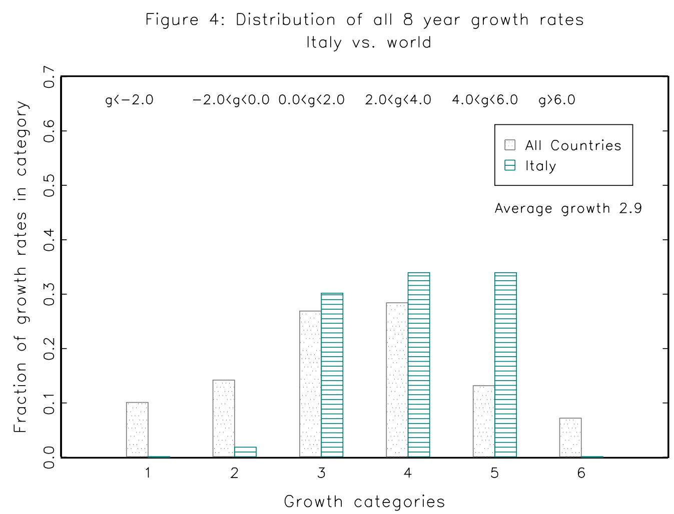


Figure 4: Distribution of all 8 year growth rates
Italy vs. world
g<−2.0 −2.0<g<0.0 0.0<g<2.0 2.0<g<4.0 4.0<g<6.0 g>6.0
All Countries
Italy
Average growth 2.9
Fraction of growth rates in category
Growth categories

Jamaica

Figure 1: Overall, ten, and five year growth rates: Jamaica

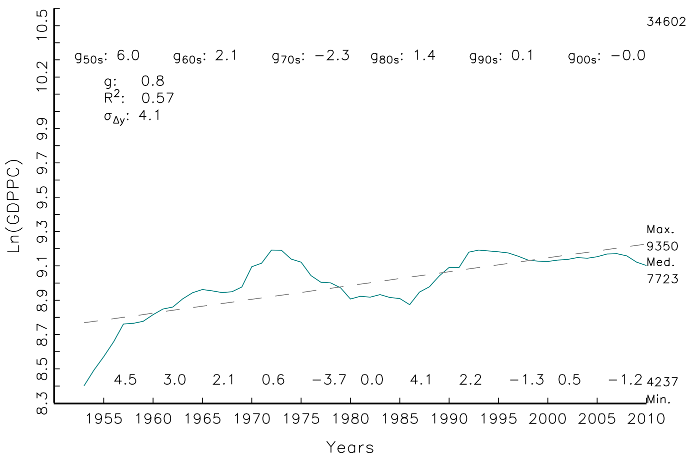


Figure 2: Initial and Final level of GDPPC: Jamaica

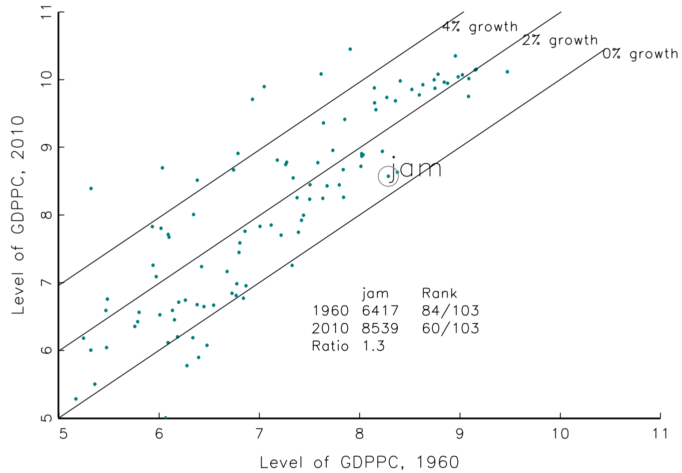


Figure 3: (ln) First Differences and five year MA: Jamaica

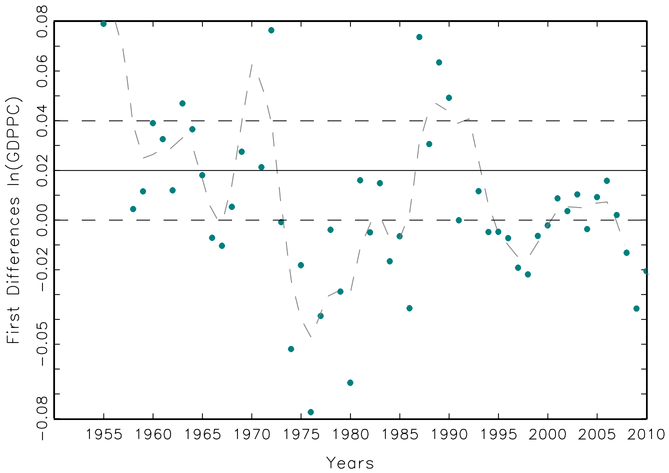
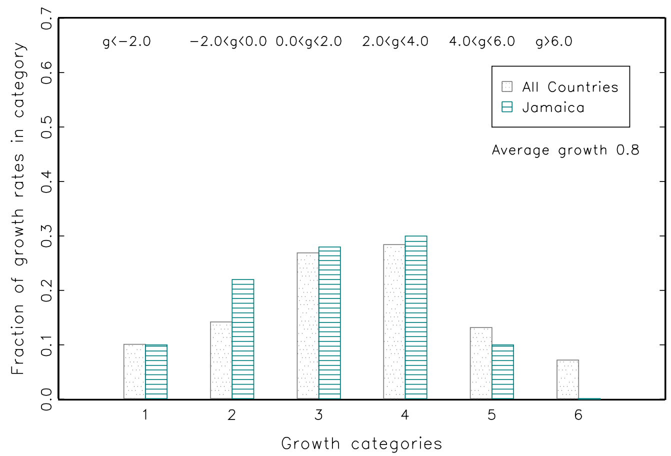


Figure 4: Distribution of all 8 year growth rates
Jamaica vs. world



Japan

Figure 1: Overall, ten, and five year growth rates: Japan

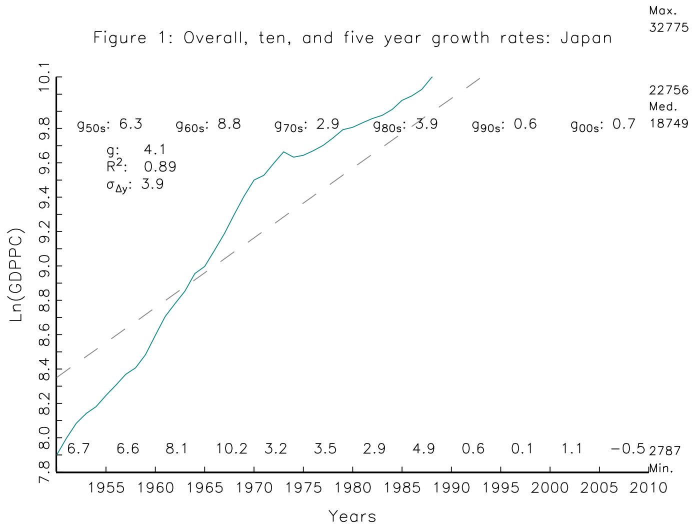


Figure 2: Initial and Final level of GDPPC: Japan

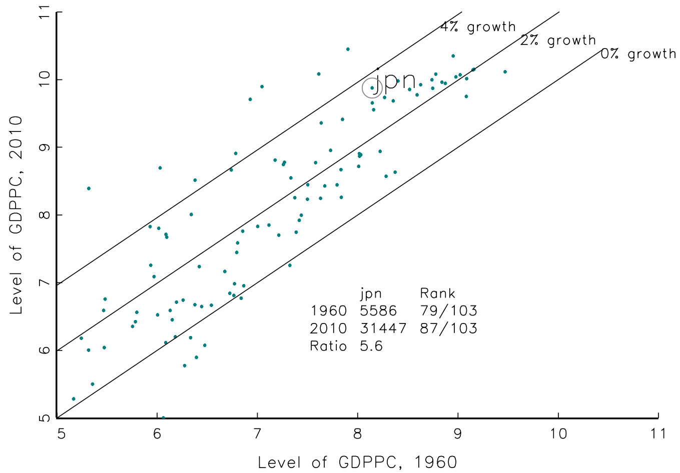


Figure 3: (ln) First Differences and five year MA: Japan

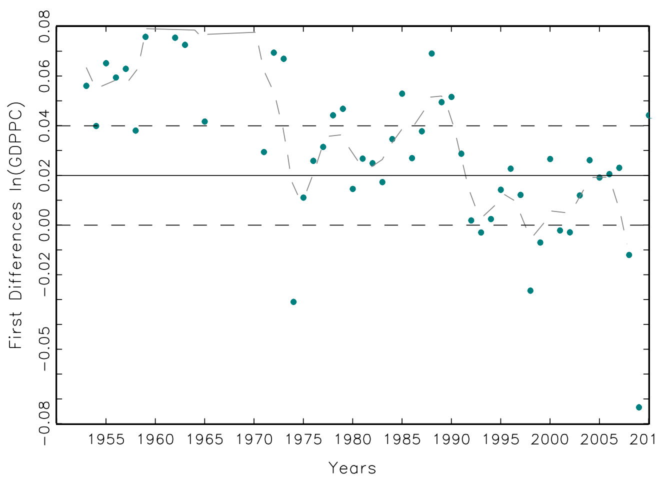
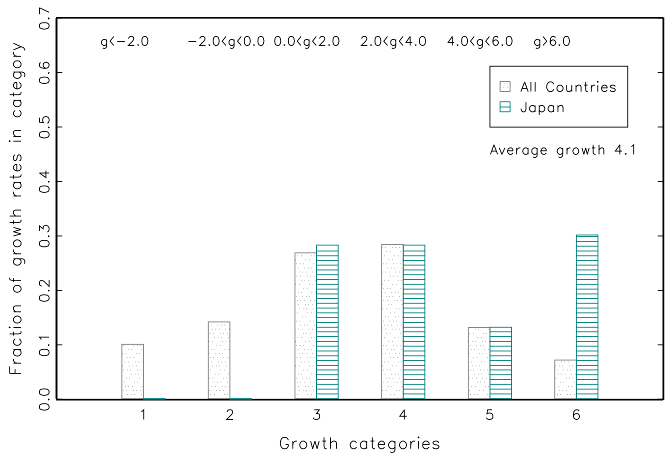


Figure 4: Distribution of all 8 year growth rates
Japan vs. world



Jordan

Figure 1: Overall, ten, and five year growth rates: Jordan

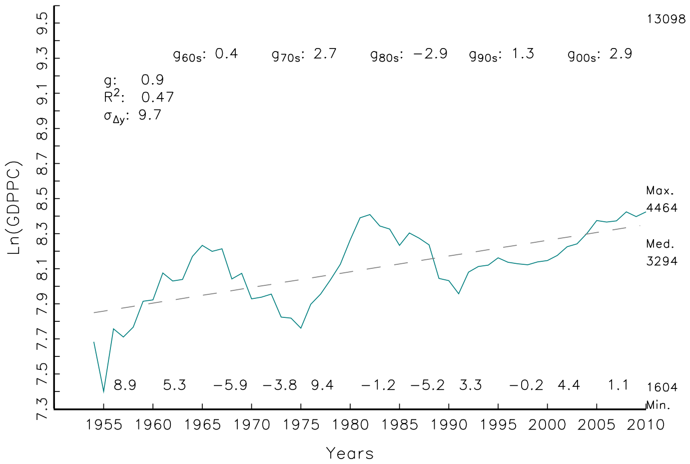


Figure 2: Initial and Final level of GDPPC: Jordan

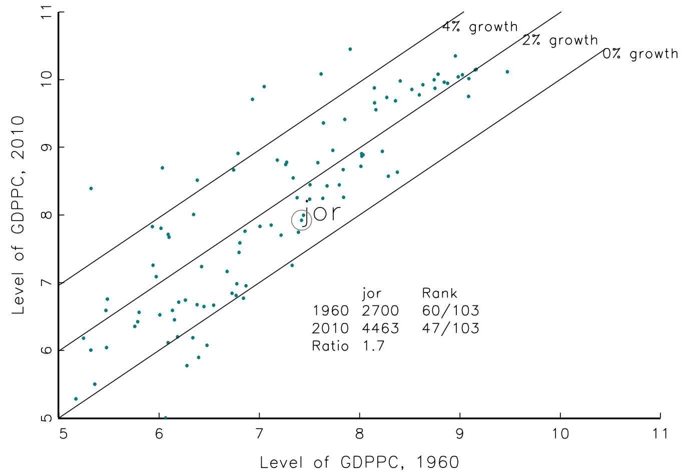


Figure 3: (ln) First Differences and five year MA: Jordan

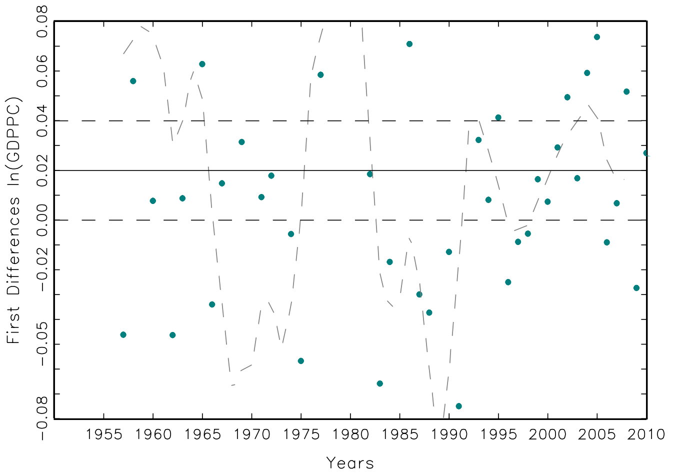
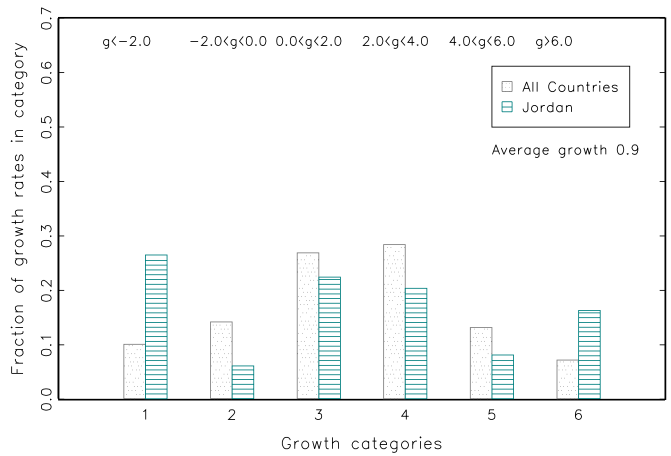


Figure 4: Distribution of all 8 year growth rates
Jordan vs. world



Kenya

Figure 1: Overall, ten, and five year growth rates: Kenya

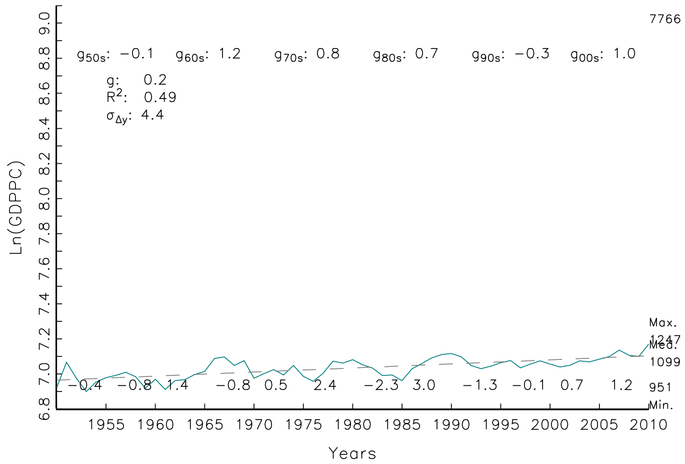


Figure 2: Initial and Final level of GDPPC: Kenya

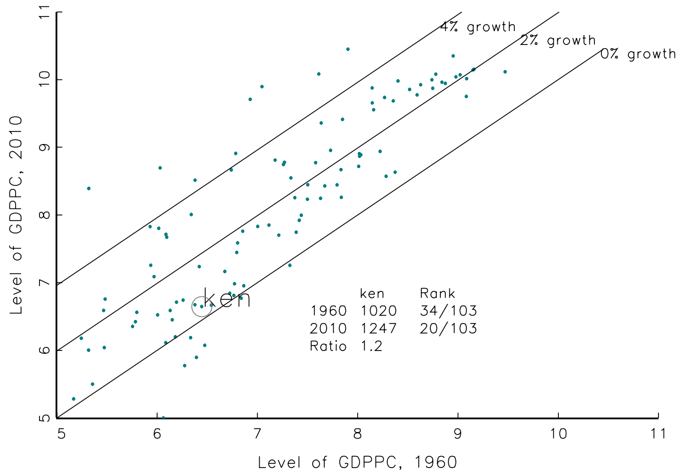


Figure 3: (ln) First Differences and five year MA: Kenya

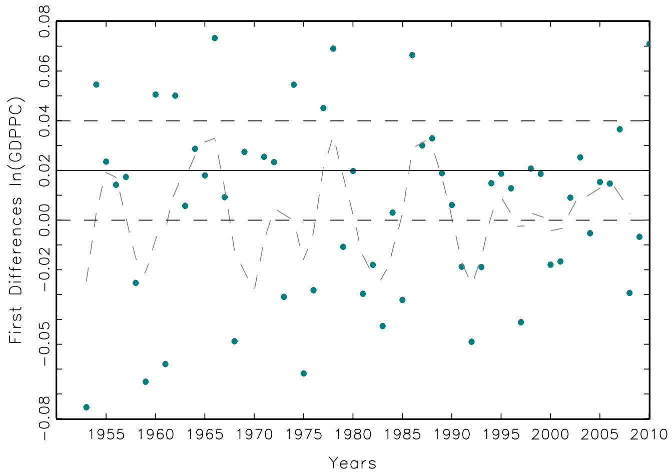
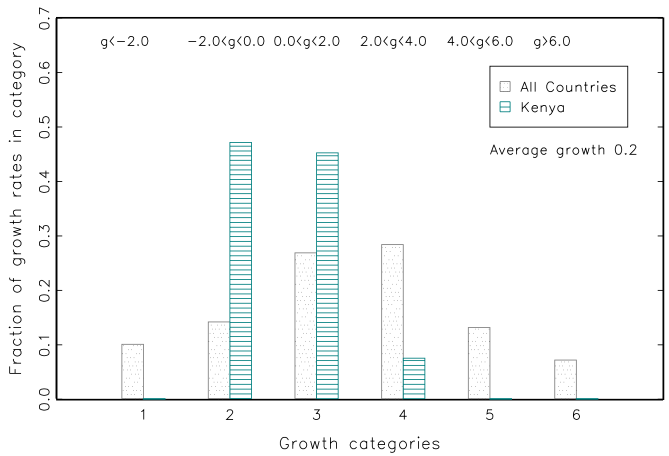


Figure 4: Distribution of all 8 year growth rates
Kenya vs. world



Korea, Rep.

Figure 1: Overall, ten, and five year growth rates: Korea, Republic of

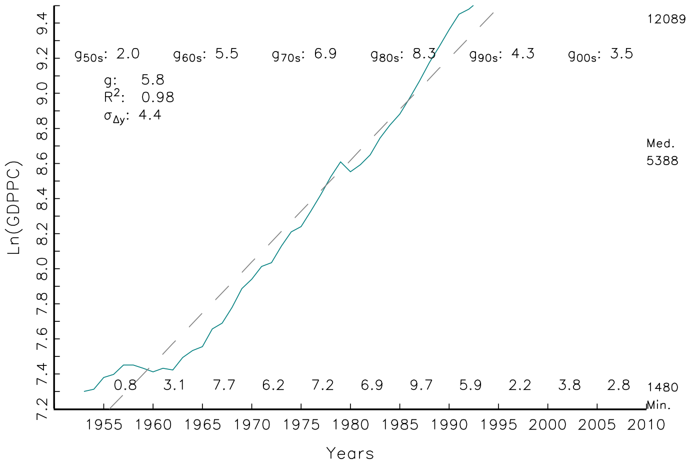


Figure 2: Initial and Final level of GDPPC: Korea, Republic of

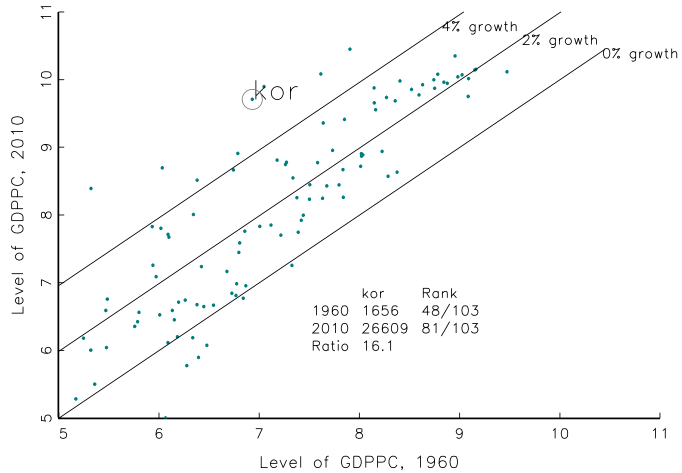


Figure 3: (ln) First Differences and five year MA: Korea, Republic of

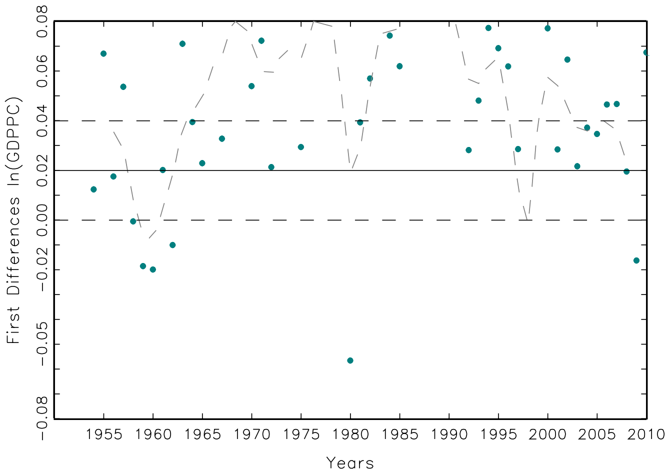
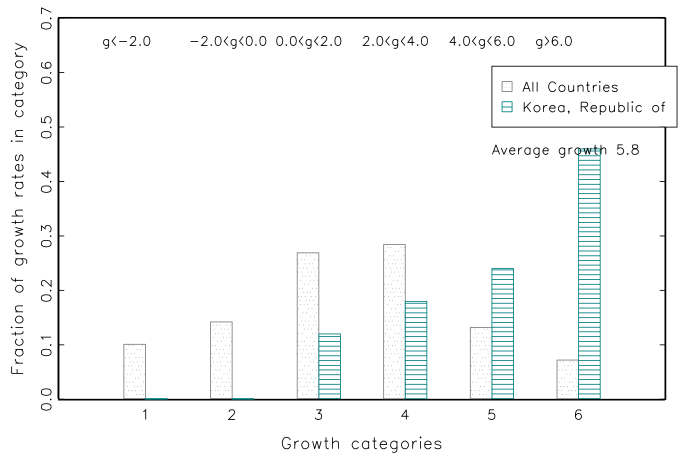


Figure 4: Distribution of all 8 year growth rates
Korea, Republic of vs. world



Lao PDR

Figure 1: Overall, ten, and five year growth rates: Laos

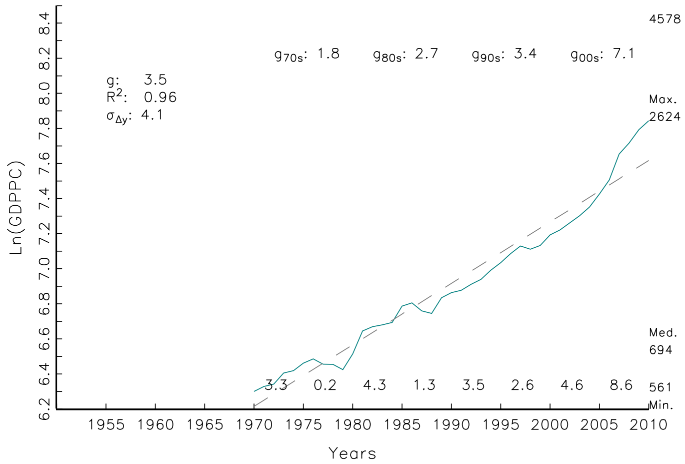


Figure 2: Initial and Final level of GDPPC: Laos

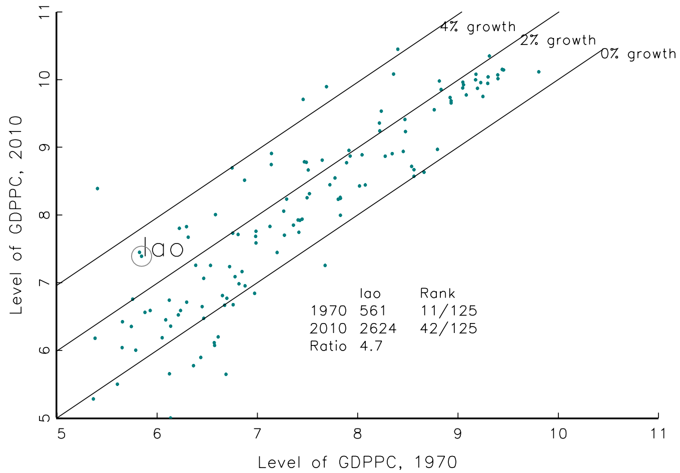


Figure 3: (ln) First Differences and five year MA: Laos

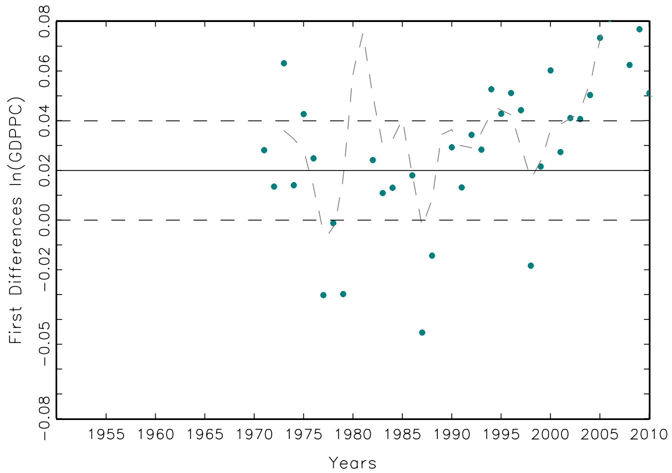
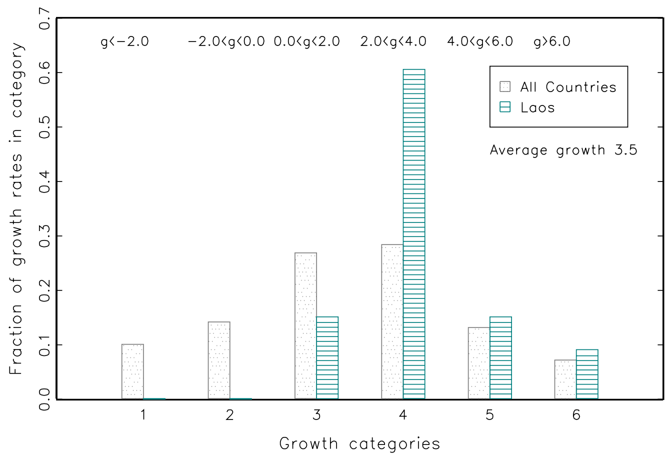


Figure 4: Distribution of all 8 year growth rates
Laos vs. world



Lebanon

Figure 1: Overall, ten, and five year growth rates: Lebanon

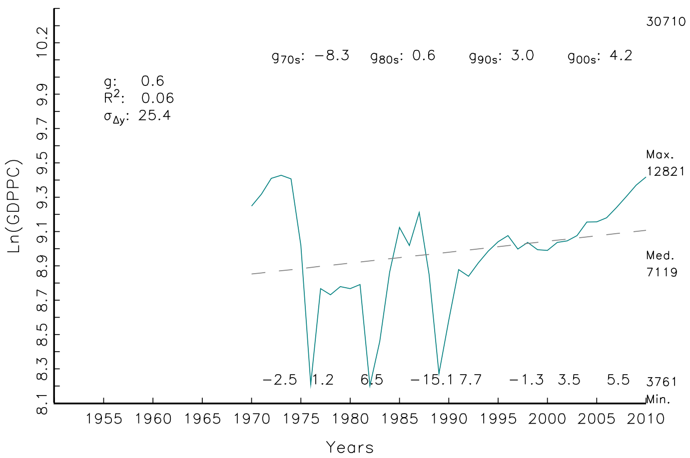


Figure 2: Initial and Final level of GDPPC: Lebanon

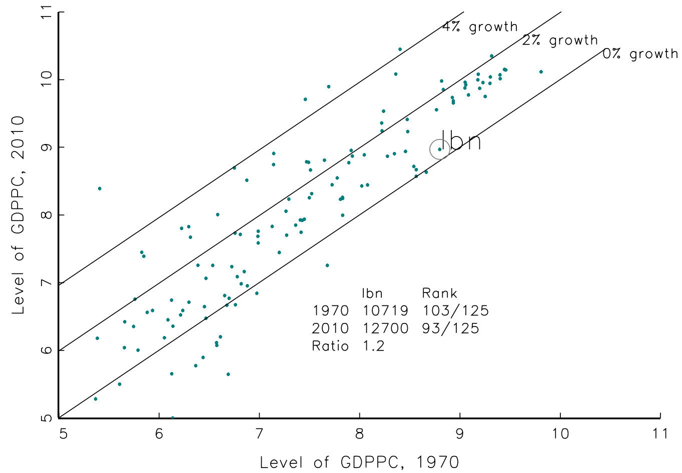


Figure 3: (ln) First Differences and five year MA: Lebanon

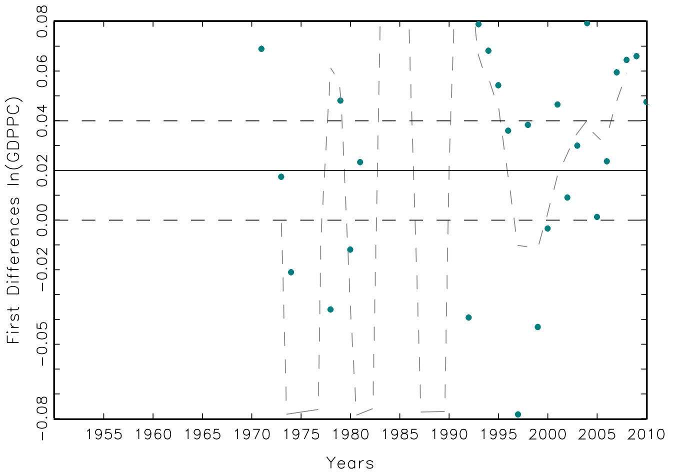
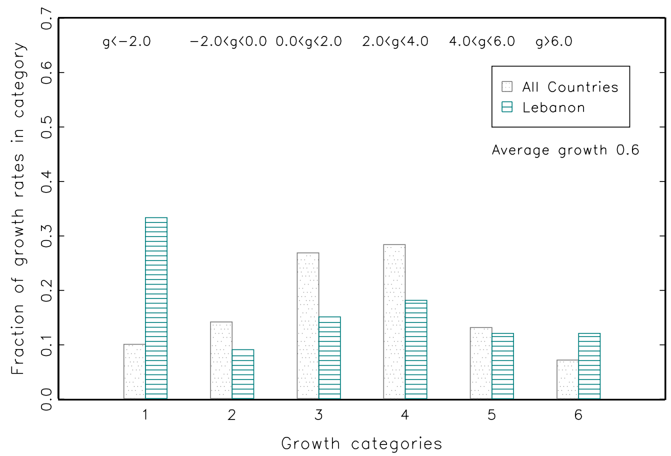


Figure 4: Distribution of all 8 year growth rates
Lebanon vs. world



Lesotho

Figure 1: Overall, ten, and five year growth rates: Lesotho

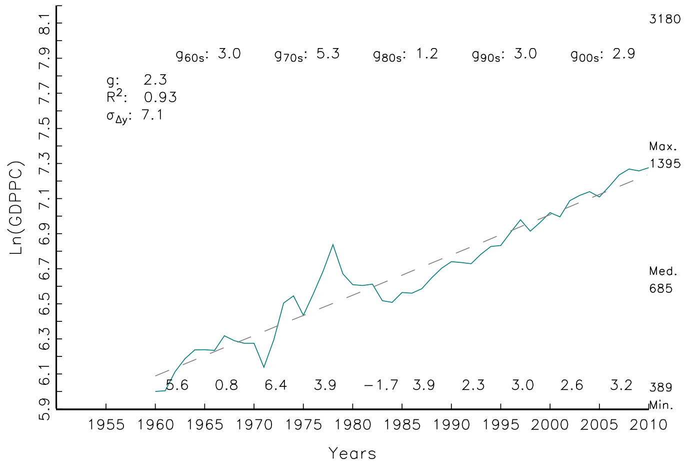


Figure 2: Initial and Final level of GDPPC: Lesotho

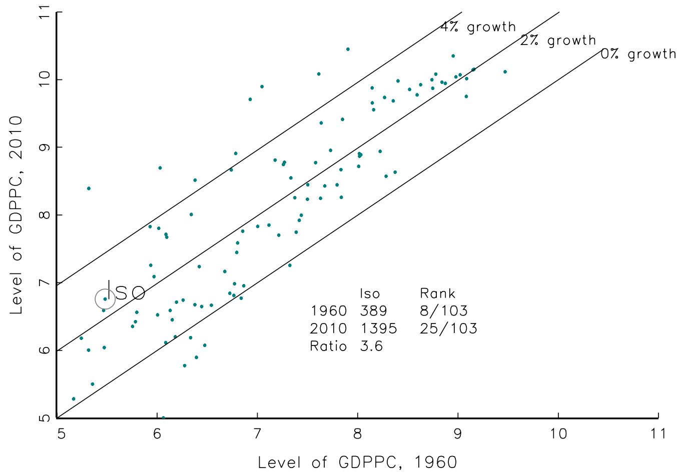


Figure 3: (ln) First Differences and five year MA: Lesotho

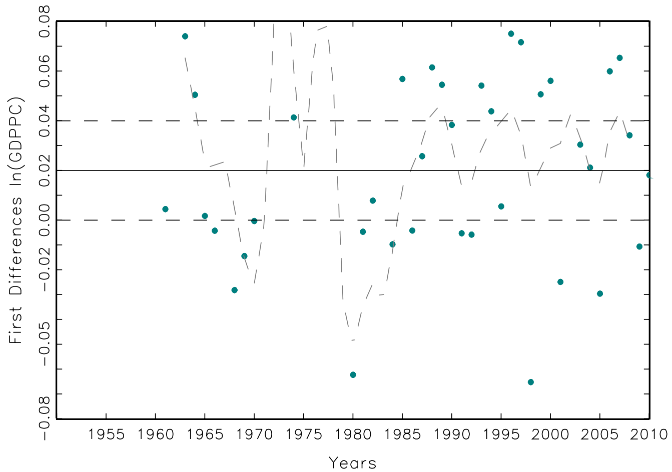
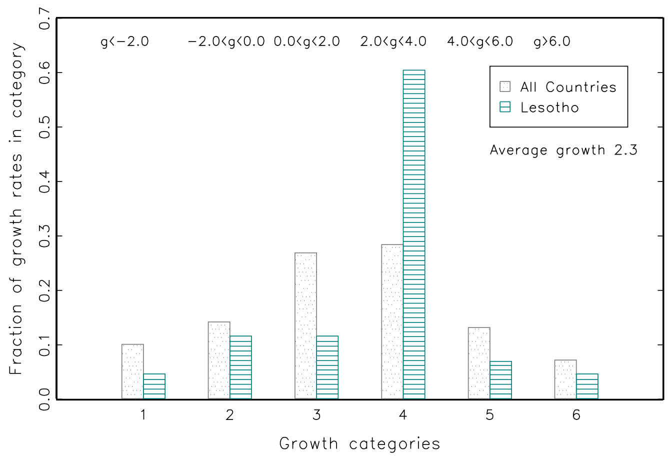


Figure 4: Distribution of all 8 year growth rates
Lesotho vs. world



Liberia

Figure 1: Overall, ten, and five year growth rates: Liberia

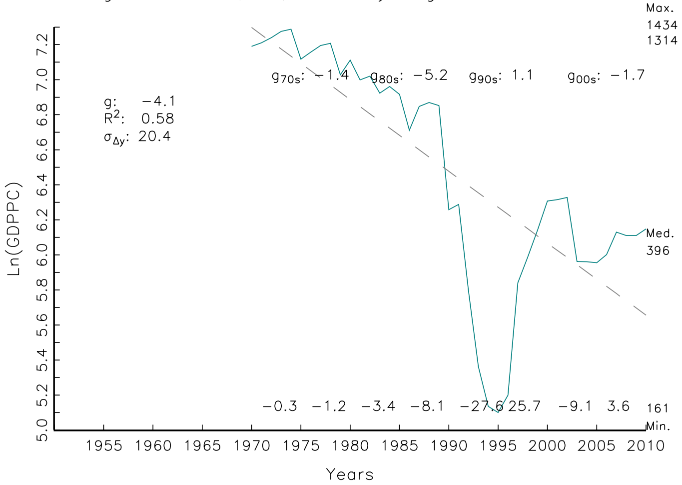


Figure 2: Initial and Final level of GDPPC: Liberia

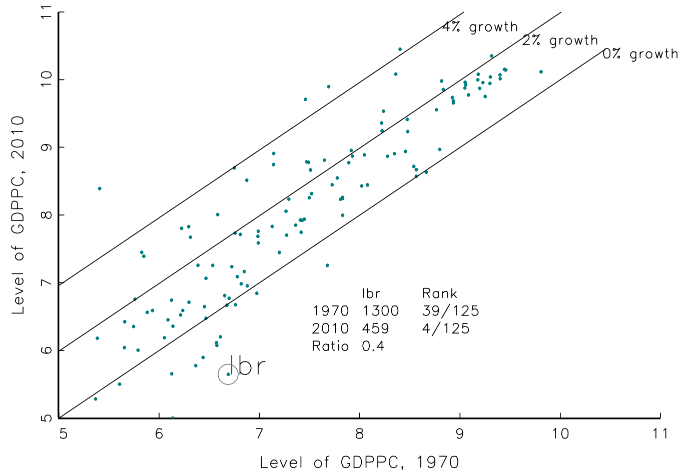


Figure 3: (ln) First Differences and five year MA: Liberia

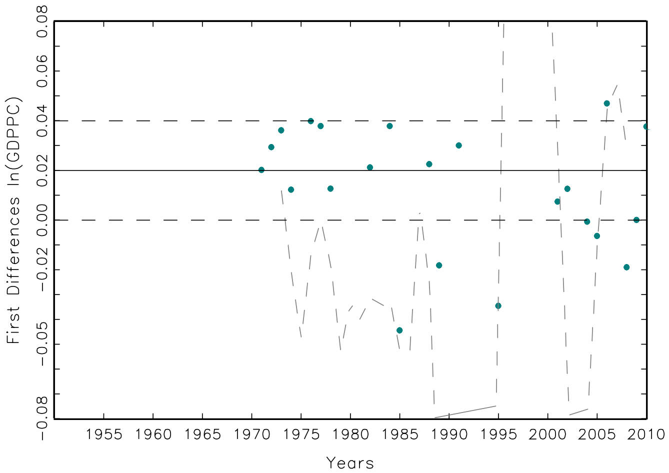
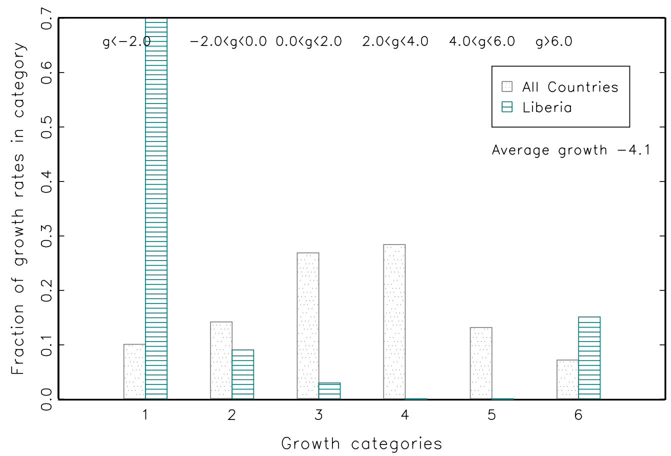


Figure 4: Distribution of all 8 year growth rates
Liberia vs. world



Madagascar

Figure 1: Overall, ten, and five year growth rates: Madagascar

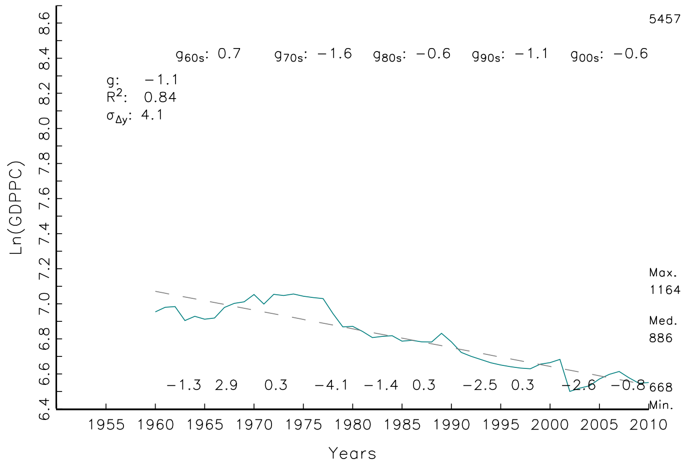


Figure 2: Initial and Final level of GDPPC: Madagascar

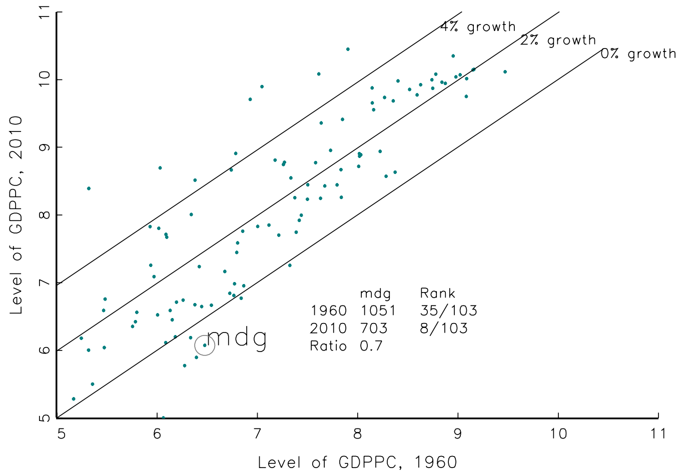


Figure 3: (ln) First Differences and five year MA: Madagascar

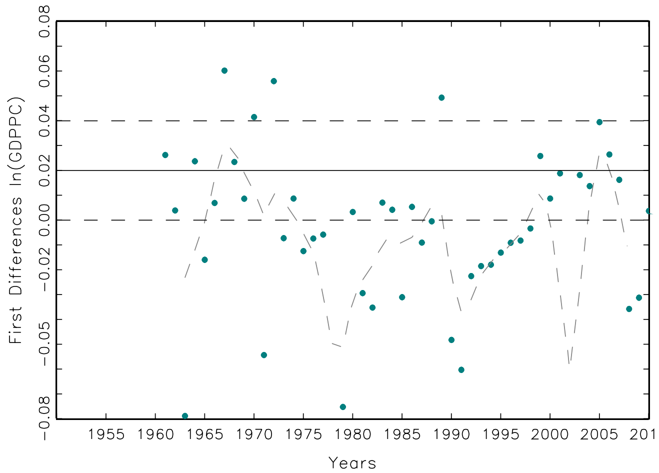
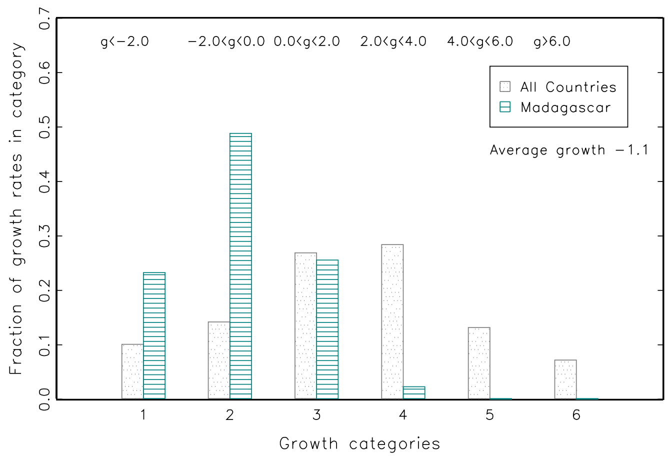


Figure 4: Distribution of all 8 year growth rates
Madagascar vs. world



Malawai

Figure 1: Overall, ten, and five year growth rates: Malawi

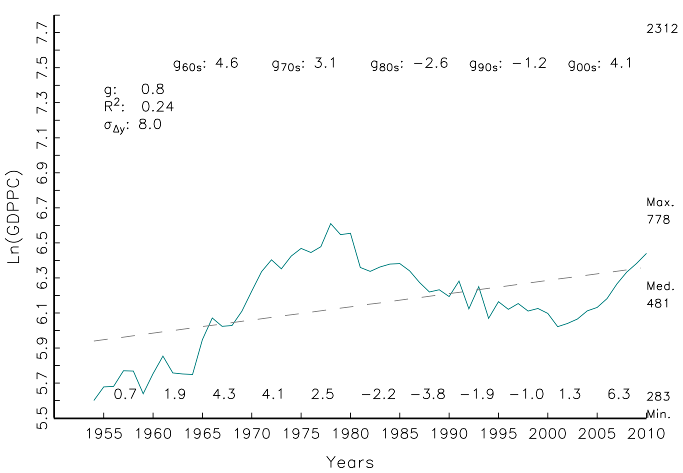


Figure 2: Initial and Final level of GDPPC: Malawi

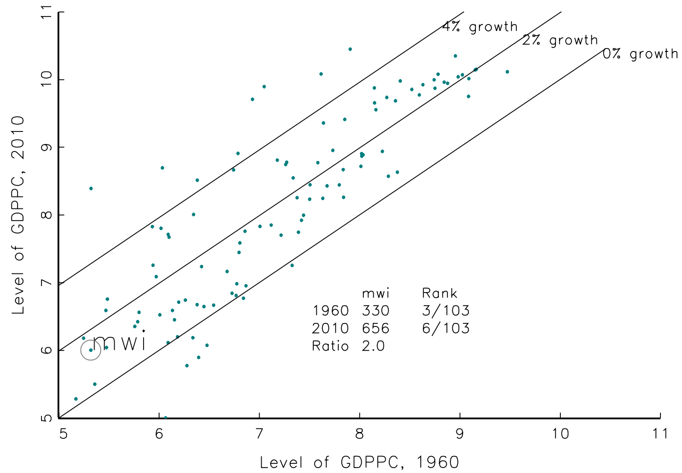


Figure 3: (ln) First Differences and five year MA: Malawi

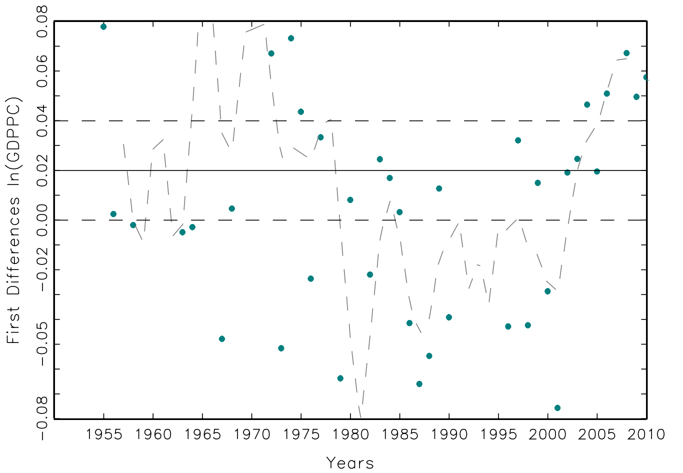
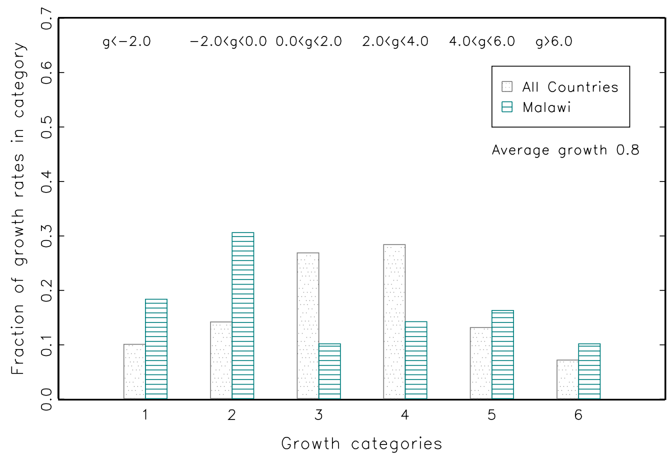


Figure 4: Distribution of all 8 year growth rates
Malawi vs. world



Malaysia

Figure 1: Overall, ten, and five year growth rates: Malaysia

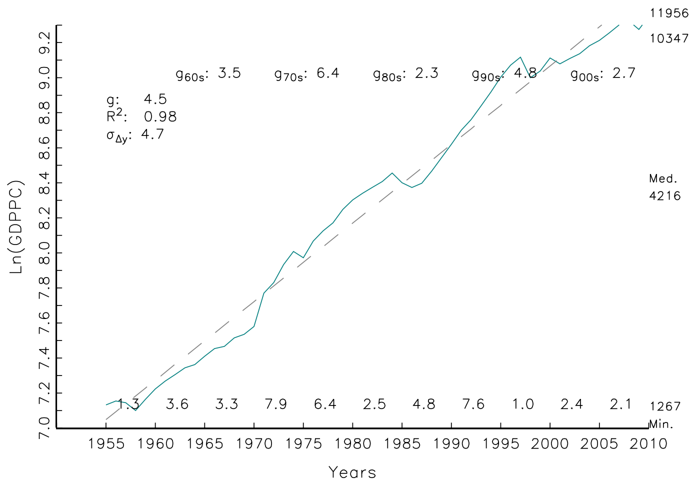


Figure 2: Initial and Final level of GDPPC: Malaysia

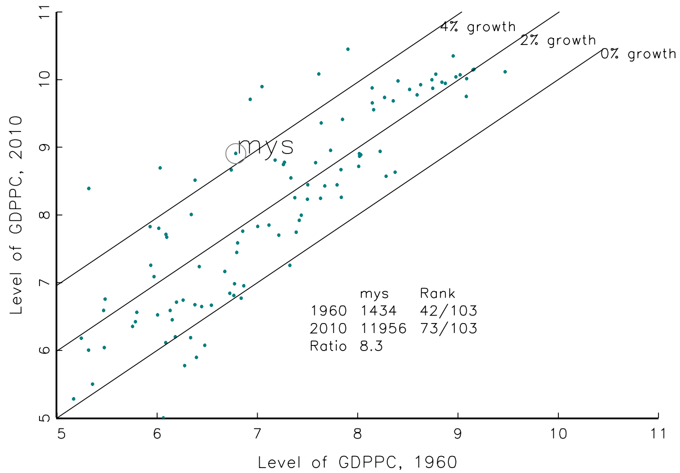


Figure 3: (ln) First Differences and five year MA: Malaysia

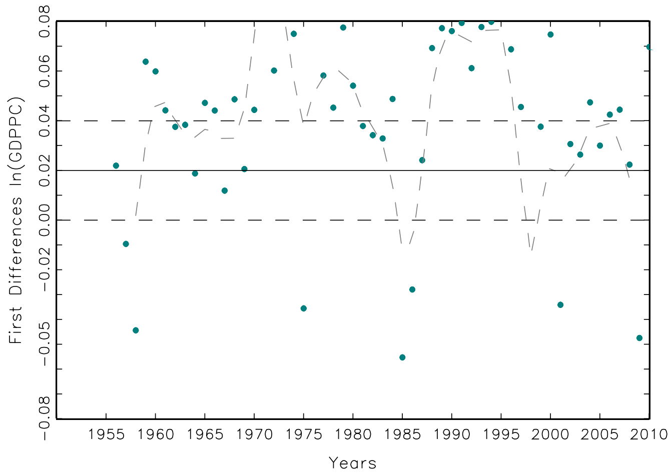
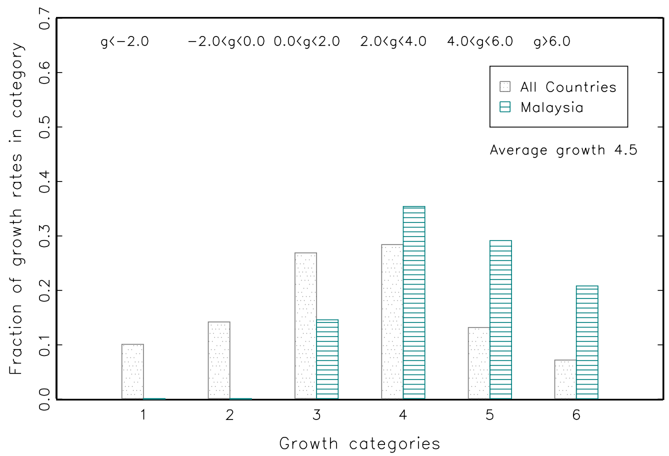


Figure 4: Distribution of all 8 year growth rates
Malaysia vs. world



Mali

Figure 1: Overall, ten, and five year growth rates: Mali

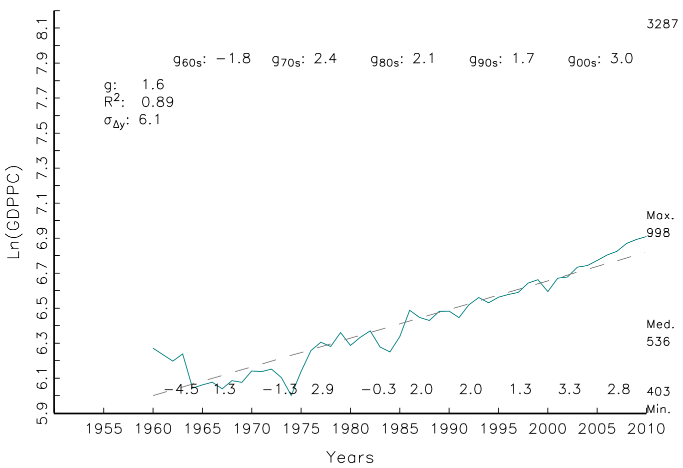


Figure 2: Initial and Final level of GDPPC: Mali

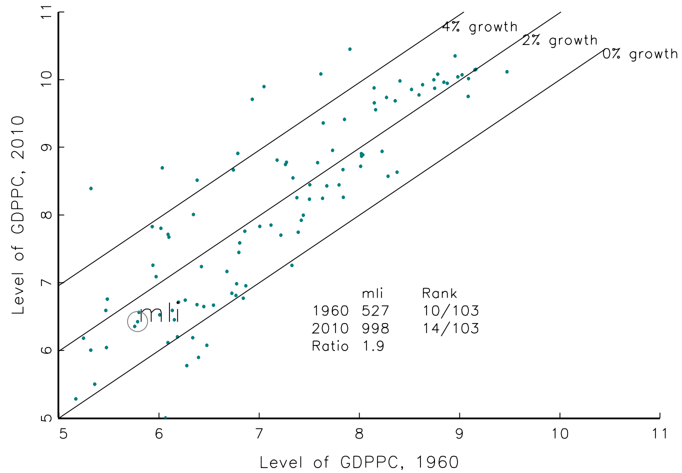


Figure 3: (ln) First Differences and five year MA: Mali

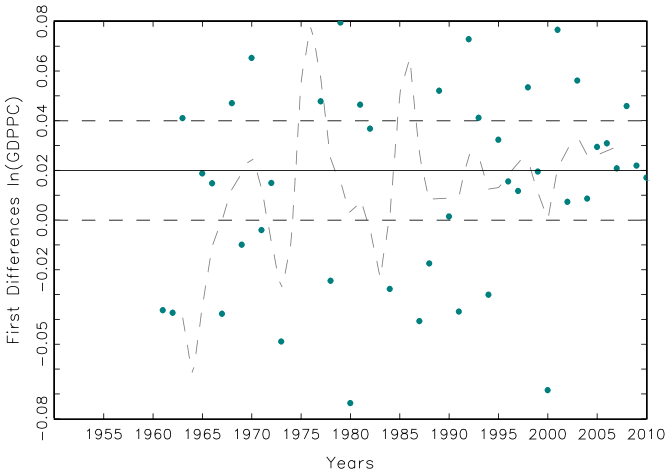
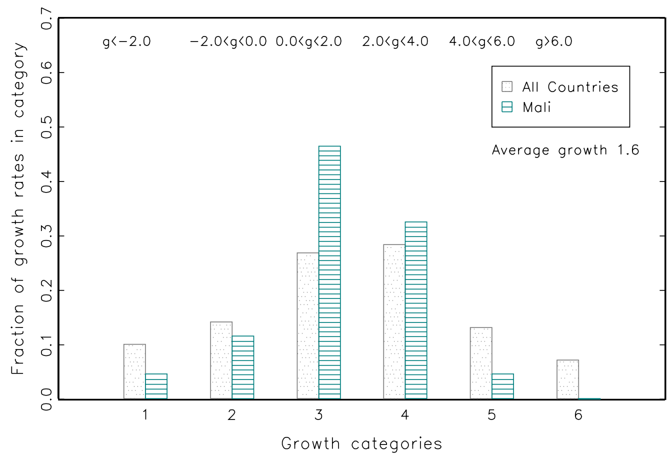


Figure 4: Distribution of all 8 year growth rates
Mali vs. world



Mauritania

Figure 1: Overall, ten, and five year growth rates: Mauritania

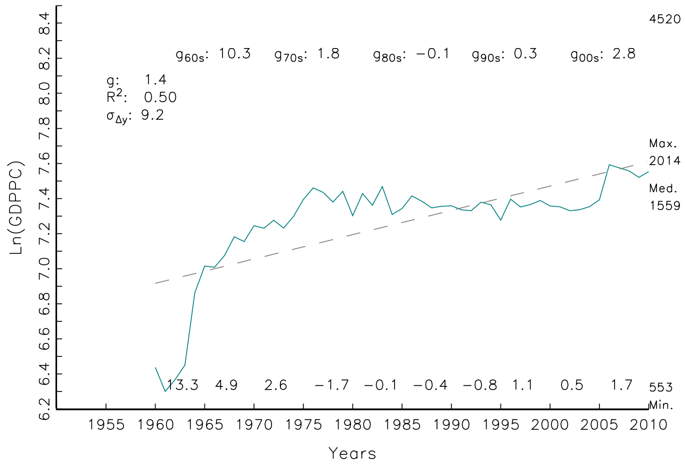


Figure 2: Initial and Final level of GDPPC: Mauritania

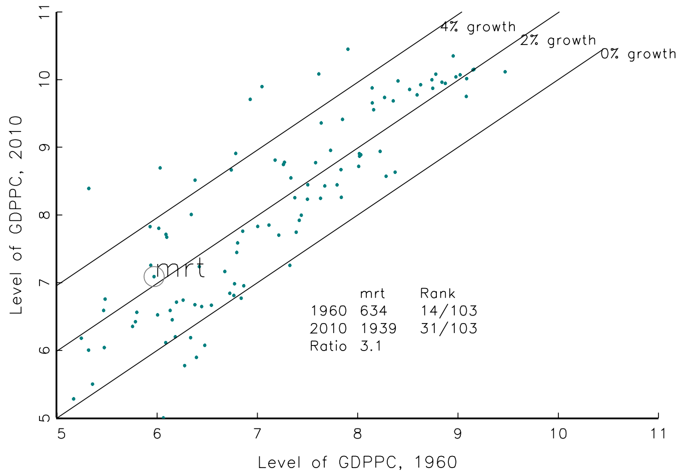


Figure 3: (ln) First Differences and five year MA: Mauritania

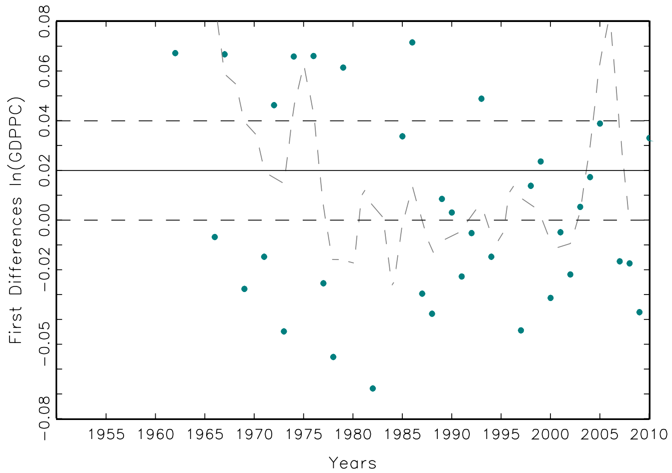
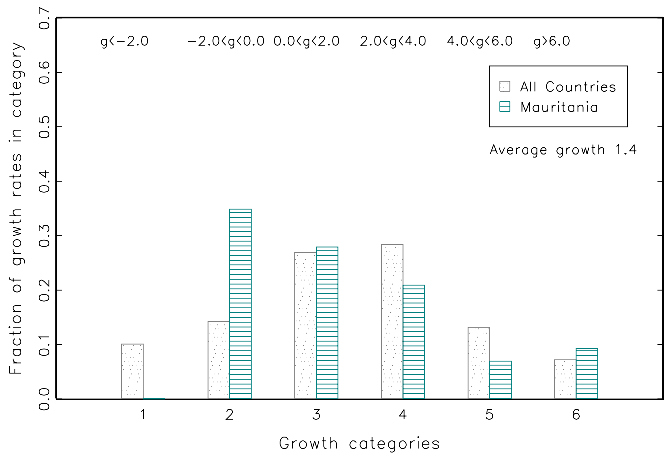


Figure 4: Distribution of all 8 year growth rates
Mauritania vs. world



Mauritius

Figure 1: Overall, ten, and five year growth rates: Mauritius

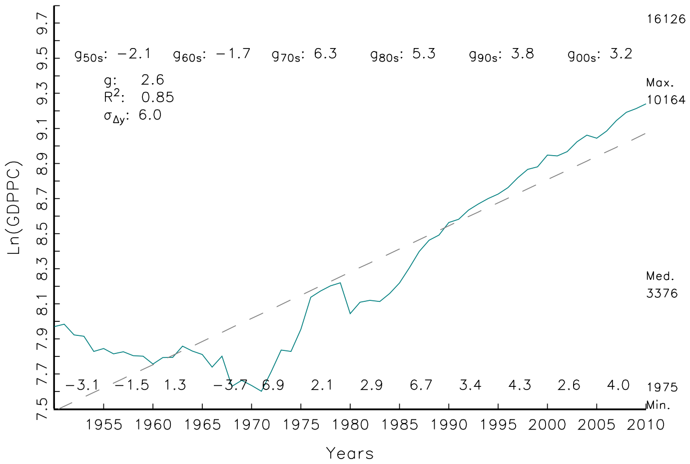


Figure 2: Initial and Final level of GDPPC: Mauritius

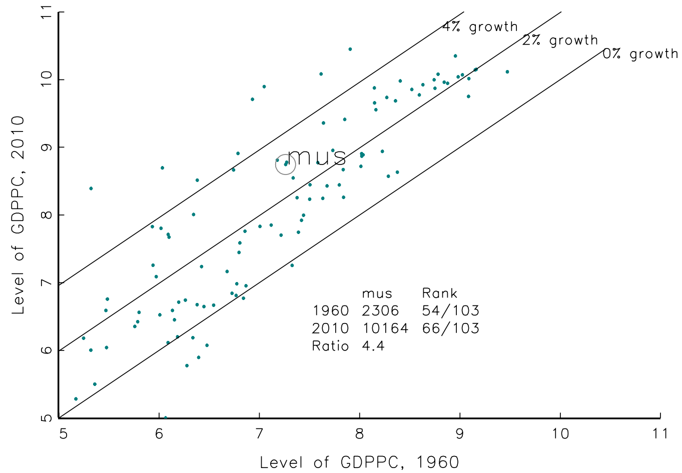


Figure 3: (ln) First Differences and five year MA: Mauritius

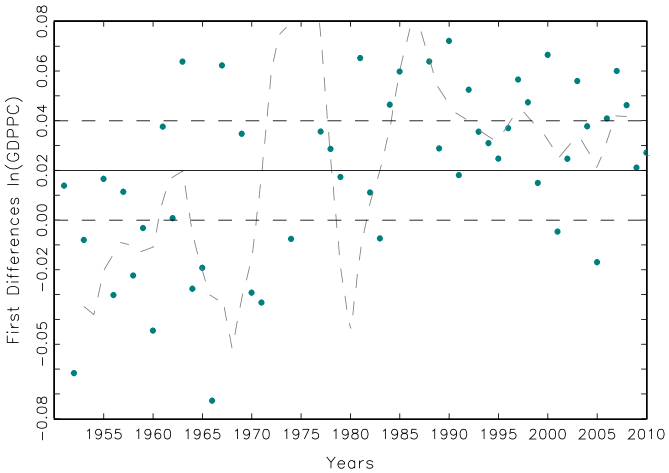
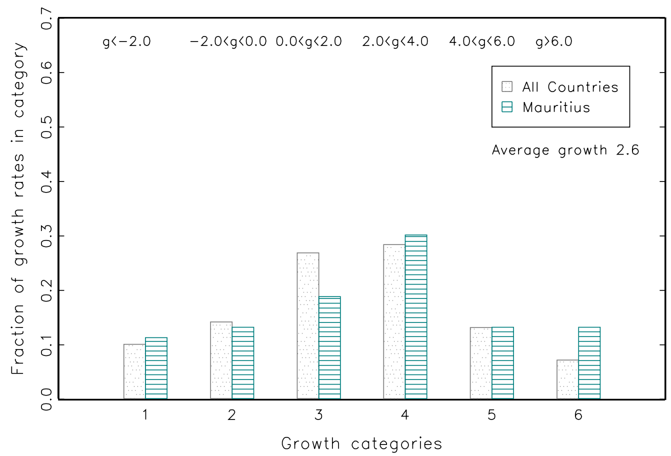


Figure 4: Distribution of all 8 year growth rates
Mauritius vs. world



Mexico

Figure 1: Overall, ten, and five year growth rates: Mexico

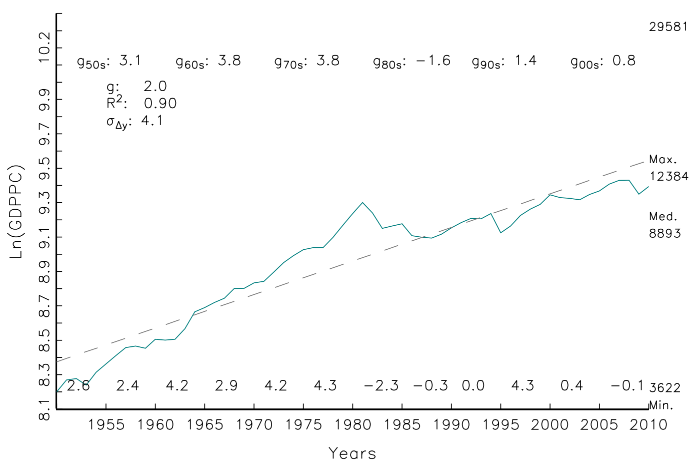


Figure 2: Initial and Final level of GDPPC: Mexico

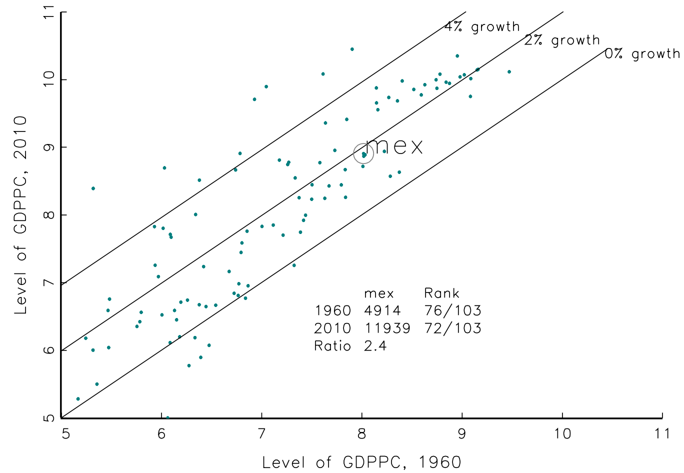


Figure 3: (ln) First Differences and five year MA: Mexico

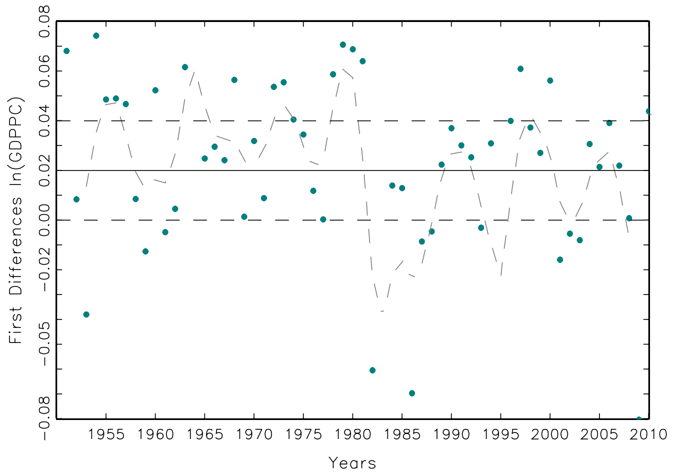
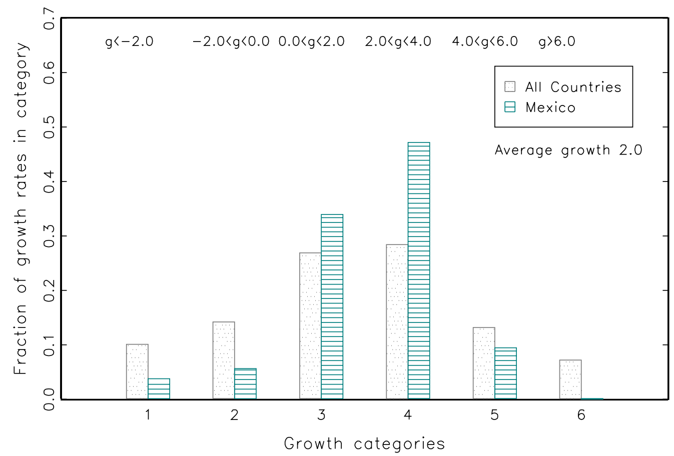


Figure 4: Distribution of all 8 year growth rates
Mexico vs. world



Mongolia

Figure 1: Overall, ten, and five year growth rates: Mongolia

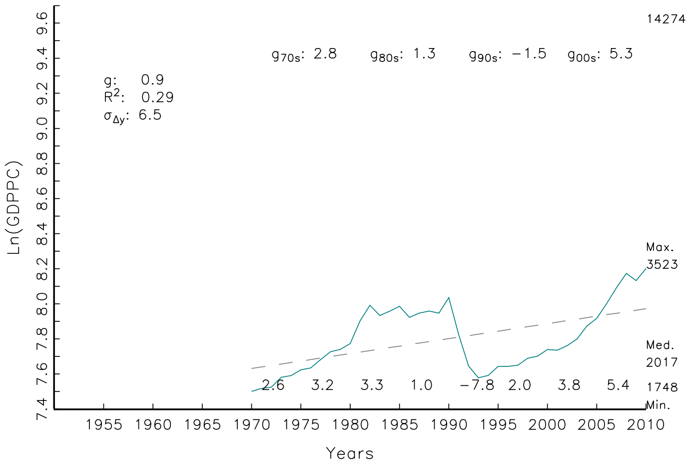


Figure 2: Initial and Final level of GDPPC: Mongolia

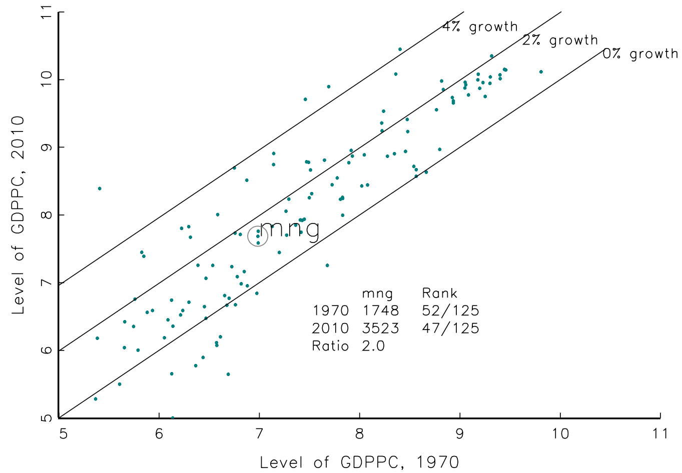


Figure 3: (ln) First Differences and five year MA: Mongolia

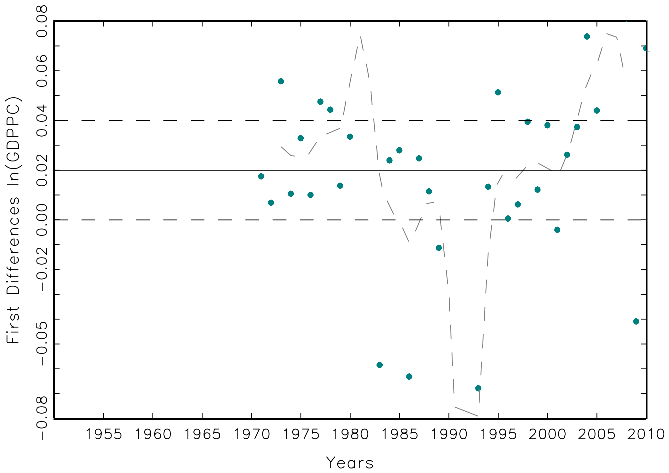
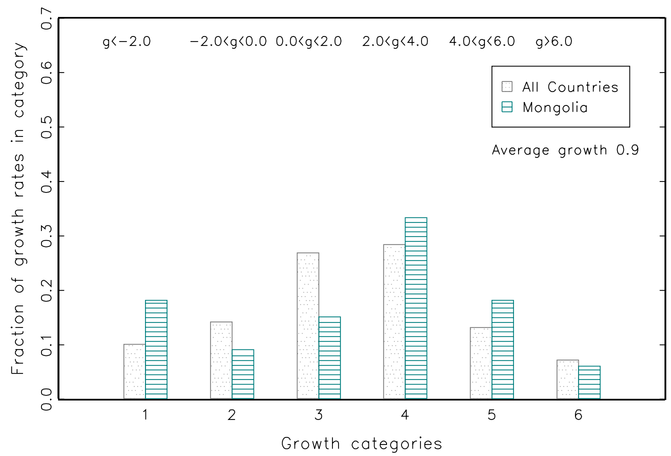


Figure 4: Distribution of all 8 year growth rates
Mongolia vs. world



Morocco

Figure 1: Overall, ten, and five year growth rates: Morocco

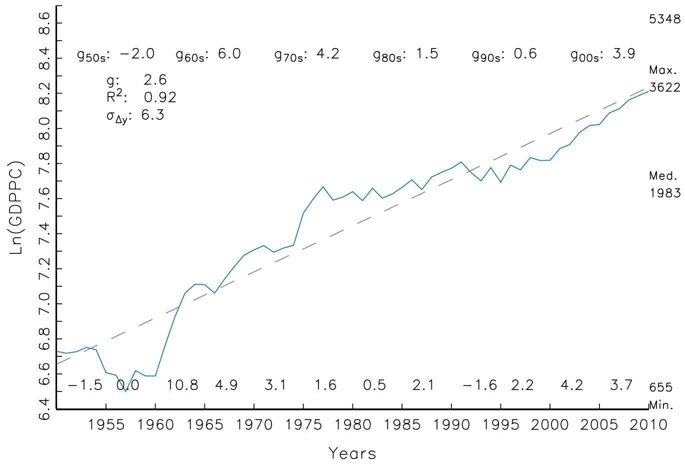


Figure 2: Initial and Final level of GDPPC: Morocco

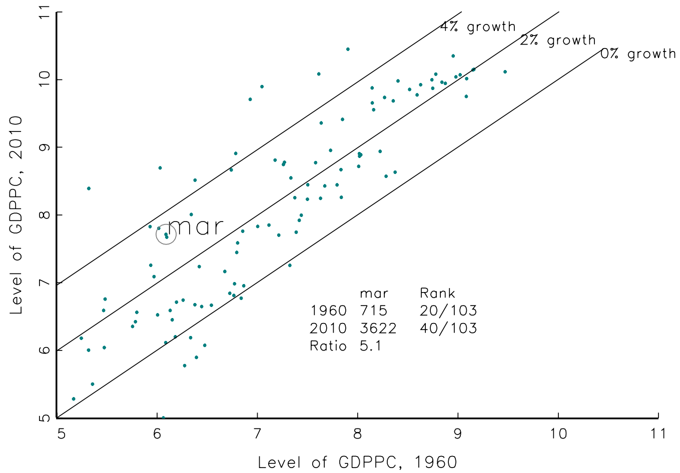


Figure 3: (ln) First Differences and five year MA: Morocco

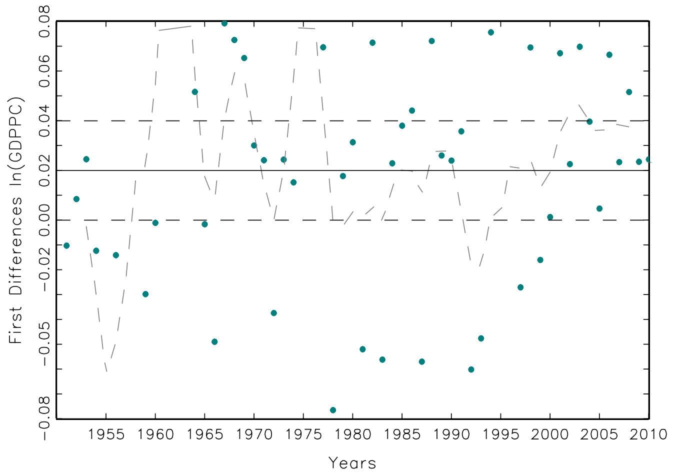
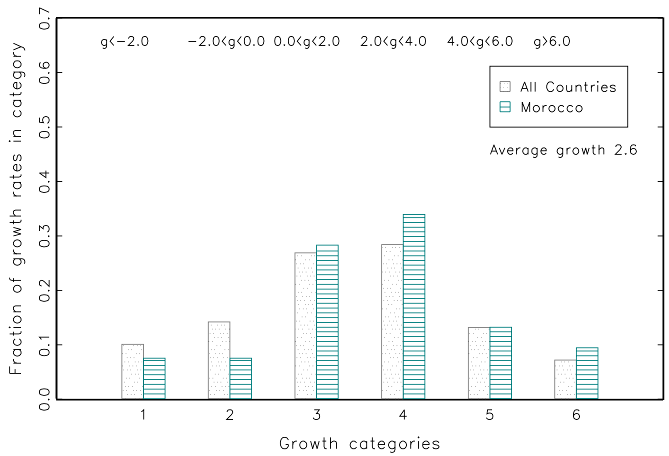


Figure 4: Distribution of all 8 year growth rates
Morocco vs. world



Mozambique

Figure 1: Overall, ten, and five year growth rates: Mozambique

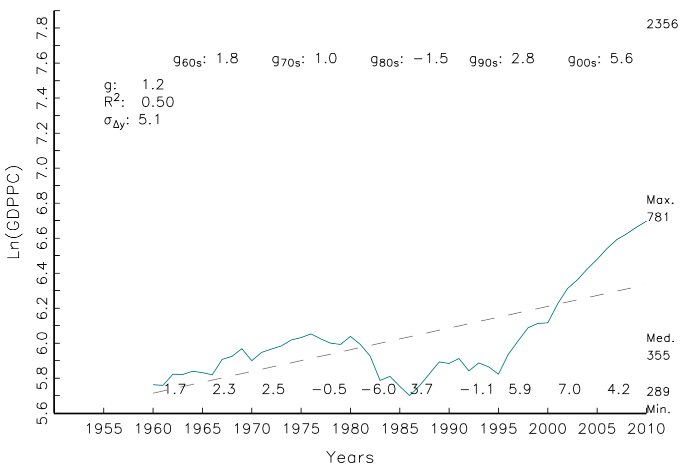


Figure 2: Initial and Final level of GDPPC: Mozambique

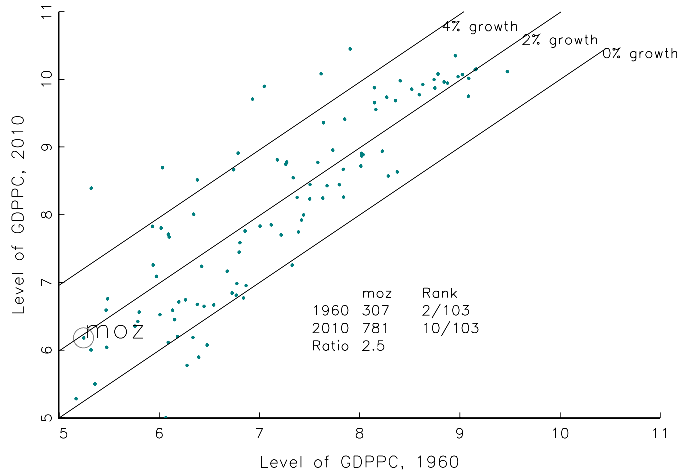


Figure 3: (ln) First Differences and five year MA: Mozambique

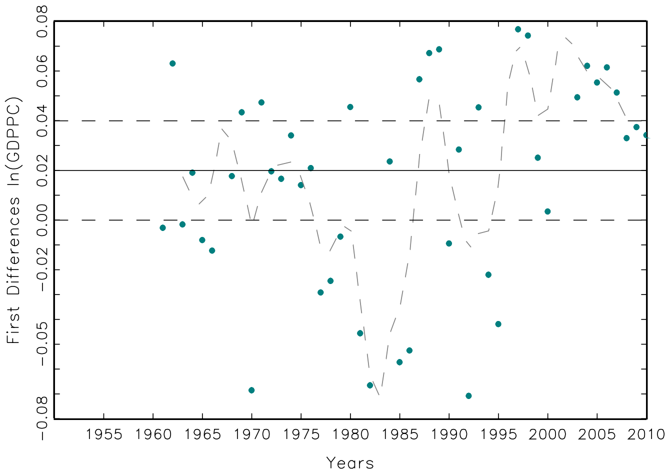
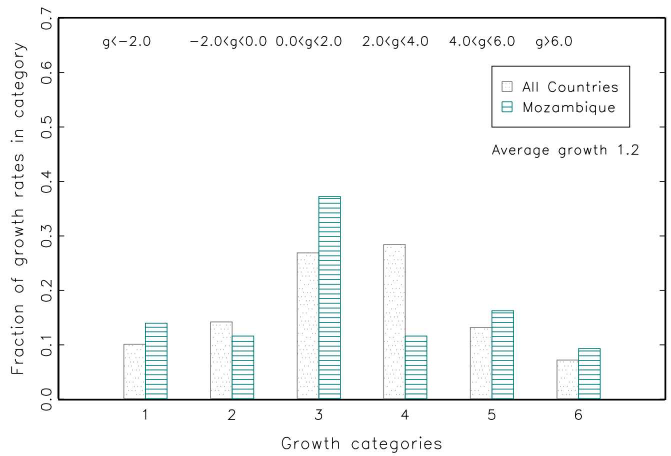


Figure 4: Distribution of all 8 year growth rates
Mozambique vs. world



Namibia

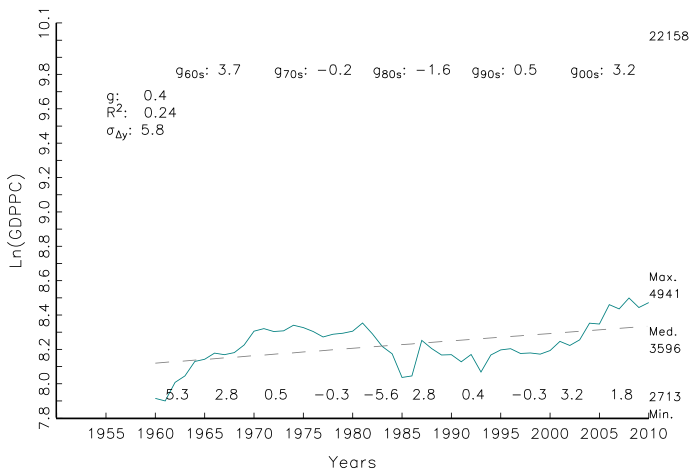


Figure 1: Overall, ten, and five year growth rates: Namibia

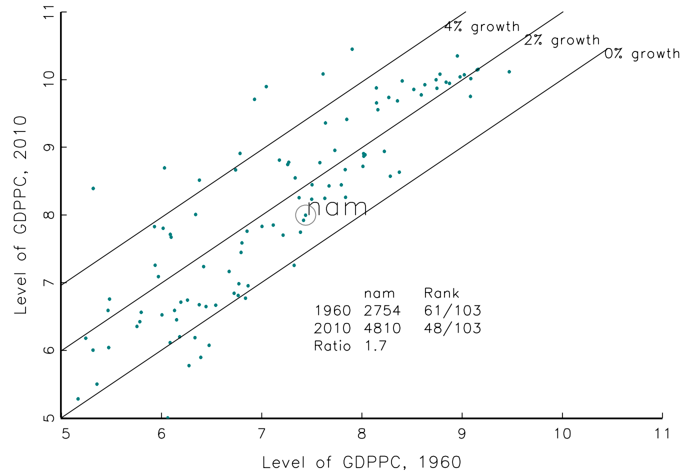


Figure 2: Initial and Final level of GDPPC: Namibia

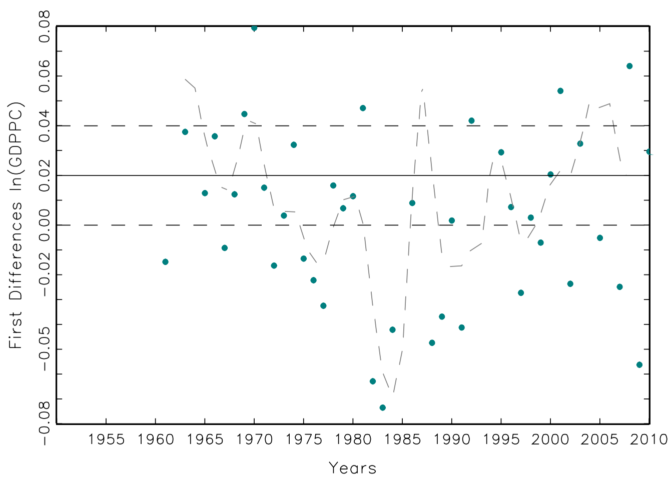


Figure 3: (ln) First Differences and five year MA: Namibia

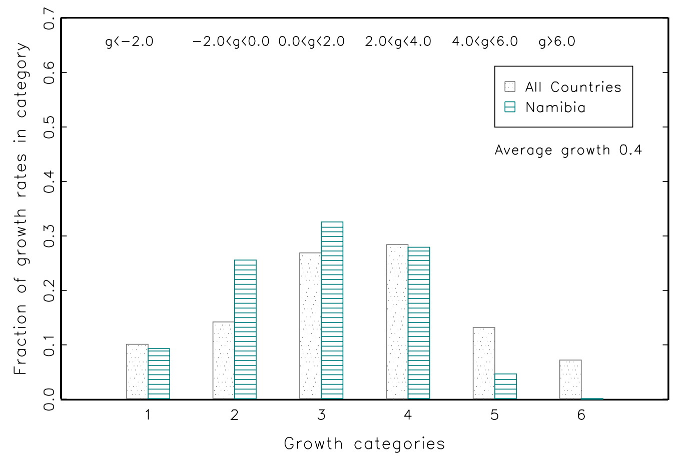


Figure 4: Distribution of all 8 year growth rates
Namibia vs. world

Nepal

Figure 1: Overall, ten, and five year growth rates: Nepal

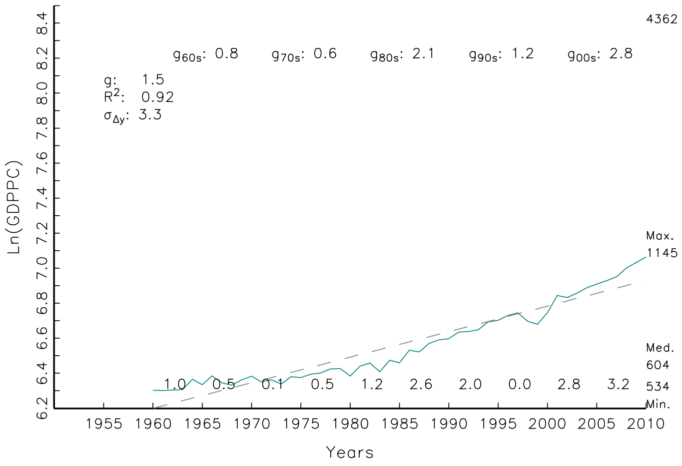


Figure 2: Initial and Final level of GDPPC: Nepal

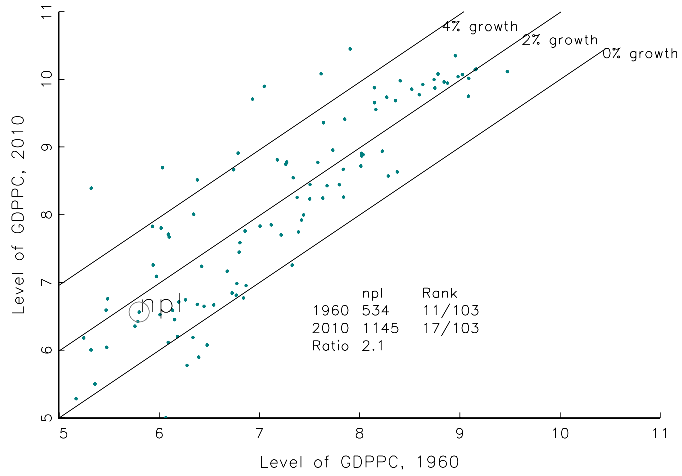


Figure 3: (ln) First Differences and five year MA: Nepal

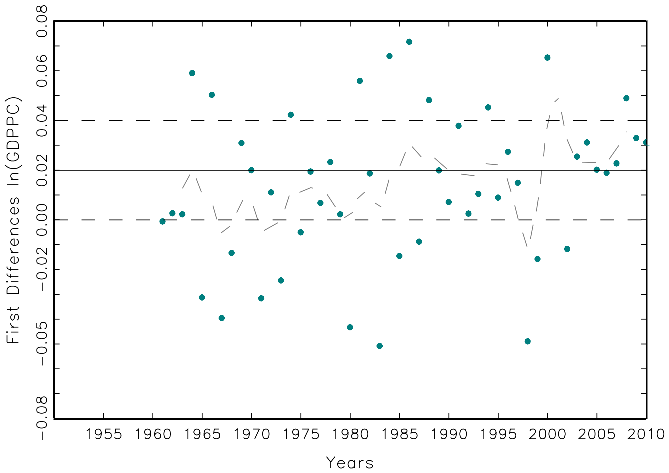
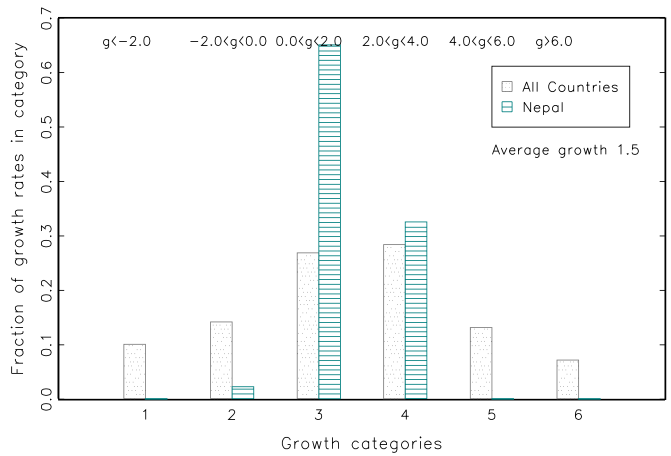


Figure 4: Distribution of all 8 year growth rates
Nepal vs. world



Netherlands

Figure 1: Overall, ten, and five year growth rates: Netherlands

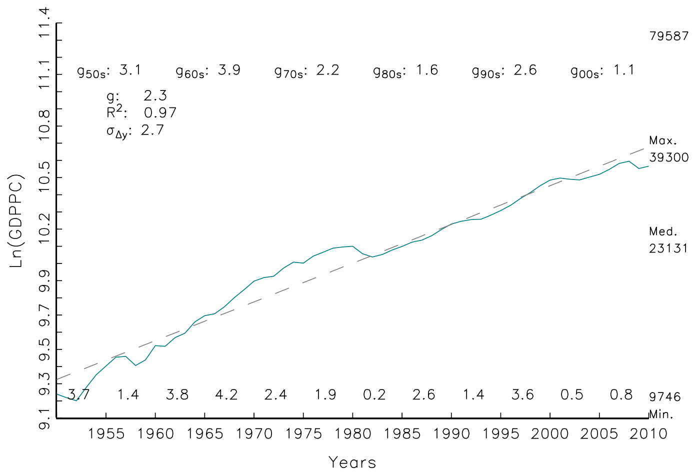


Figure 2: Initial and Final level of GDPPC: Netherlands

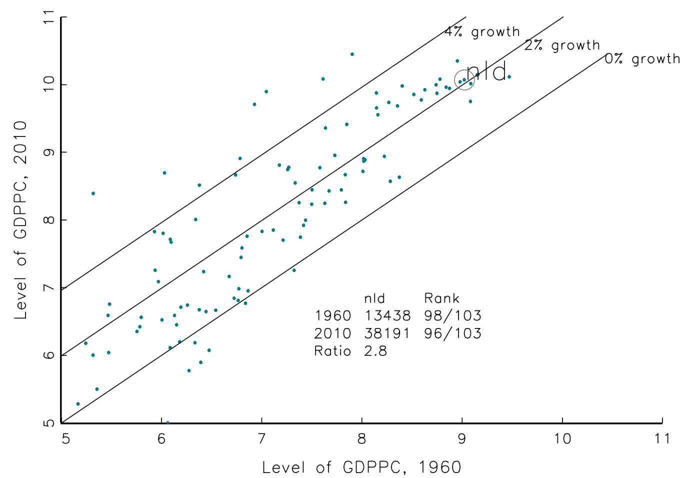


Figure 3: (ln) First Differences and five year MA: Netherlands

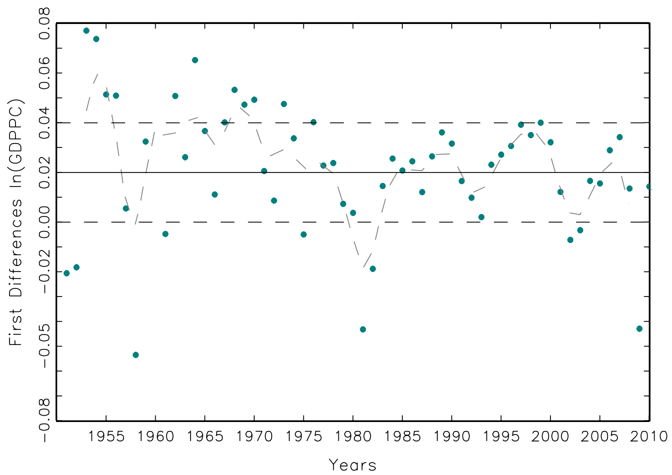
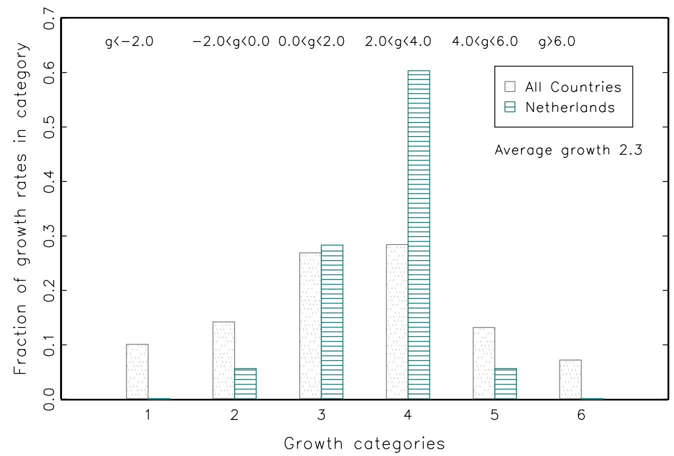


Figure 4: Distribution of all 8 year growth rates
Netherlands vs. world



New Zealand

Figure 1: Overall, ten, and five year growth rates: New Zealand

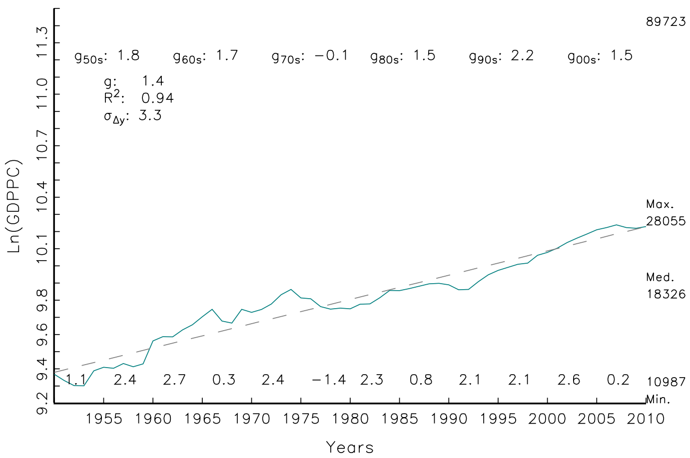


Figure 2: Initial and Final level of GDPPC: New Zealand

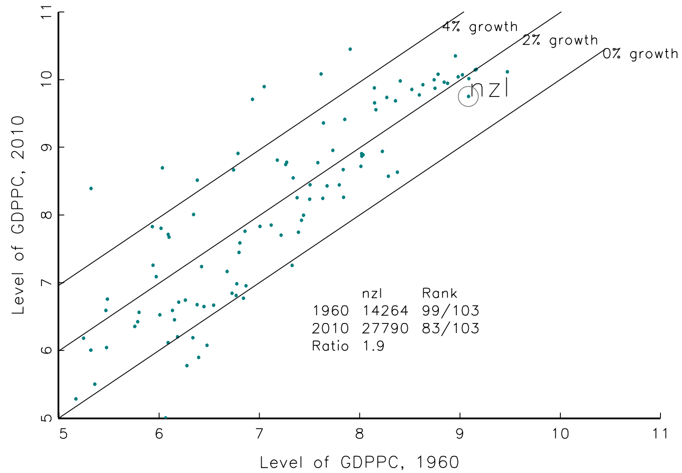


Figure 3: (ln) First Differences and five year MA: New Zealand

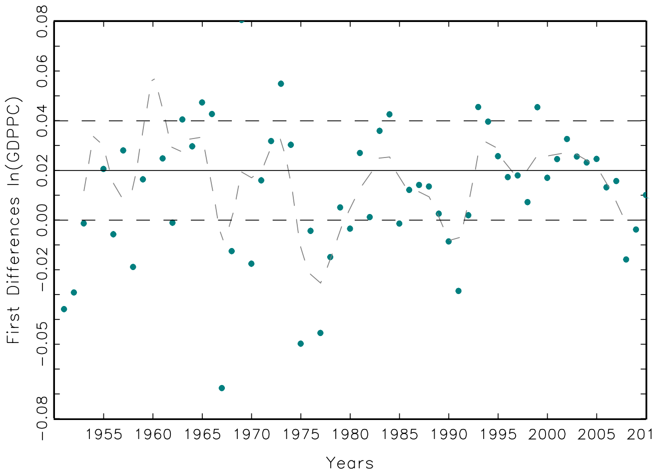
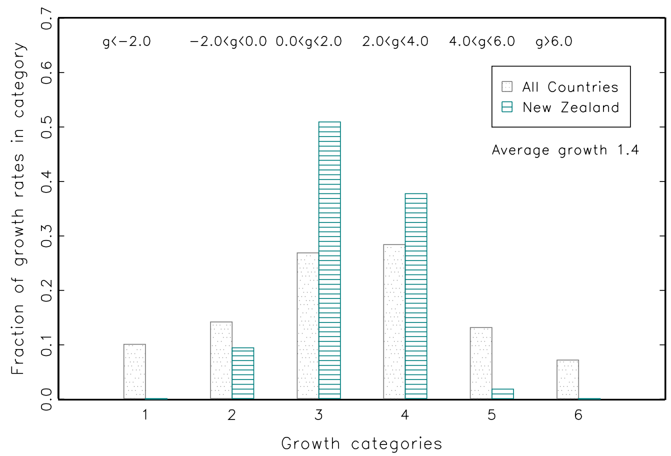


Figure 4: Distribution of all 8 year growth rates
New Zealand vs. world



Nicaragua

Figure 1: Overall, ten, and five year growth rates: Nicaragua

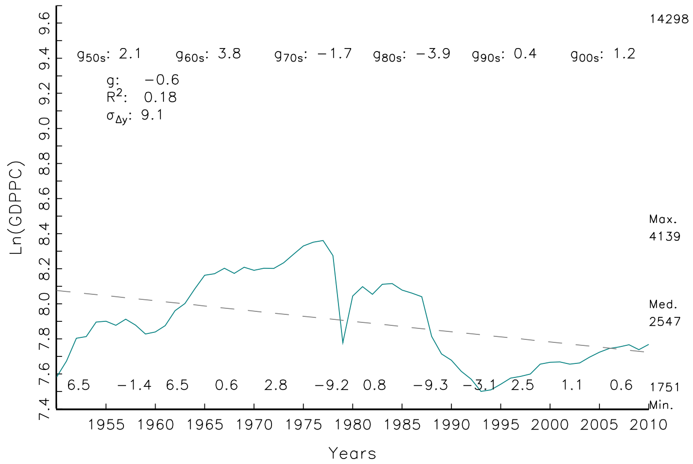


Figure 2: Initial and Final level of GDPPC: Nicaragua

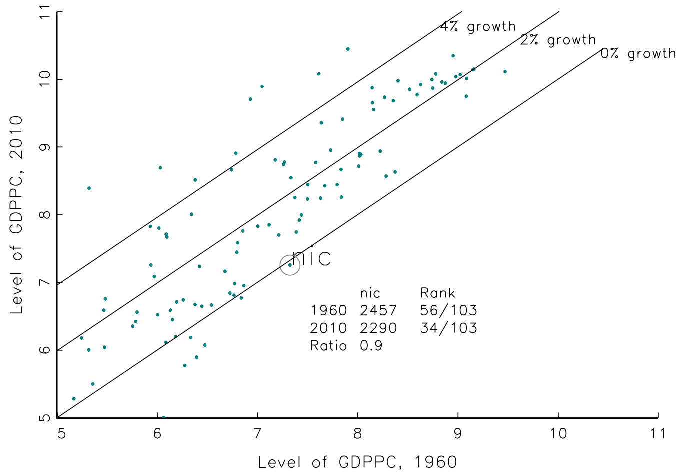


Figure 3: (ln) First Differences and five year MA: Nicaragua

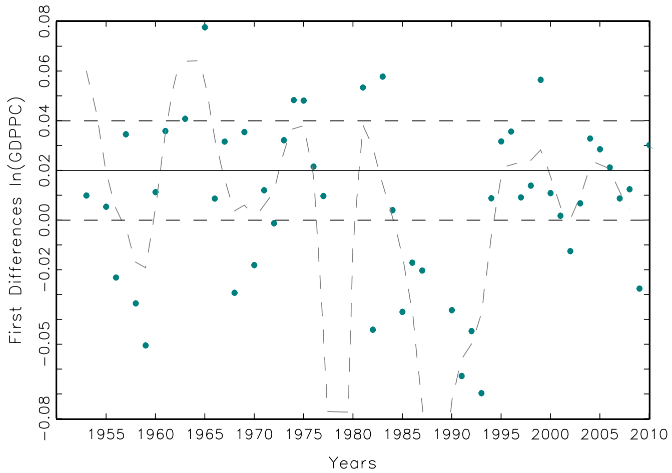
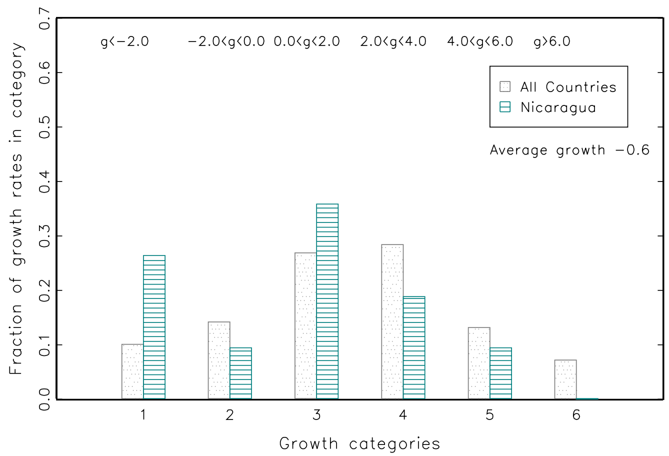


Figure 4: Distribution of all 8 year growth rates
Nicaragua vs. world



Niger

Figure 1: Overall, ten, and five year growth rates: Niger

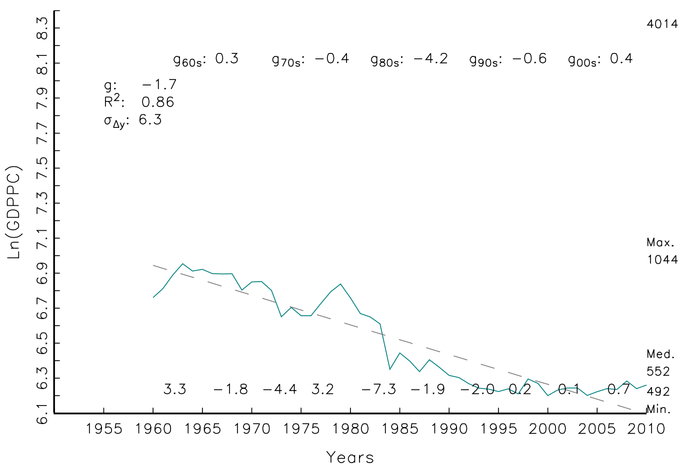


Figure 2: Initial and Final level of GDPPC: Niger

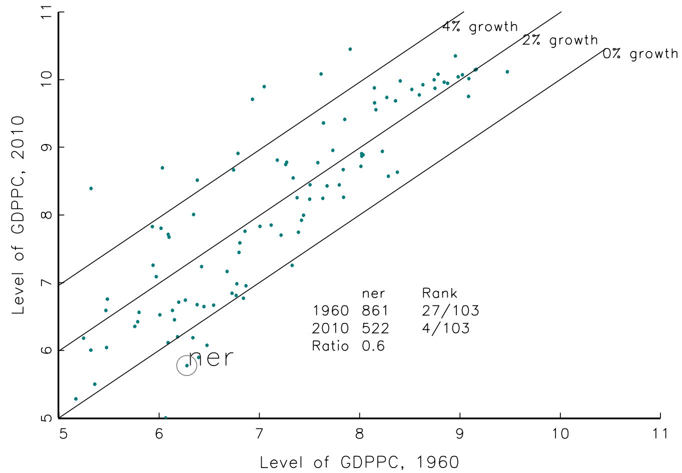


Figure 3: (ln) First Differences and five year MA: Niger

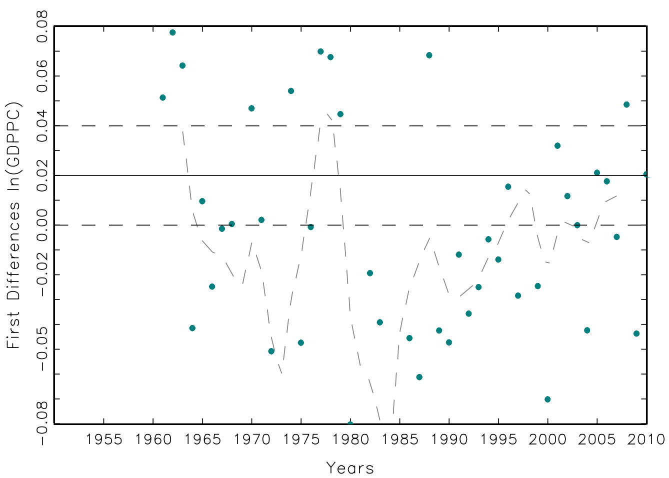
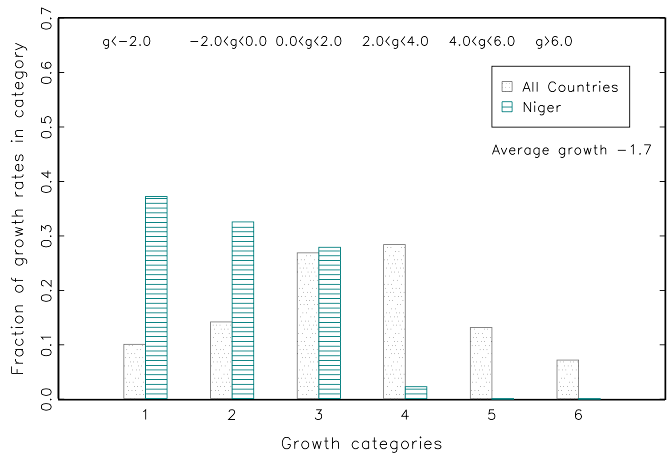


Figure 4: Distribution of all 8 year growth rates
Niger vs. world



Nigeria

Figure 1: Overall, ten, and five year growth rates: Nigeria

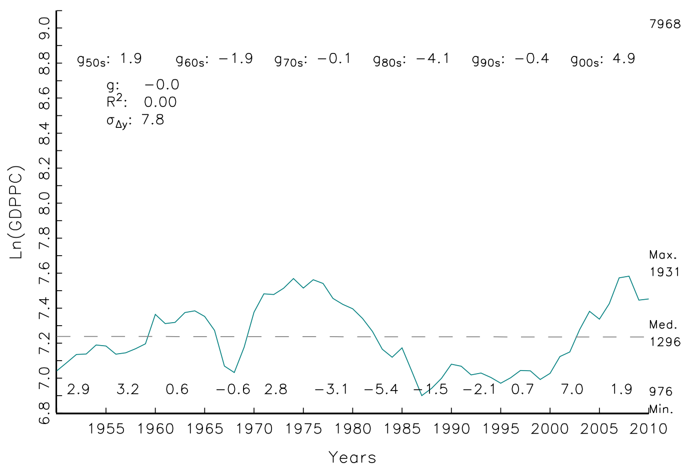


Figure 2: Initial and Final level of GDPPC: Nigeria

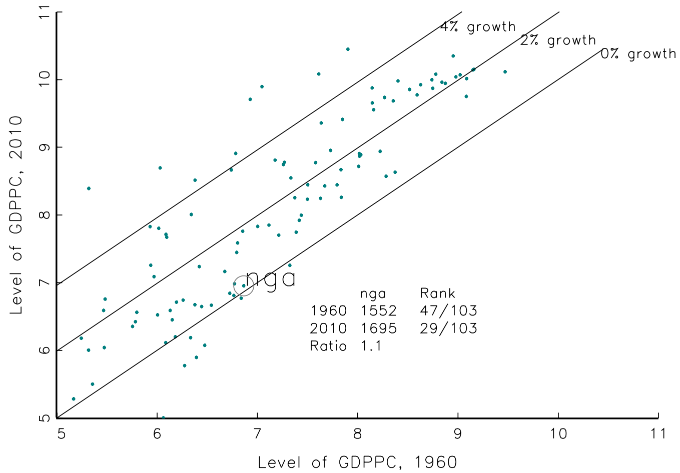


Figure 3: (ln) First Differences and five year MA: Nigeria

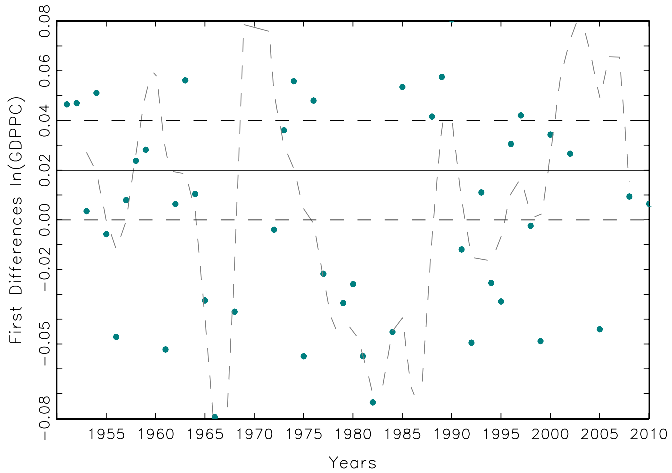
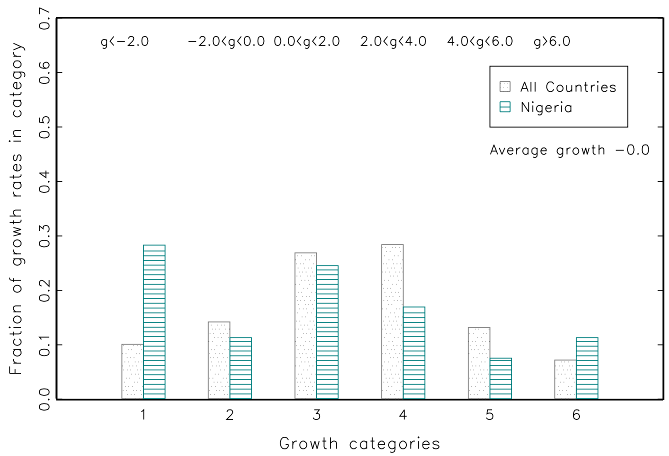


Figure 4: Distribution of all 8 year growth rates
Nigeria vs. world



Norway

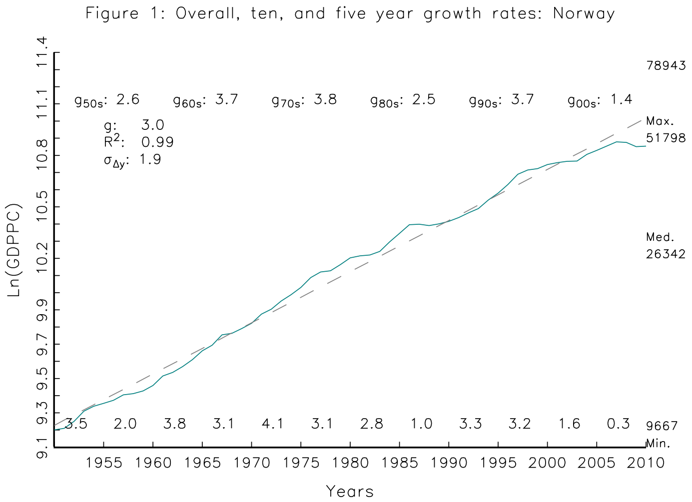


Figure 1: Overall, ten, and five year growth rates: Norway
g50s: 2.6 g60s: 3.7 g70s: 3.8 g80s: 2.5 g90s: 3.7 g00s: 1.4
g: 3.0
R2: 0.99
σΔy: 1.9
78943
Max. 51798
Med. 26342
9667 Min.
3.5 2.0 3.8 3.1 4.1 3.1 2.8 1.0 3.3 3.2 1.6 0.3
Ln(GDPPC)
Years

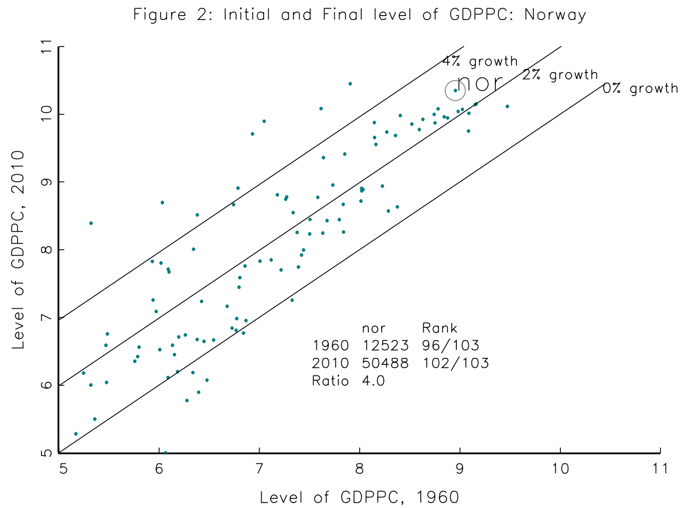


Figure 2: Initial and Final level of GDPPC: Norway
4% growth
2% growth
0% growth
nor
nor Rank
1960 12523 96/103
2010 50488 102/103
Ratio 4.0
Level of GDPPC, 2010
Level of GDPPC, 1960

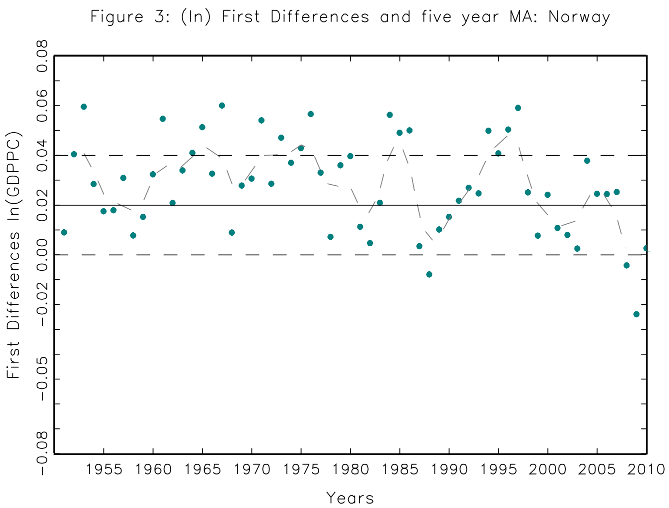


Figure 3: (ln) First Differences and five year MA: Norway
First Differences ln(GDPPC)
Years

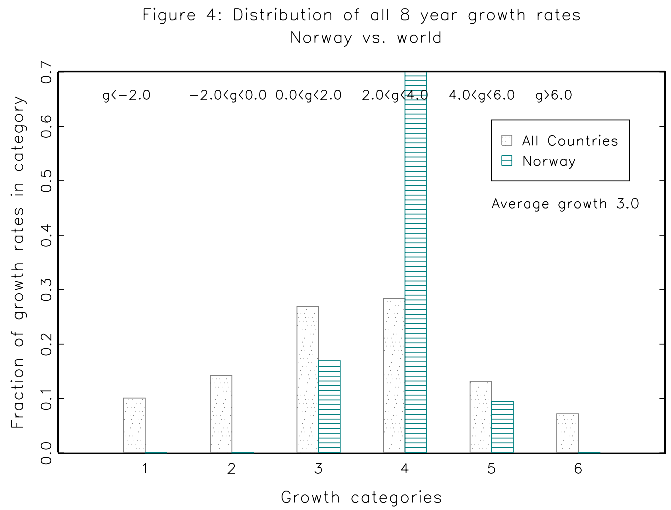


Figure 4: Distribution of all 8 year growth rates
Norway vs. world
g<−2.0 −2.0<g<0.0 0.0<g<2.0 2.0<g<4.0 4.0<g<6.0 g>6.0
All Countries
Norway
Average growth 3.0
Fraction of growth rates in category
Growth categories

Oman

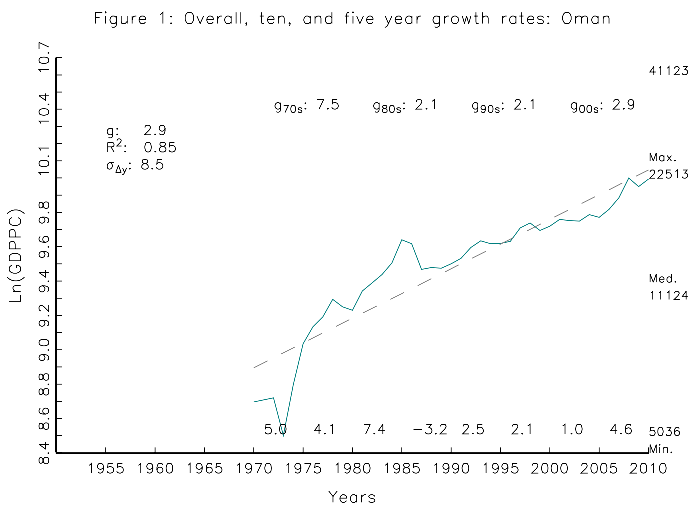


Figure 1: Overall, ten, and five year growth rates: Oman
g_{70s}: 7.5
g_{80s}: 2.1
g_{90s}: 2.1
g_{00s}: 2.9
g: 2.9
R^2: 0.85
$\sigma_{\Delta y}$: 8.5
41123
Max. 22513
Med. 11124
5036 Min.
5.0 4.1 7.4 −3.2 2.5 2.1 1.0 4.6
Ln(GDPPC)
Years

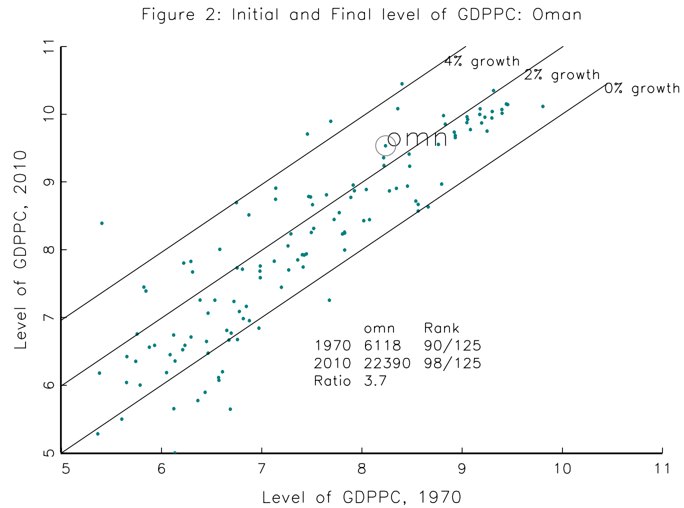


Figure 2: Initial and Final level of GDPPC: Oman
4% growth
2% growth
0% growth
omn
omn Rank
1970 6118 90/125
2010 22390 98/125
Ratio 3.7
Level of GDPPC, 2010
Level of GDPPC, 1970

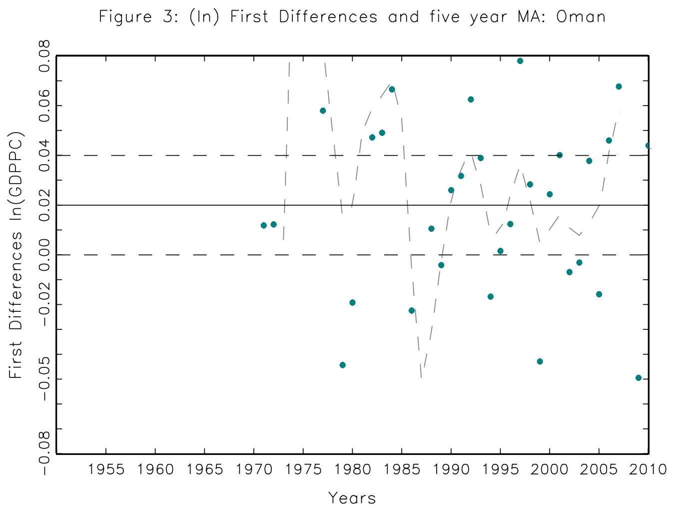


Figure 3: (ln) First Differences and five year MA: Oman
First Differences ln(GDPPC)
Years

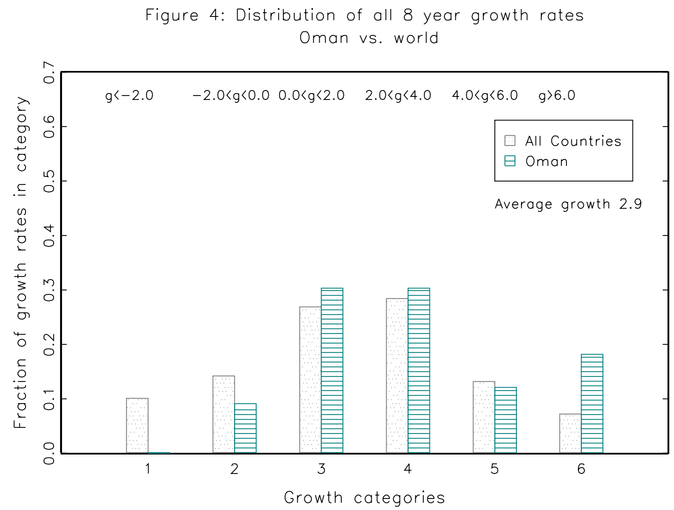


Figure 4: Distribution of all 8 year growth rates
Oman vs. world
g<−2.0
−2.0<g<0.0
0.0<g<2.0
2.0<g<4.0
4.0<g<6.0
g>6.0
All Countries
Oman
Average growth 2.9
Fraction of growth rates in category
Growth categories

Pakistan

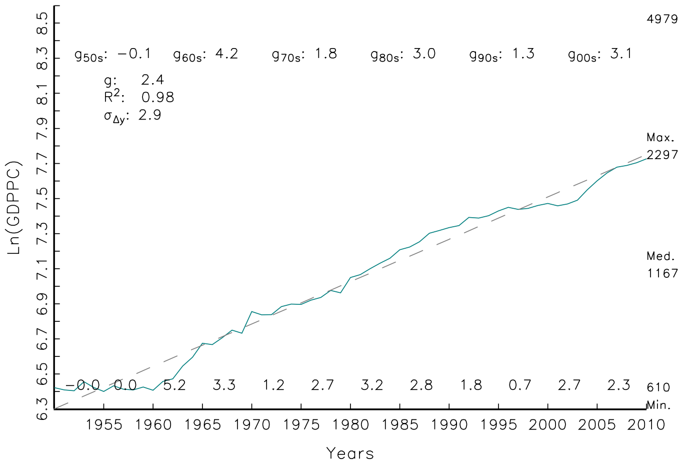


Figure 1: Overall, ten, and five year growth rates: Pakistan
Ln(GDPPC)
Years
g_{50s}: −0.1 g_{60s}: 4.2 g_{70s}: 1.8 g_{80s}: 3.0 g_{90s}: 1.3 g_{00s}: 3.1
g: 2.4
R^2: 0.98
$\sigma_{\Delta y}$: 2.9
4979
Max. 2297
Med. 1167
610 Min.
−0.0 0.0 5.2 3.3 1.2 2.7 3.2 2.8 1.8 0.7 2.7 2.3

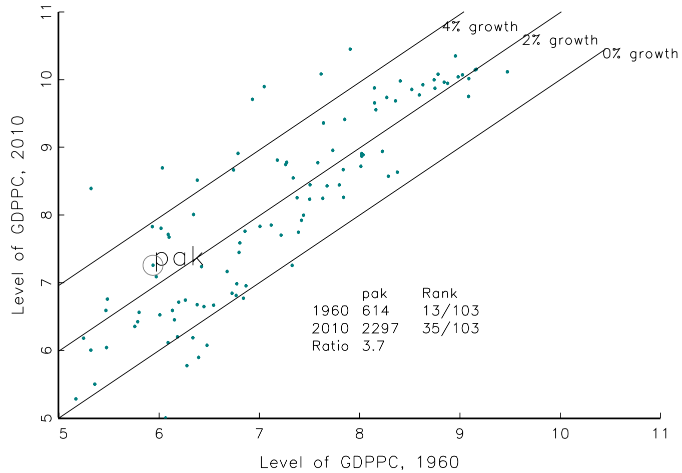


Figure 2: Initial and Final level of GDPPC: Pakistan
Level of GDPPC, 2010
Level of GDPPC, 1960
4% growth
2% growth
0% growth
pak
pak Rank
1960 614 13/103
2010 2297 35/103
Ratio 3.7

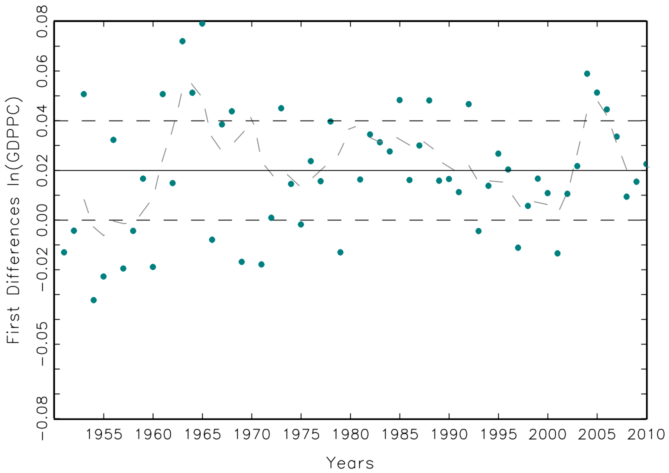


Figure 3: (ln) First Differences and five year MA: Pakistan
First Differences ln(GDPPC)
Years

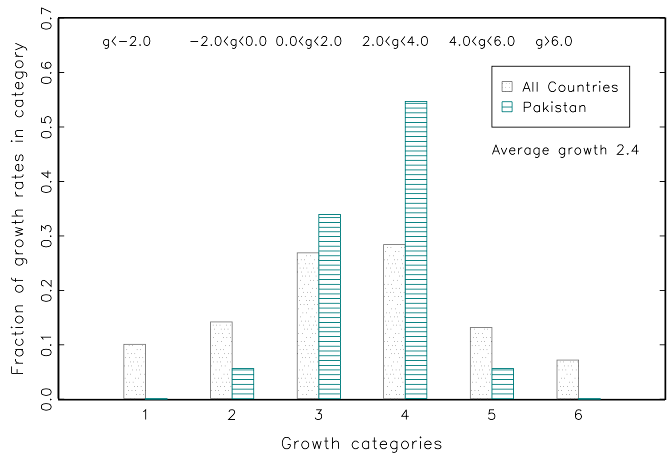


Figure 4: Distribution of all 8 year growth rates
Pakistan vs. world
Fraction of growth rates in category
Growth categories
g<−2.0 −2.0<g<0.0 0.0<g<2.0 2.0<g<4.0 4.0<g<6.0 g>6.0
All Countries
Pakistan
Average growth 2.4

Panama

Figure 1: Overall, ten, and five year growth rates: Panama

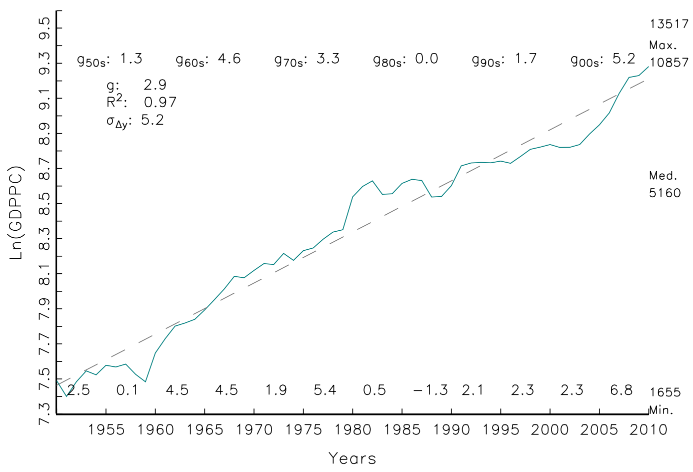


Figure 2: Initial and Final level of GDPPC: Panama

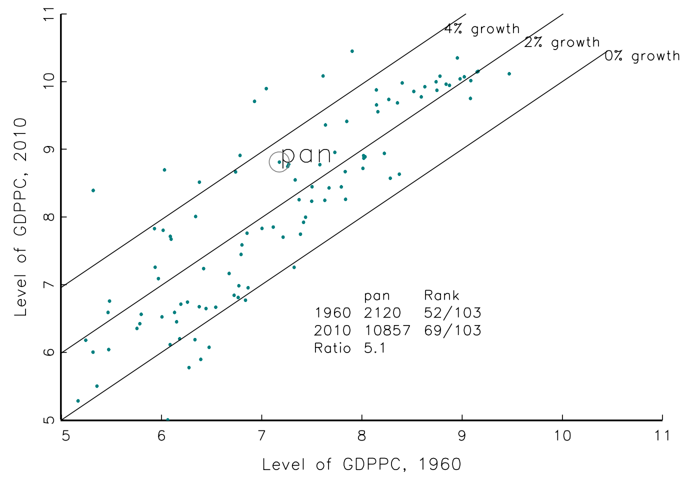


Figure 3: (ln) First Differences and five year MA: Panama

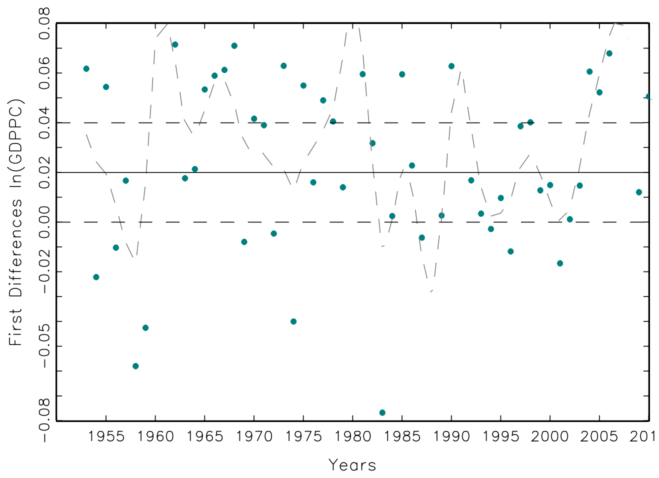
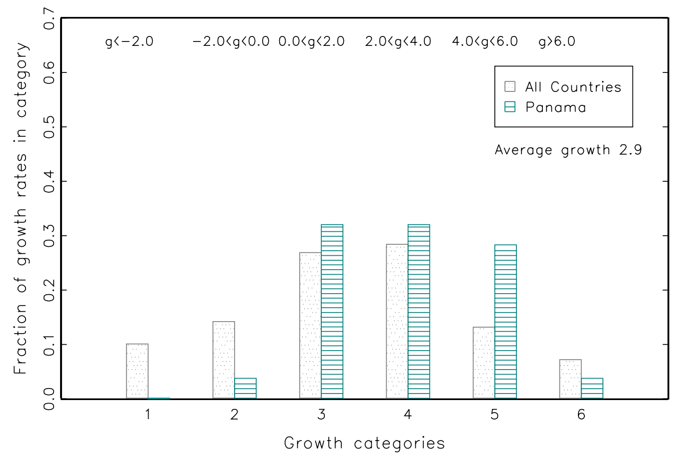


Figure 4: Distribution of all 8 year growth rates
Panama vs. world



Papua New Guinea

Figure 1: Overall, ten, and five year growth rates: Papua New Guinea

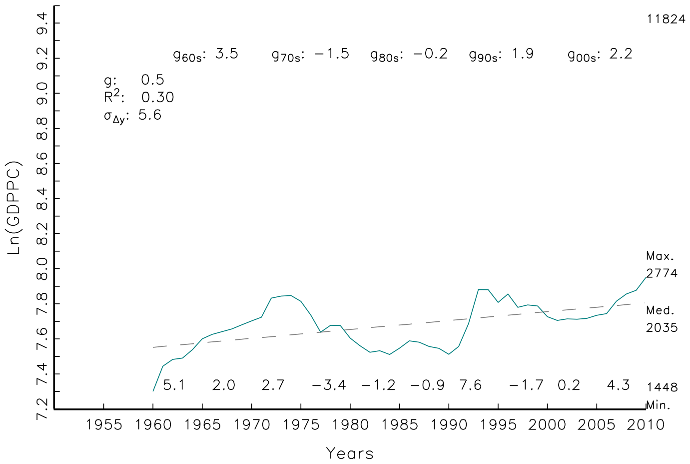


Figure 2: Initial and Final level of GDPPC: Papua New Guinea

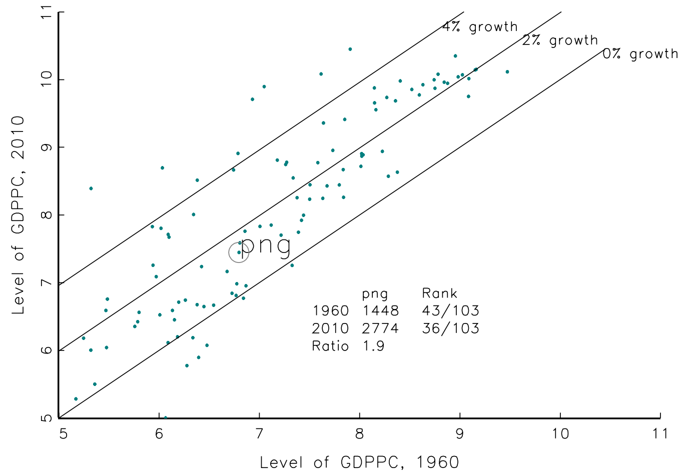


Figure 3: (ln) First Differences and five year MA: Papua New Guinea

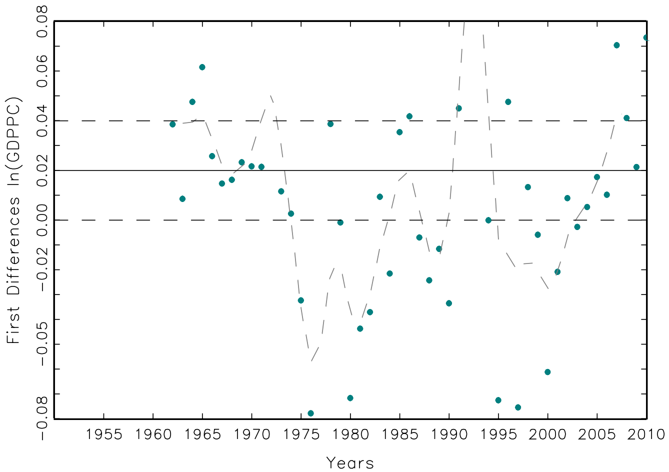
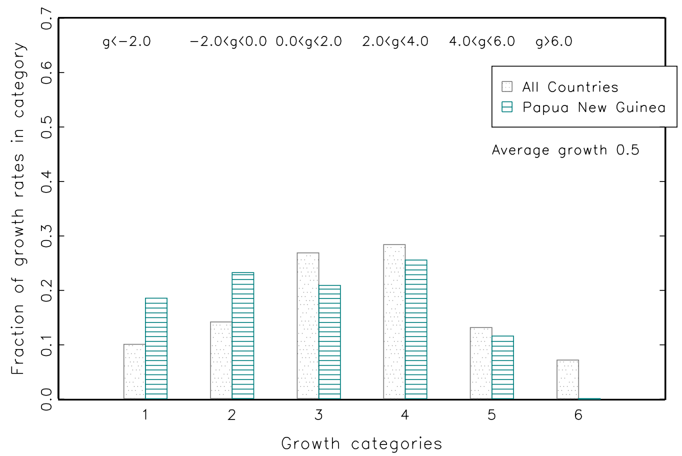


Figure 4: Distribution of all 8 year growth rates
Papua New Guinea vs. world



Paraguay

Figure 1: Overall, ten, and five year growth rates: Paraguay

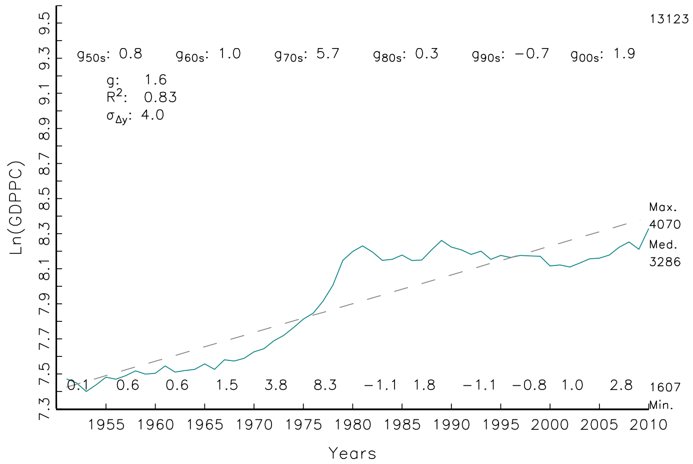


Figure 2: Initial and Final level of GDPPC: Paraguay

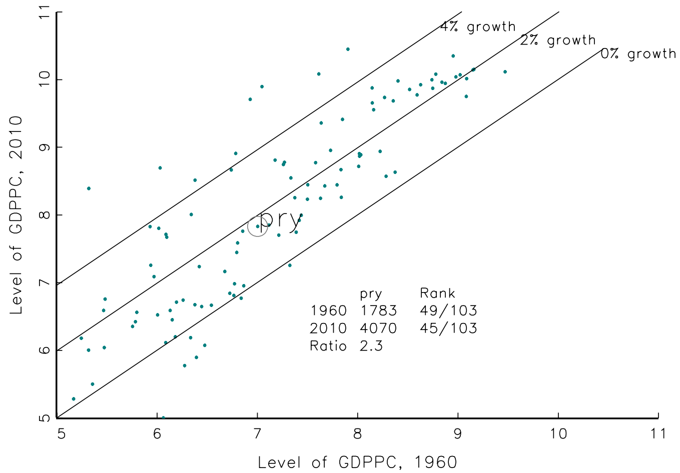


Figure 3: (ln) First Differences and five year MA: Paraguay

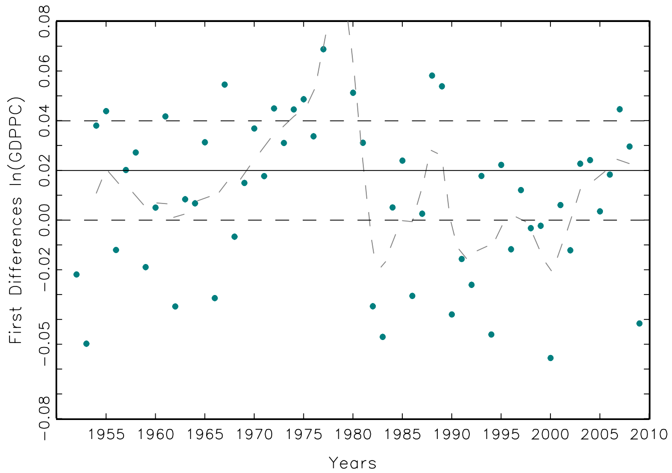
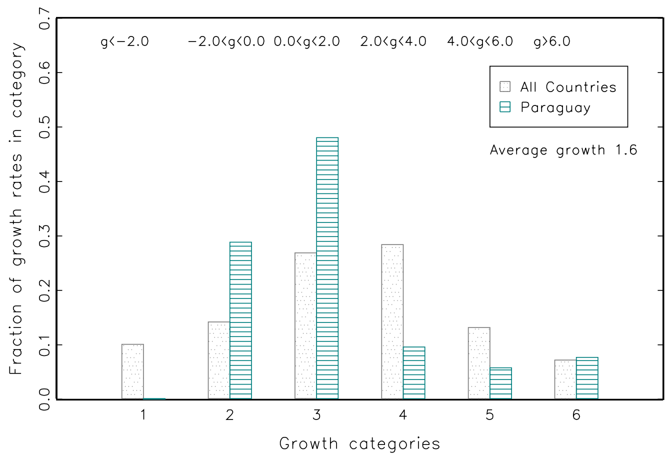


Figure 4: Distribution of all 8 year growth rates
Paraguay vs. world



Peru

Figure 1: Overall, ten, and five year growth rates: Peru

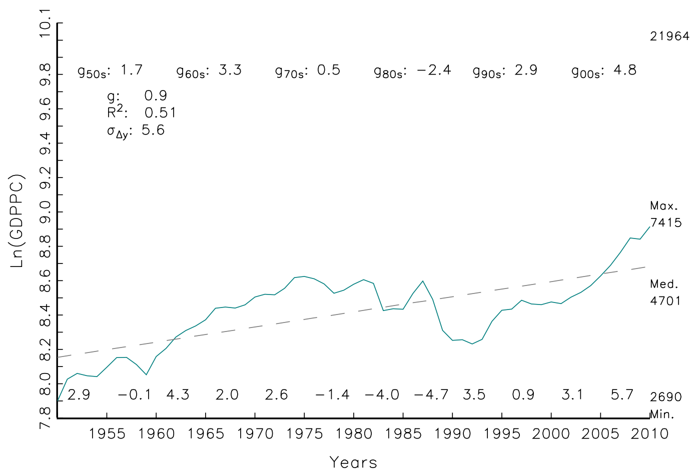


Figure 2: Initial and Final level of GDPPC: Peru

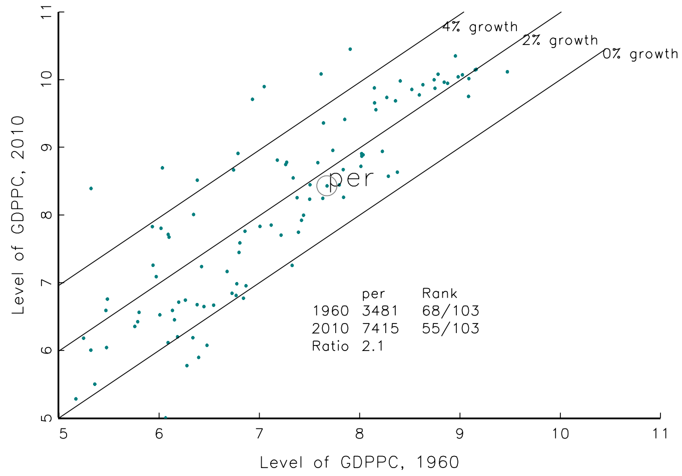


Figure 3: (ln) First Differences and five year MA: Peru

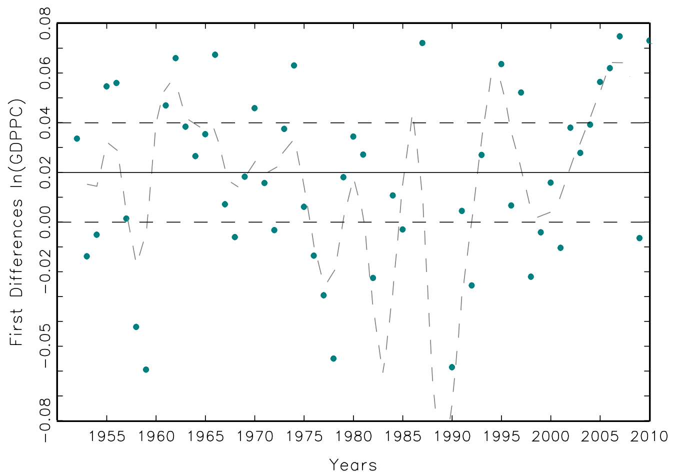
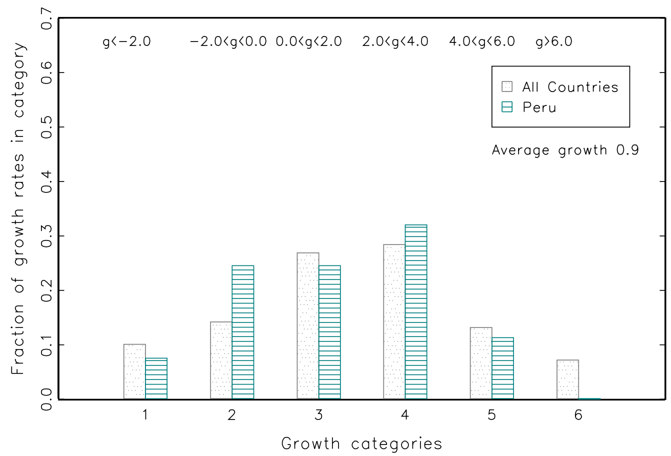


Figure 4: Distribution of all 8 year growth rates
Peru vs. world



Philippines

Figure 1: Overall, ten, and five year growth rates: Philippines

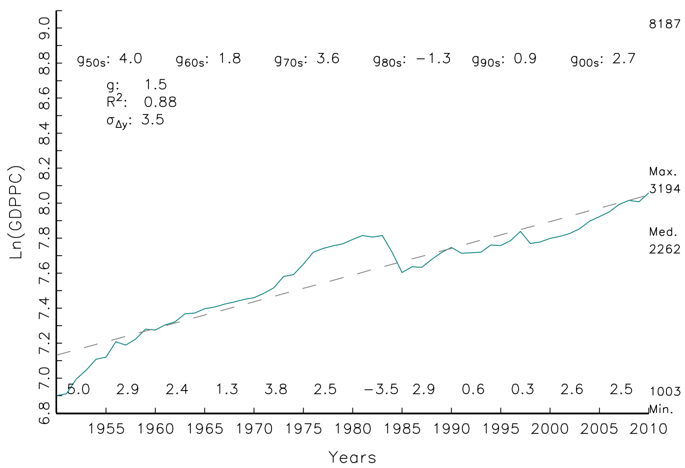


Figure 2: Initial and Final level of GDPPC: Philippines

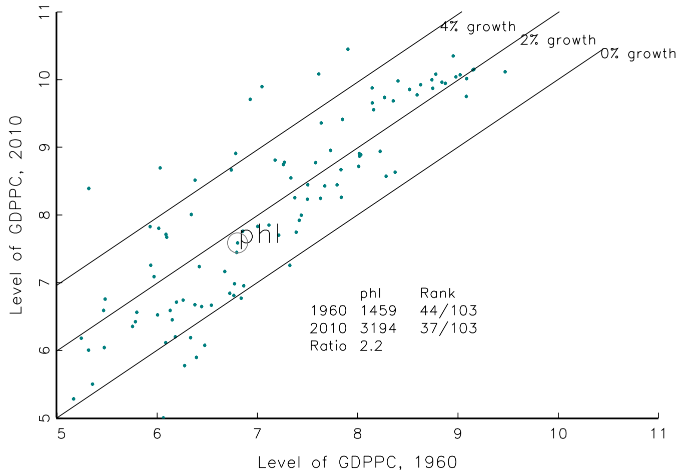


Figure 3: (ln) First Differences and five year MA: Philippines

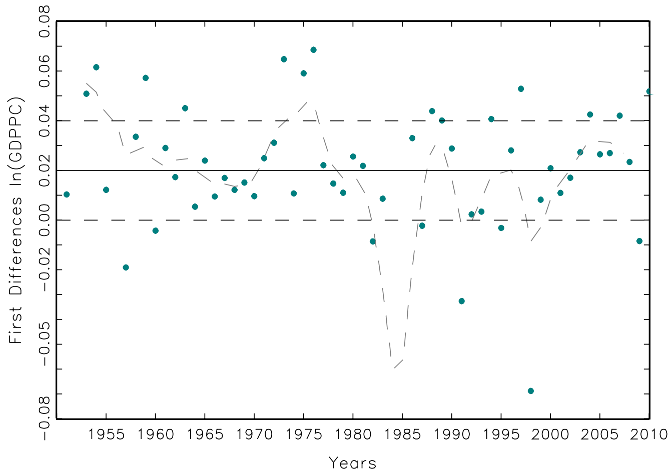
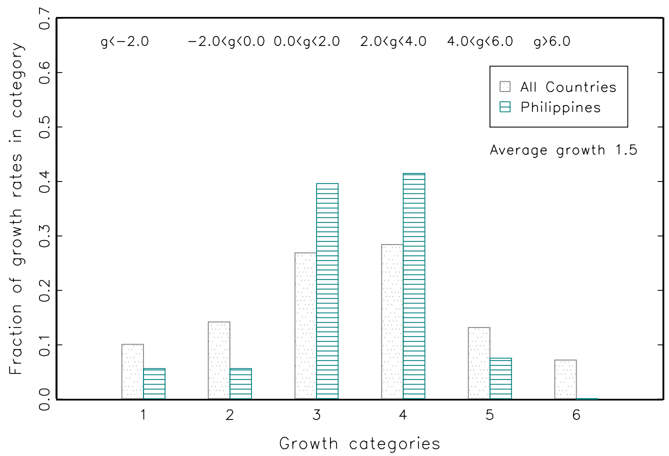


Figure 4: Distribution of all 8 year growth rates
Philippines vs. world



Poland

Figure 1: Overall, ten, and five year growth rates: Poland

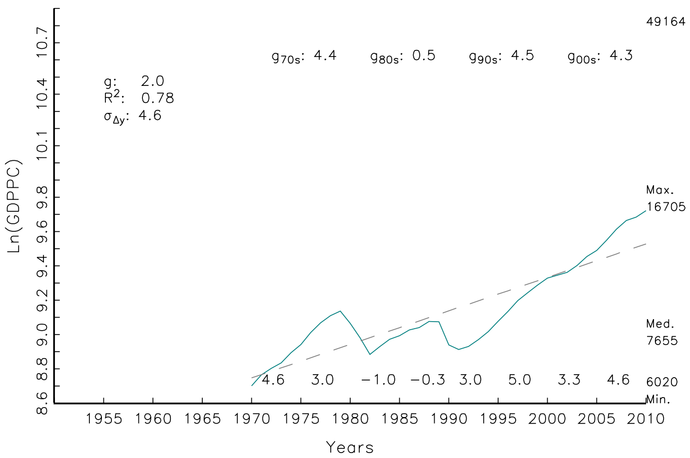


Figure 2: Initial and Final level of GDPPC: Poland

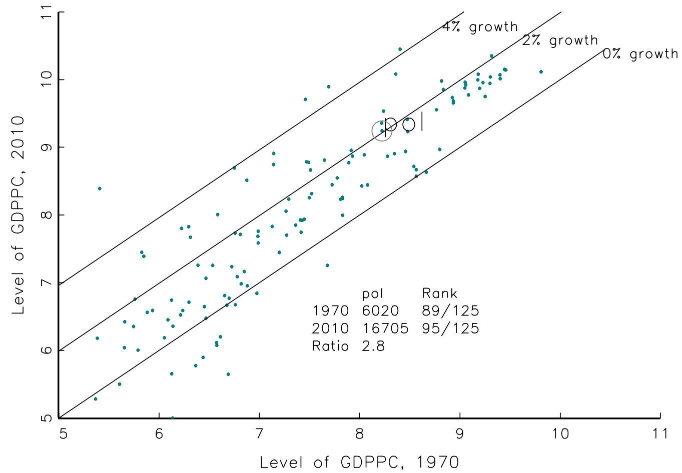


Figure 3: (ln) First Differences and five year MA: Poland

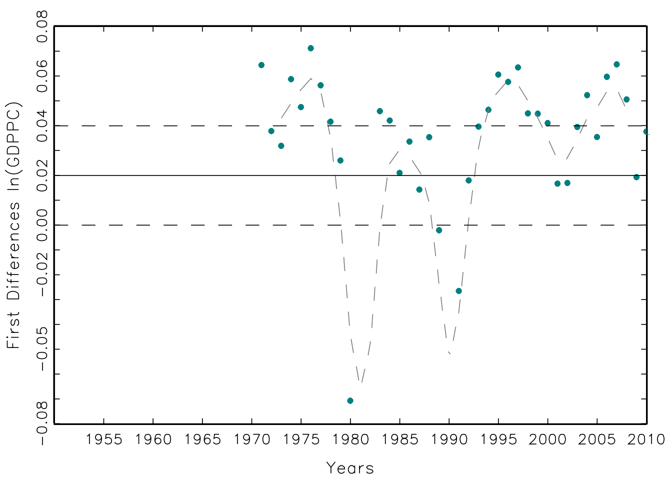
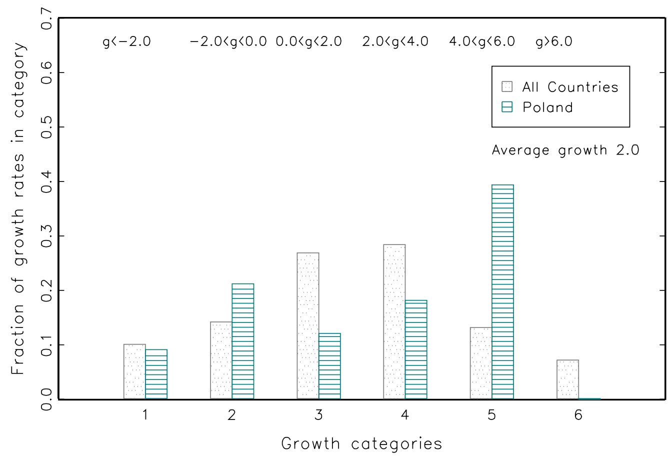


Figure 4: Distribution of all 8 year growth rates Poland vs. world



Portugal

Figure 1: Overall, ten, and five year growth rates: Portugal

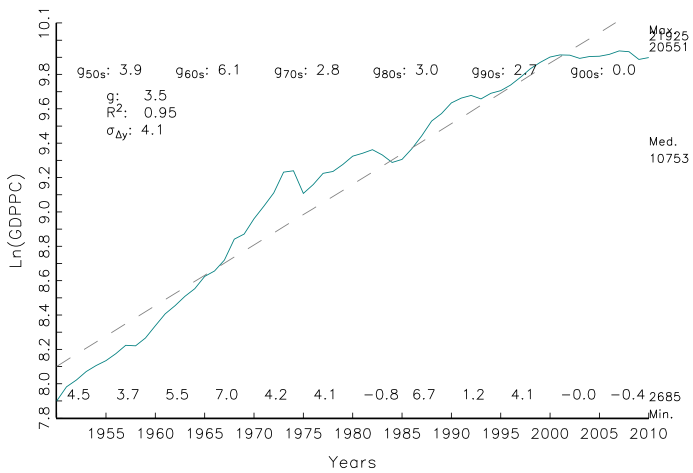


Figure 2: Initial and Final level of GDPPC: Portugal

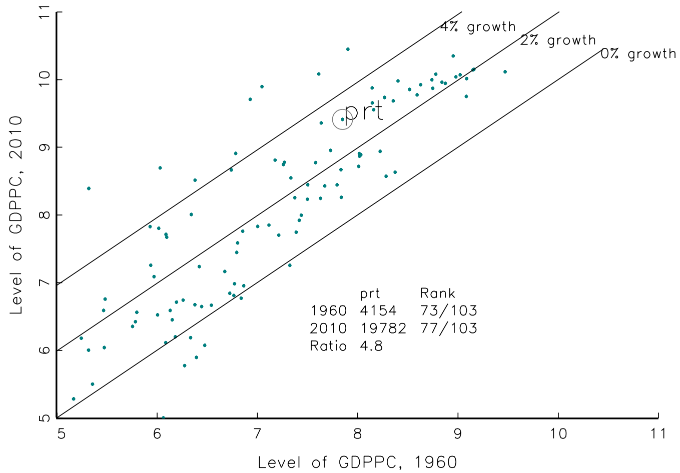


Figure 3: (ln) First Differences and five year MA: Portugal

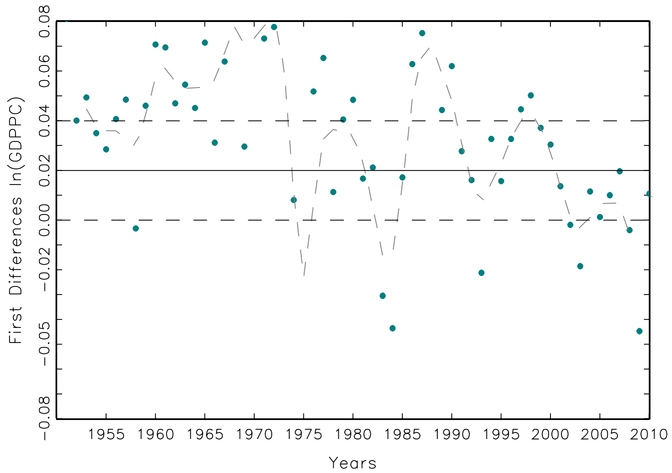
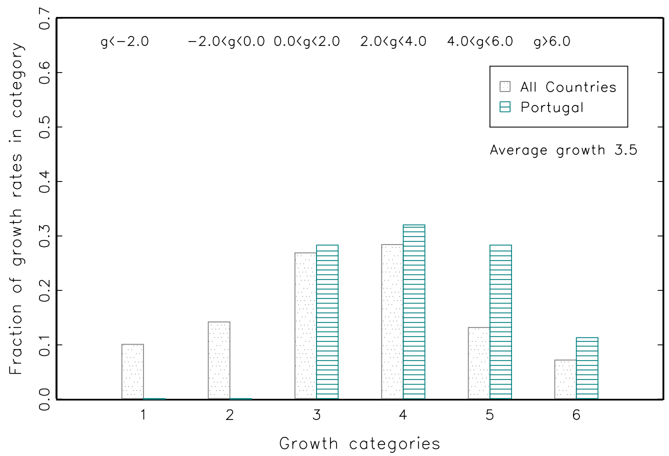


Figure 4: Distribution of all 8 year growth rates
Portugal vs. world



Puerto Rico

Figure 1: Overall, ten, and five year growth rates: Puerto Rico

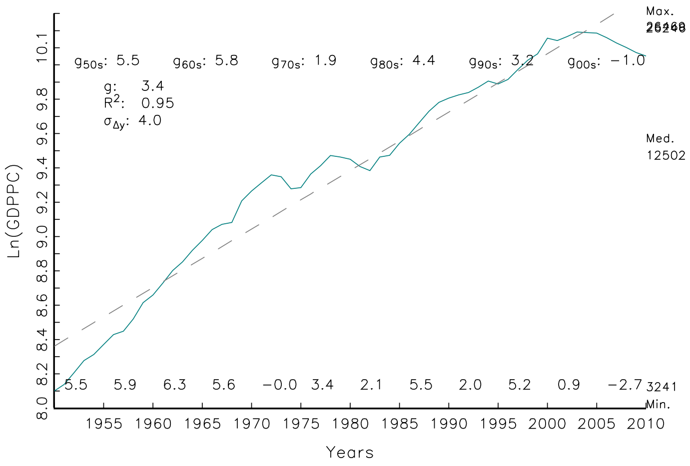


Figure 2: Initial and Final level of GDPPC: Puerto Rico

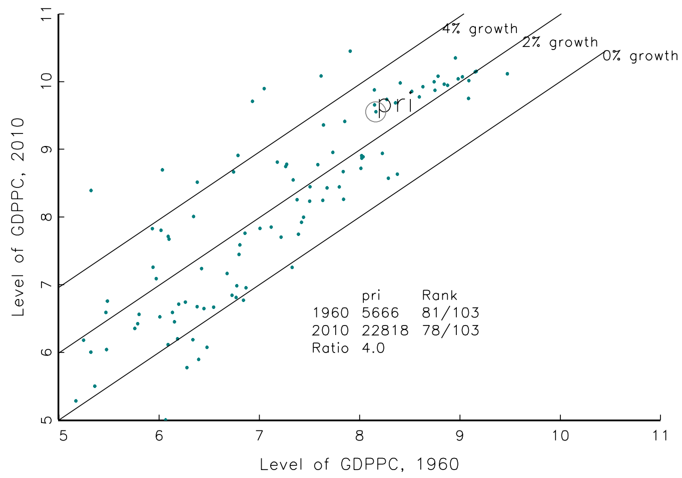


Figure 3: (ln) First Differences and five year MA: Puerto Rico

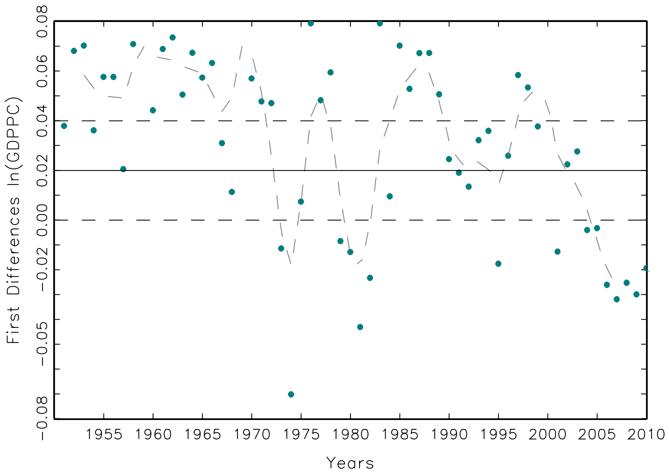
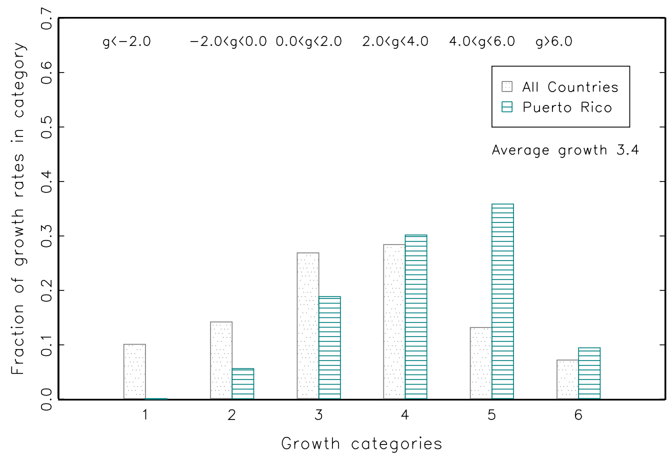


Figure 4: Distribution of all 8 year growth rates
Puerto Rico vs. world



Romania

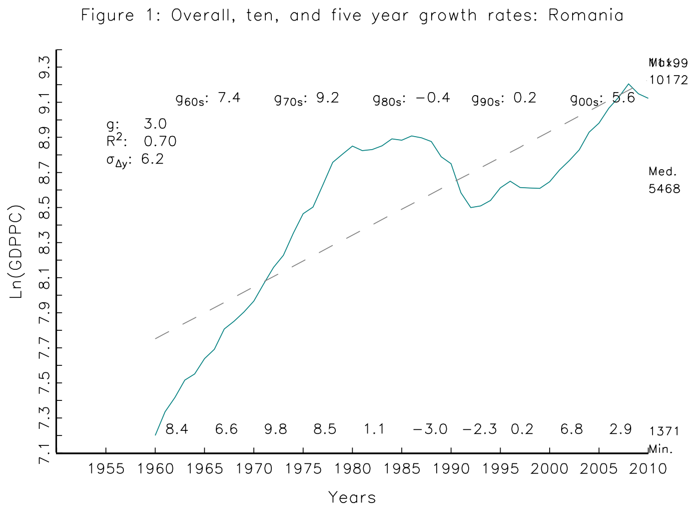


Figure 1: Overall, ten, and five year growth rates: Romania
g_{60s}: 7.4
g_{70s}: 9.2
g_{80s}: −0.4
g_{90s}: 0.2
g_{00s}: 5.6
g: 3.0
R^2: 0.70
$\sigma_{\Delta y}$: 6.2
Max.
10172
Med.
5468
1371
Min.
8.4 6.6 9.8 8.5 1.1 −3.0 −2.3 0.2 6.8 2.9
Ln(GDPPC)
Years

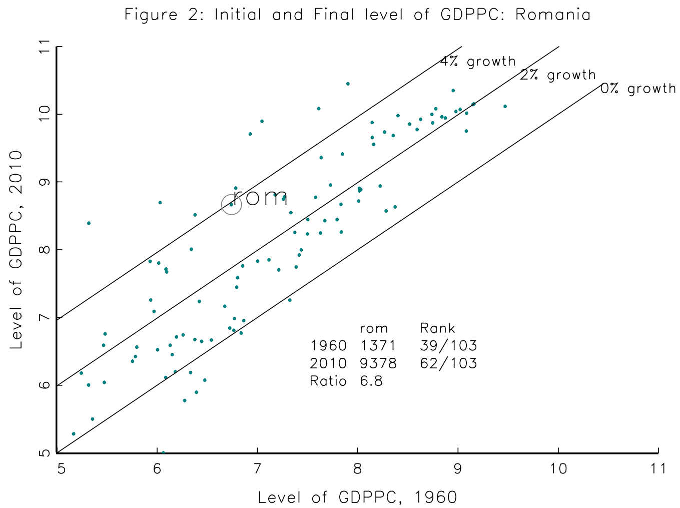


Figure 2: Initial and Final level of GDPPC: Romania
4% growth
2% growth
0% growth
rom
rom Rank
1960 1371 39/103
2010 9378 62/103
Ratio 6.8
Level of GDPPC, 2010
Level of GDPPC, 1960

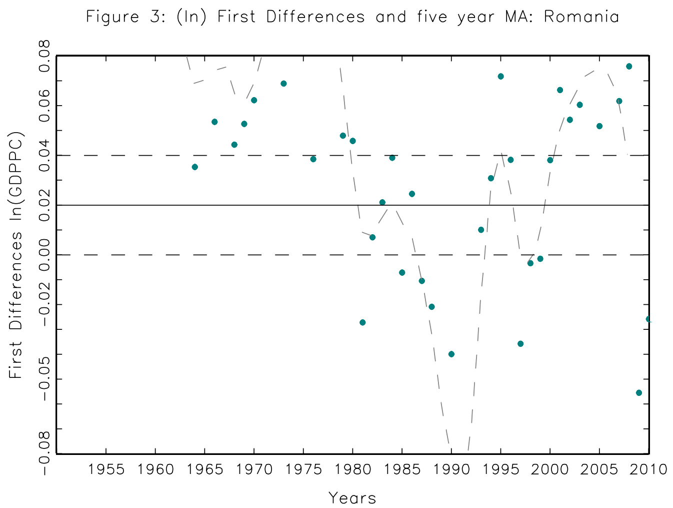


Figure 3: (ln) First Differences and five year MA: Romania
First Differences ln(GDPPC)
Years

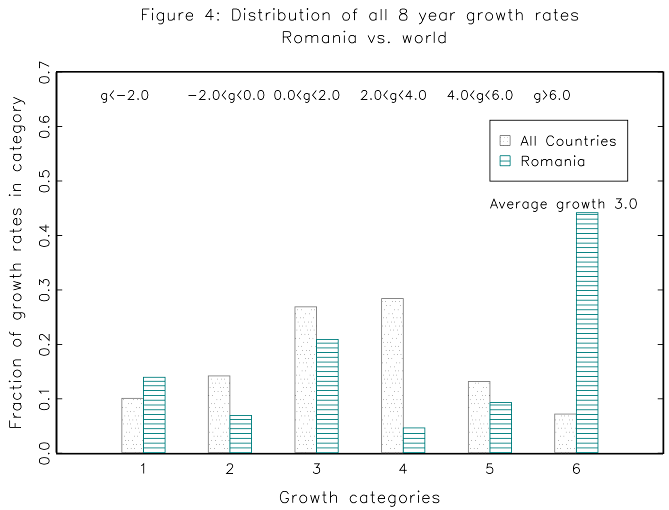


Figure 4: Distribution of all 8 year growth rates
Romania vs. world
g<−2.0
−2.0<g<0.0
0.0<g<2.0
2.0<g<4.0
4.0<g<6.0
g>6.0
All Countries
Romania
Average growth 3.0
Fraction of growth rates in category
Growth categories

Rwanda

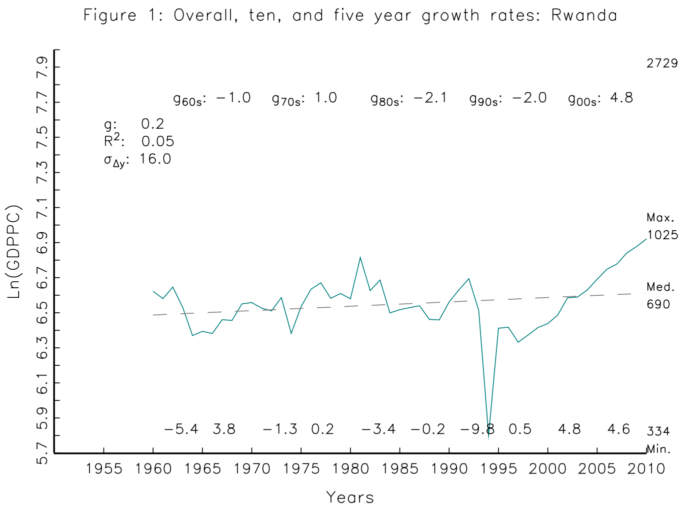


Figure 1: Overall, ten, and five year growth rates: Rwanda
g: 0.2
R2: 0.05
σΔy: 16.0
g60s: −1.0
g70s: 1.0
g80s: −2.1
g90s: −2.0
g00s: 4.8
2729
Max. 1025
Med. 690
334 Min.
−5.4 3.8 −1.3 0.2 −3.4 −0.2 −9.8 0.5 4.8 4.6
Ln(GDPPC)
Years

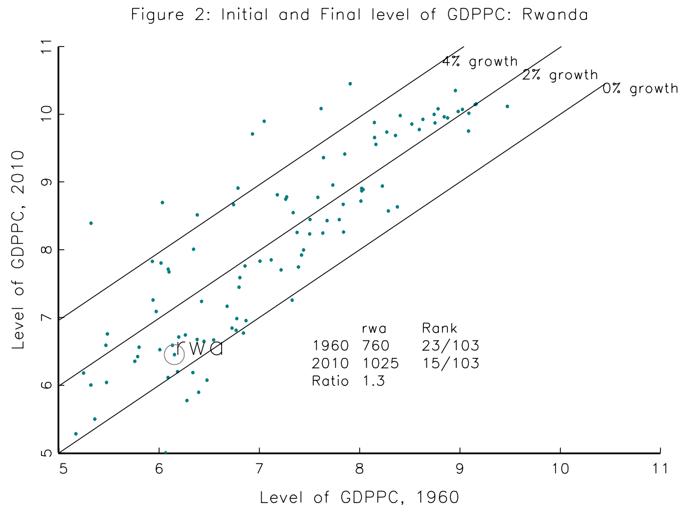


Figure 2: Initial and Final level of GDPPC: Rwanda
4% growth
2% growth
0% growth
rwa
rwa Rank
1960 760 23/103
2010 1025 15/103
Ratio 1.3
Level of GDPPC, 2010
Level of GDPPC, 1960

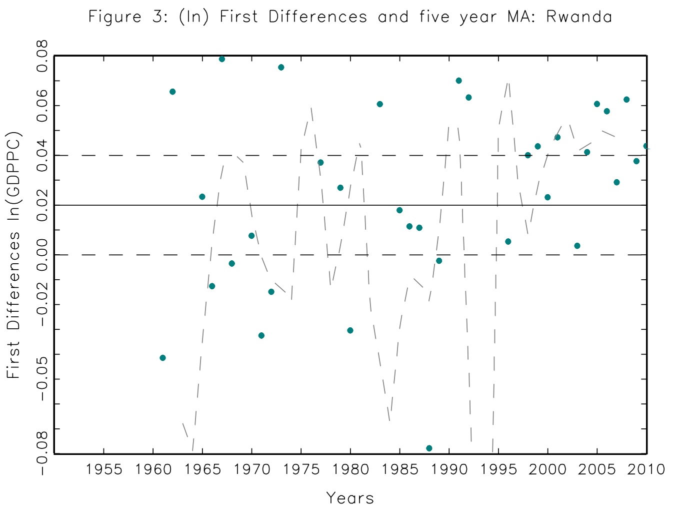


Figure 3: (ln) First Differences and five year MA: Rwanda
First Differences ln(GDPPC)
Years

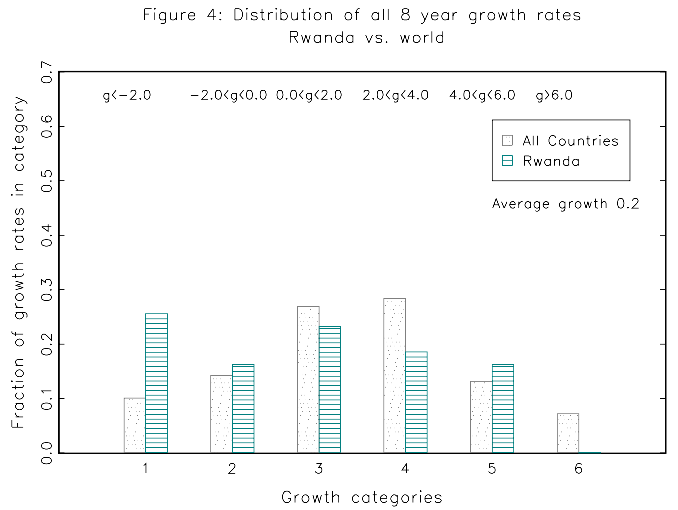


Figure 4: Distribution of all 8 year growth rates
Rwanda vs. world
g<−2.0
−2.0<g<0.0
0.0<g<2.0
2.0<g<4.0
4.0<g<6.0
g>6.0
All Countries
Rwanda
Average growth 0.2
Fraction of growth rates in category
Growth categories

Senegal

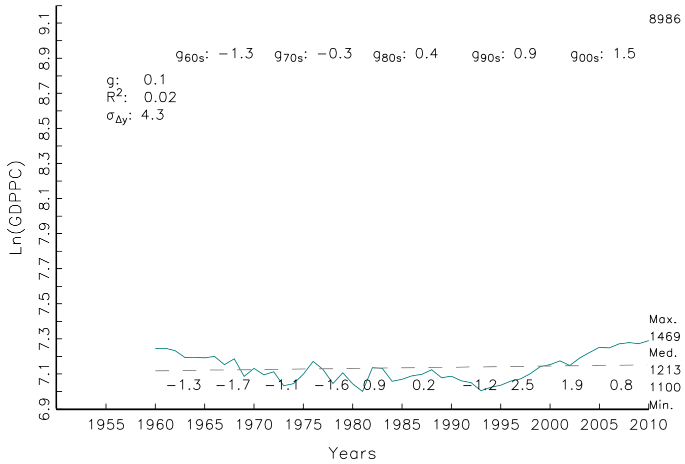


Figure 1: Overall, ten, and five year growth rates: Senegal

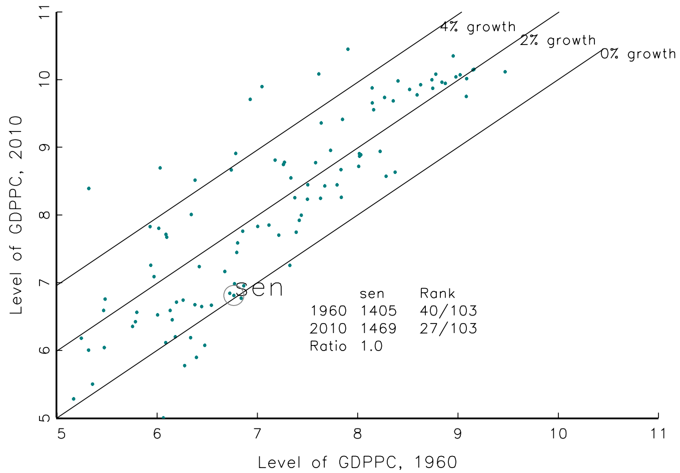


Figure 2: Initial and Final level of GDPPC: Senegal

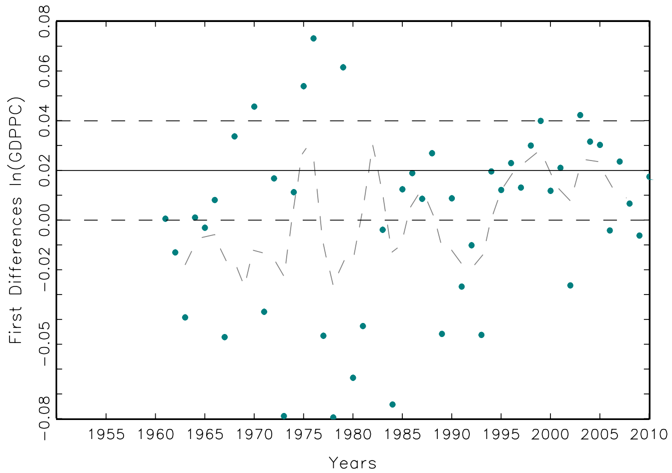


Figure 3: (ln) First Differences and five year MA: Senegal

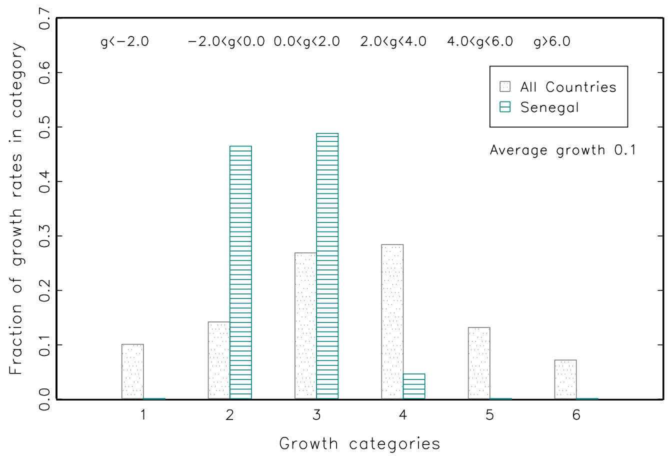


Figure 4: Distribution of all 8 year growth rates
Senegal vs. world

Sierra Leone

Figure 1: Overall, ten, and five year growth rates: Sierra Leone

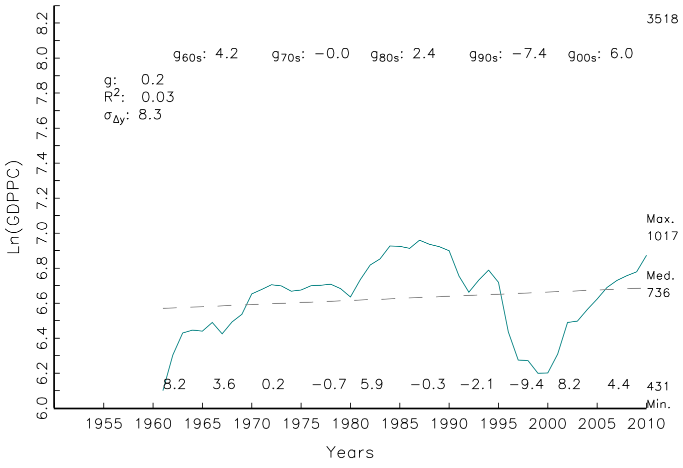


Figure 2: Initial and Final level of GDPPC: Sierra Leone

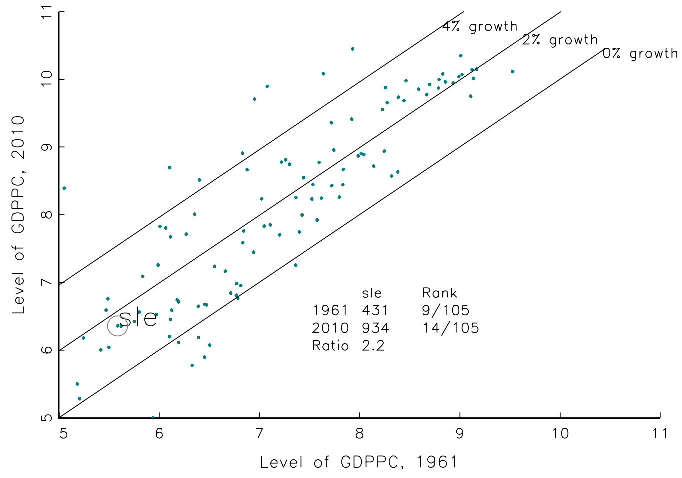


Figure 3: (ln) First Differences and five year MA: Sierra Leone

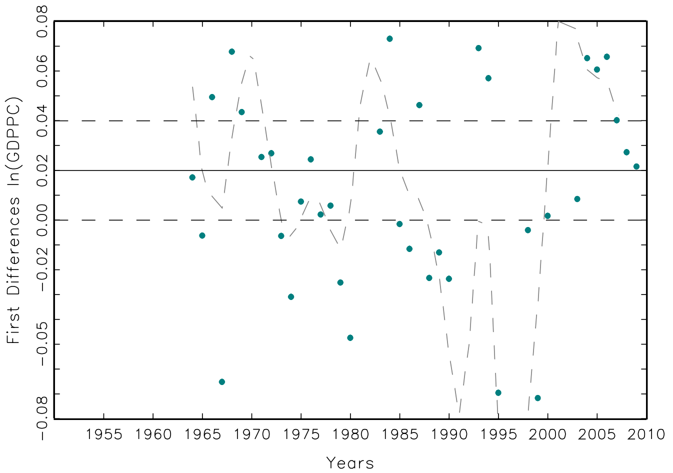
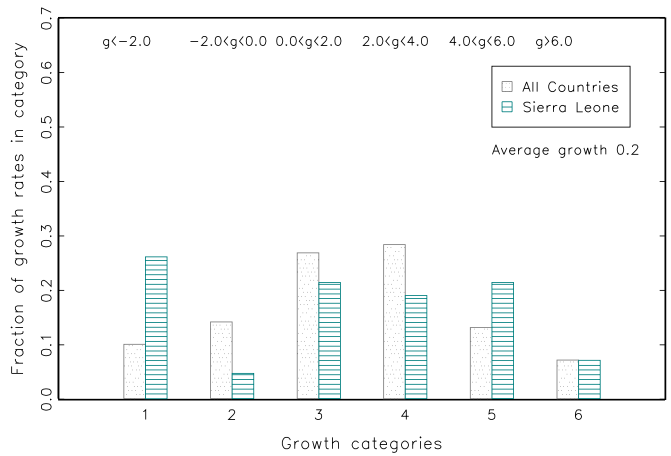


Figure 4: Distribution of all 8 year growth rates
Sierra Leone vs. world



Singapore

Figure 1: Overall, ten, and five year growth rates: Singapore

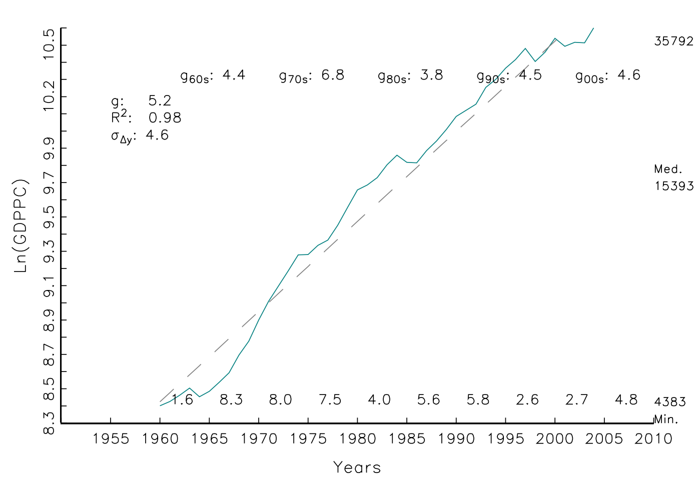


Figure 2: Initial and Final level of GDPPC: Singapore

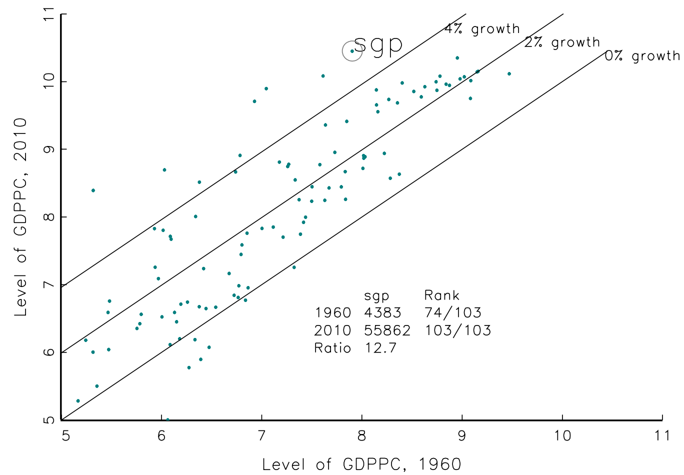


Figure 3: (ln) First Differences and five year MA: Singapore

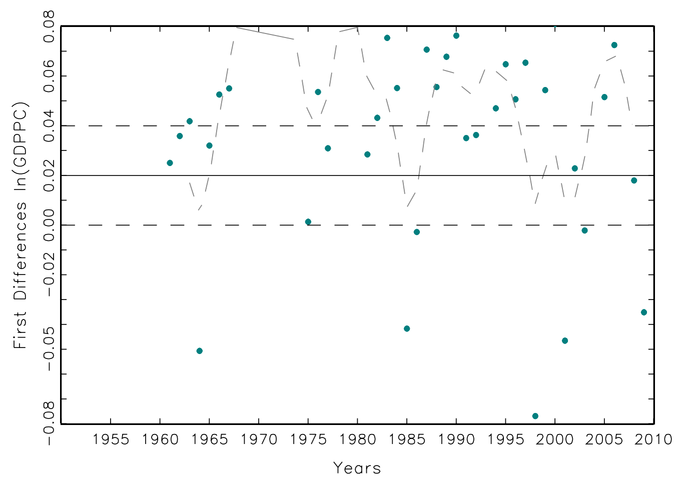
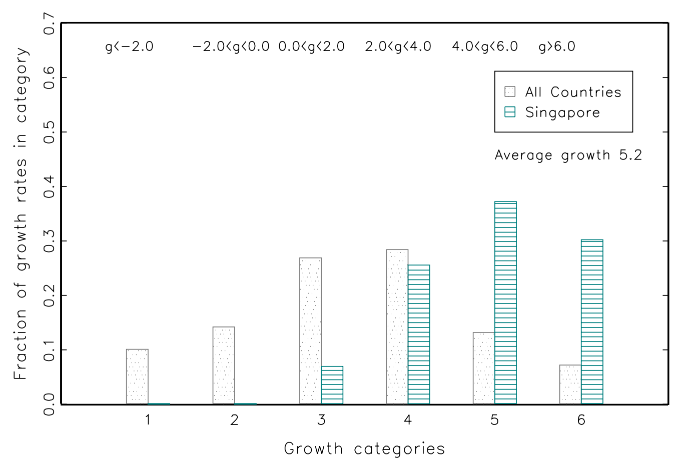


Figure 4: Distribution of all 8 year growth rates
Singapore vs. world



Somalia

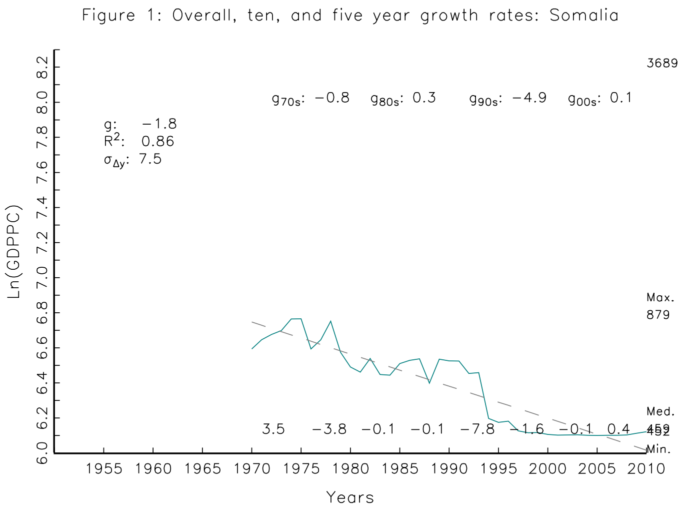


Figure 1: Overall, ten, and five year growth rates: Somalia
g: −1.8
R2: 0.86
σΔy: 7.5
g70s: −0.8 g80s: 0.3 g90s: −4.9 g00s: 0.1
3689
Max. 879
Med. 459
Min.
3.5 −3.8 −0.1 −0.1 −7.8 −1.6 −0.1 0.4
Ln(GDPPC)
Years

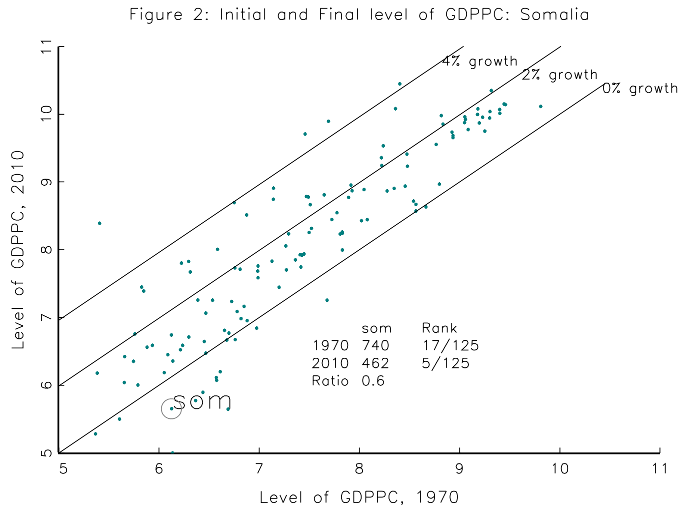


Figure 2: Initial and Final level of GDPPC: Somalia
4% growth
2% growth
0% growth
som Rank
1970 740 17/125
2010 462 5/125
Ratio 0.6
som
Level of GDPPC, 2010
Level of GDPPC, 1970

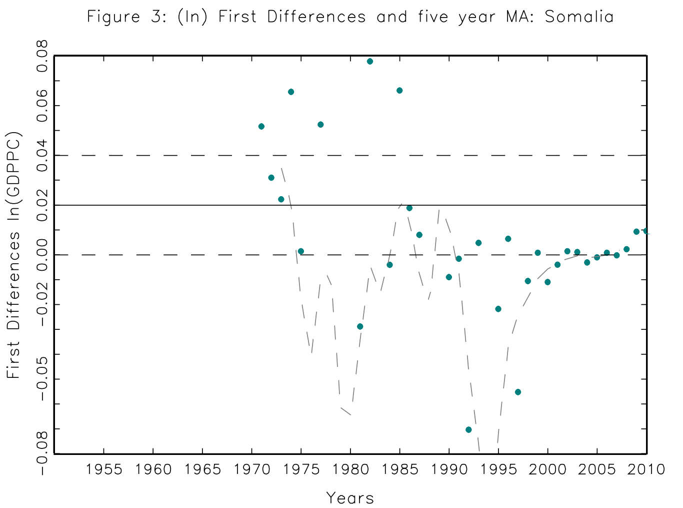


Figure 3: (ln) First Differences and five year MA: Somalia
First Differences ln(GDPPC)
Years

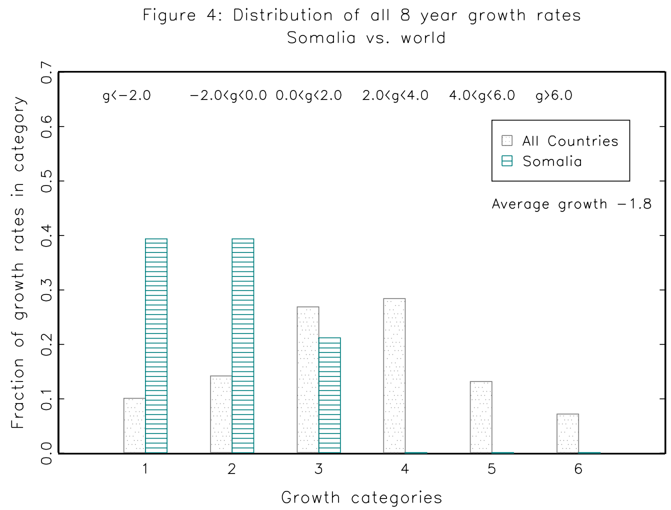
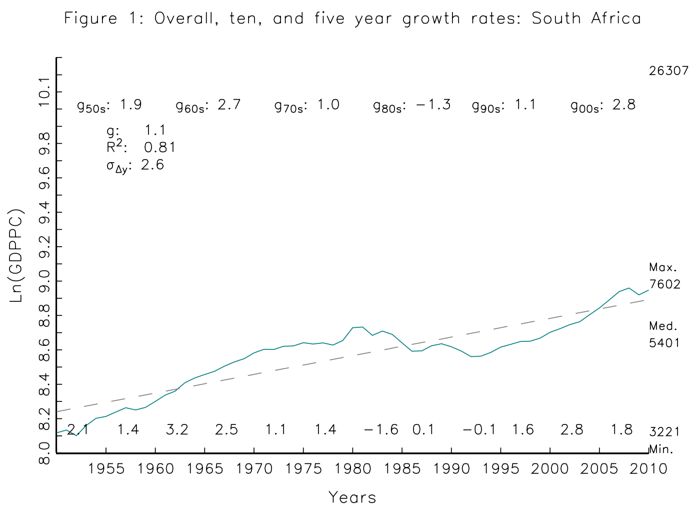
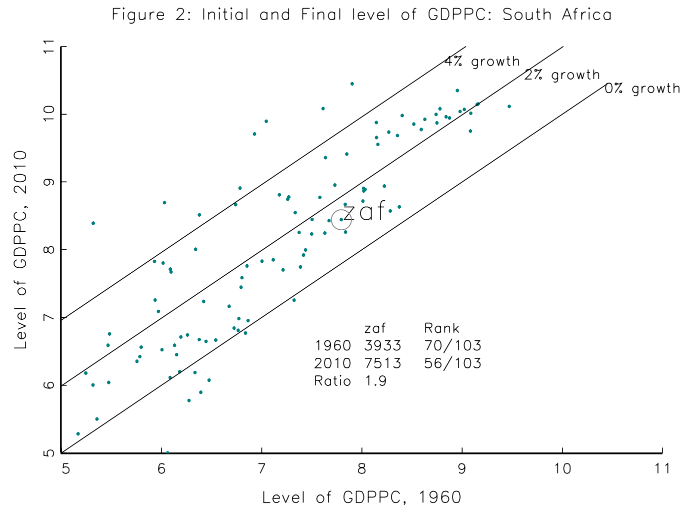
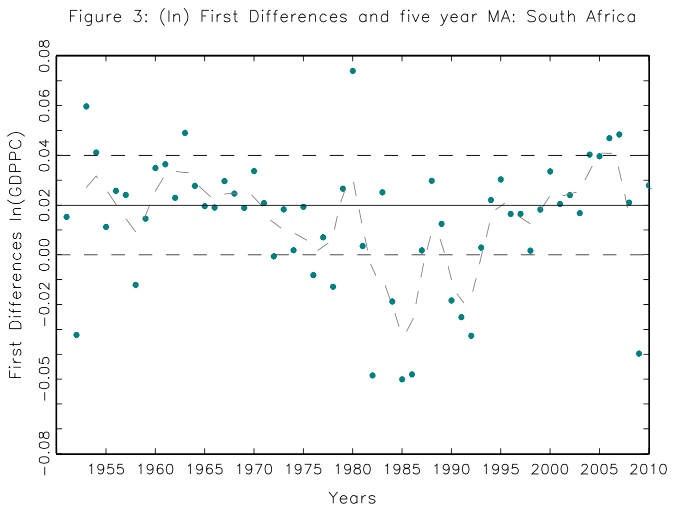


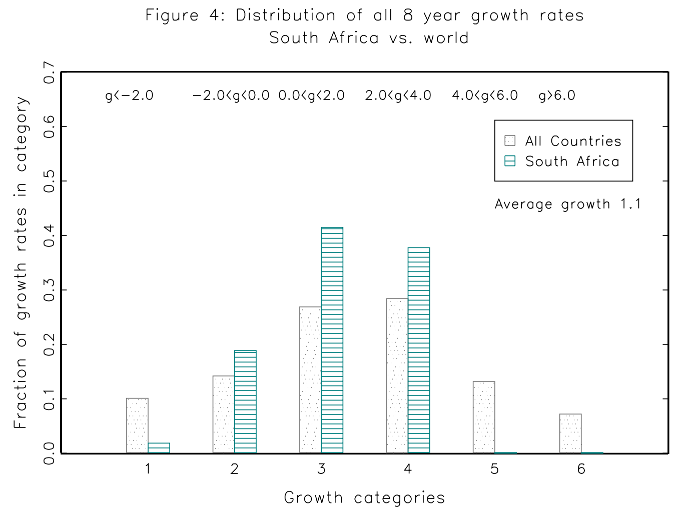
Figure 4: Distribution of all 8 year growth rates
Somalia vs. world
g<−2.0 −2.0<g<0.0 0.0<g<2.0 2.0<g<4.0 4.0<g<6.0 g>6.0
All Countries
Somalia
Average growth −1.8
Fraction of growth rates in category
Growth categories

South Africa









Spain

Figure 1: Overall, ten, and five year growth rates: Spain

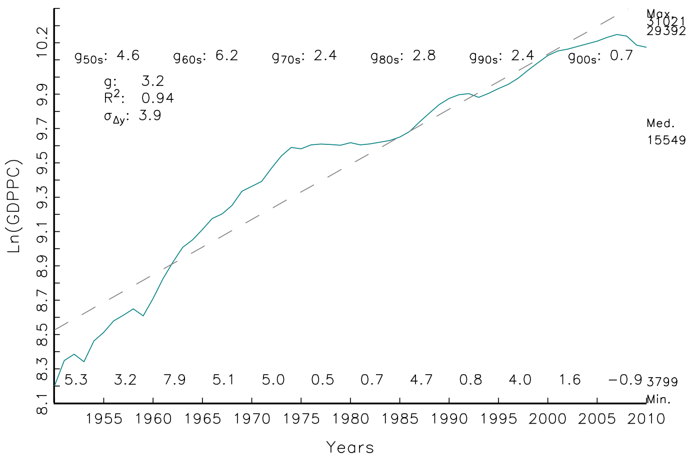


Figure 2: Initial and Final level of GDPPC: Spain

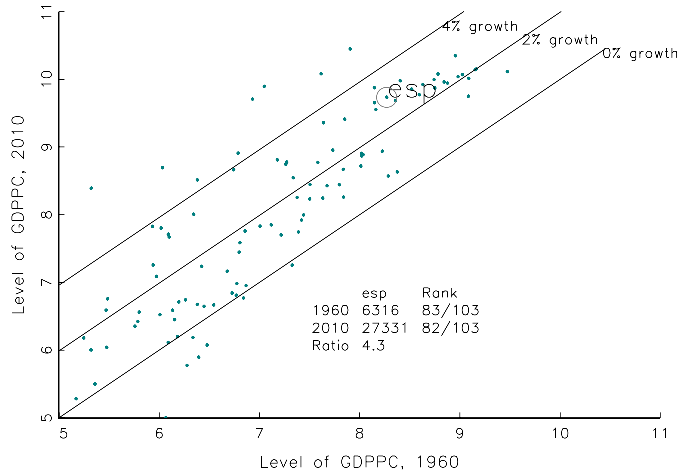


Figure 3: (ln) First Differences and five year MA: Spain

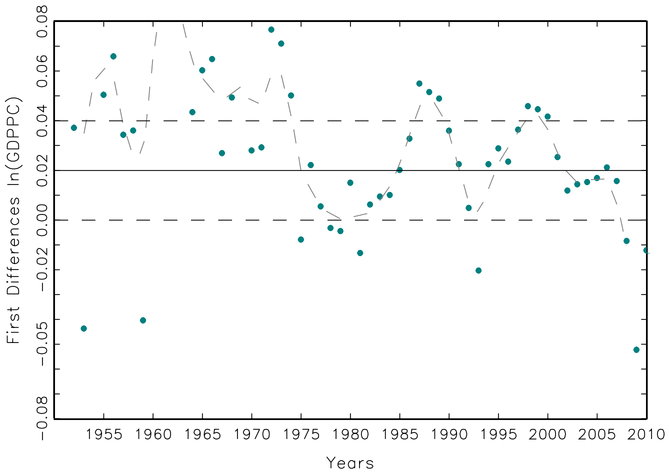
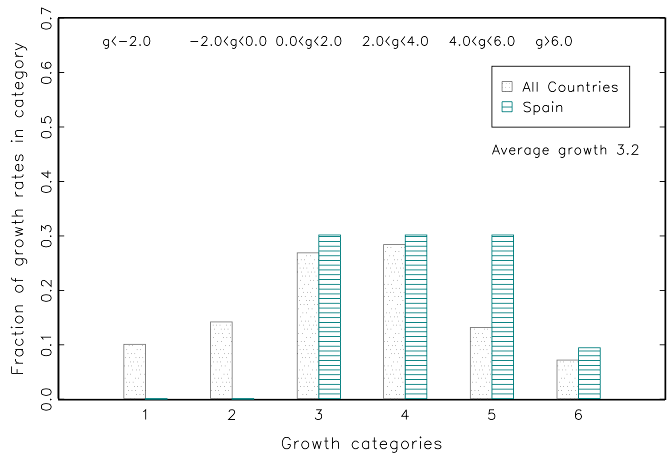


Figure 4: Distribution of all 8 year growth rates
Spain vs. world



Sri Lanka

Figure 1: Overall, ten, and five year growth rates: Sri Lanka

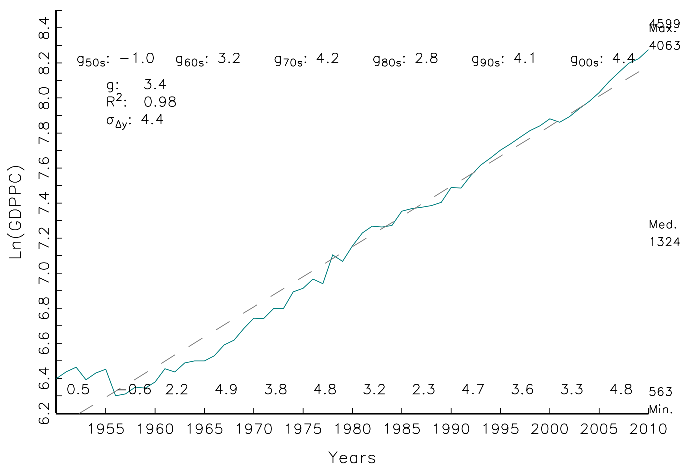


Figure 2: Initial and Final level of GDPPC: Sri Lanka

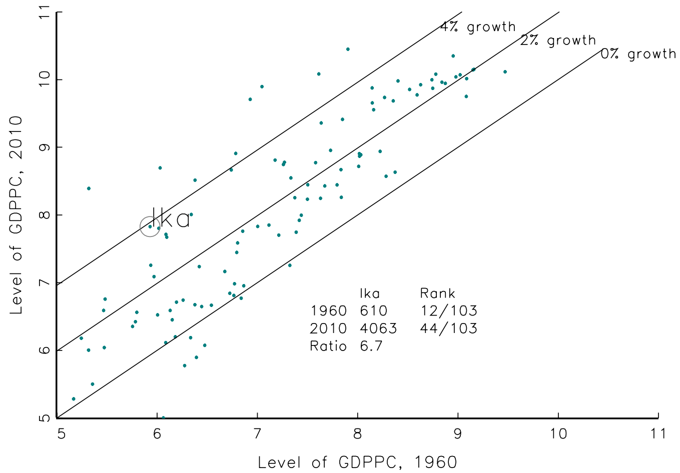


Figure 3: (ln) First Differences and five year MA: Sri Lanka

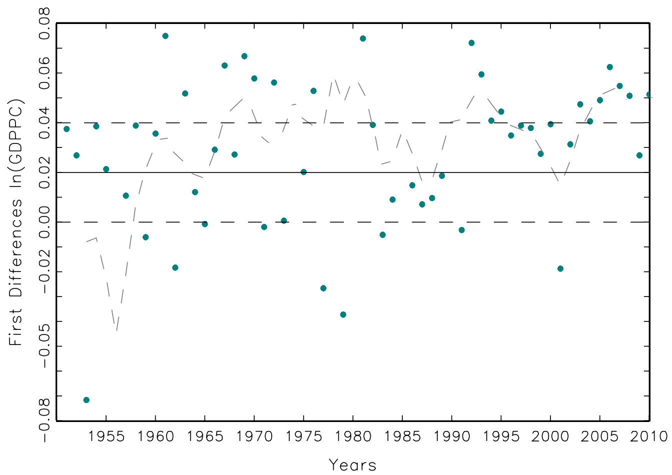
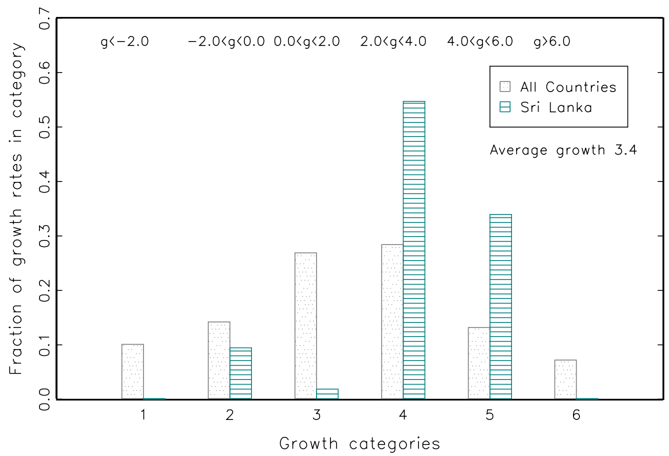


Figure 4: Distribution of all 8 year growth rates
Sri Lanka vs. world



Sudan

Figure 1: Overall, ten, and five year growth rates: Sudan

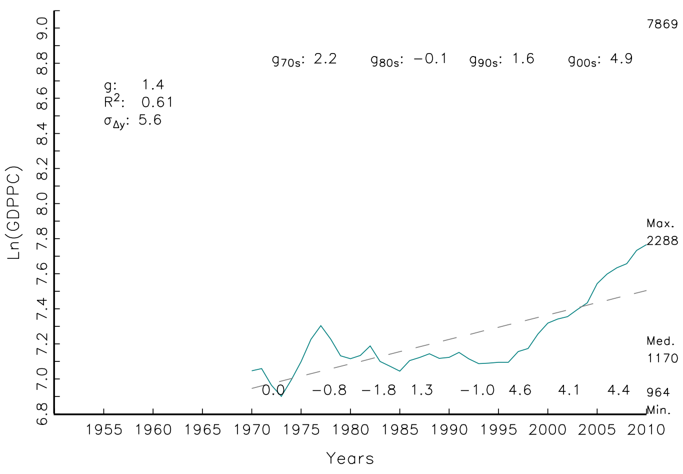


Figure 2: Initial and Final level of GDPPC: Sudan

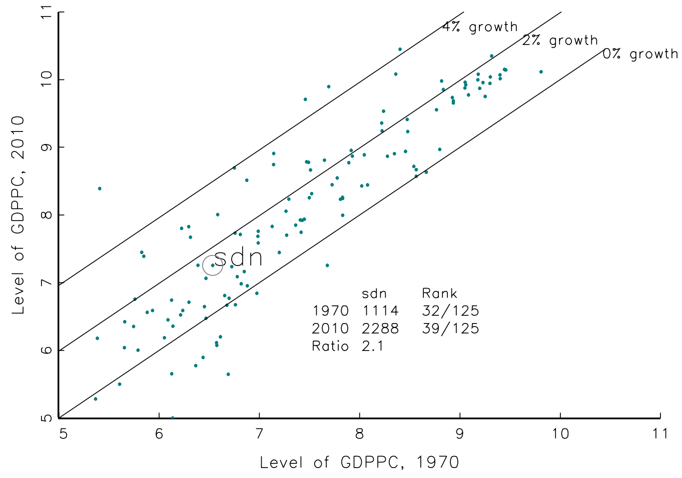


Figure 3: (ln) First Differences and five year MA: Sudan

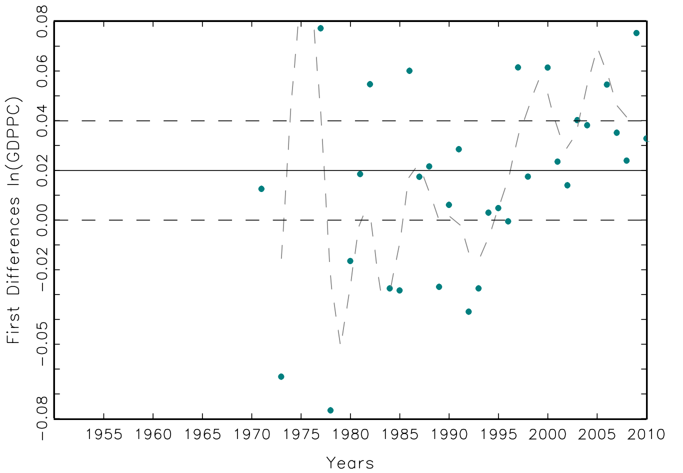
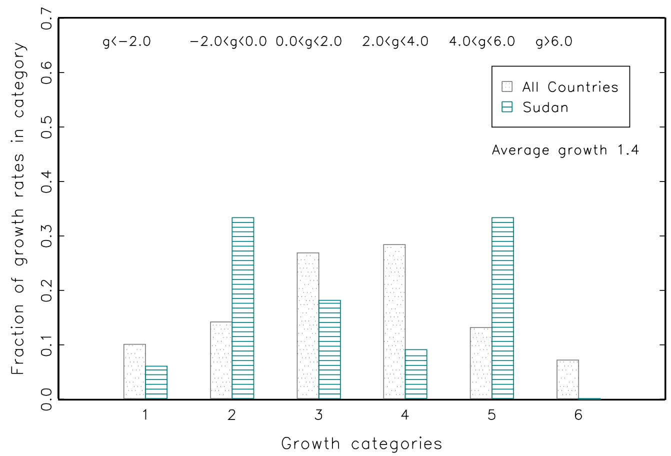


Figure 4: Distribution of all 8 year growth rates
Sudan vs. world



Swaziland

Figure 1: Overall, ten, and five year growth rates: Swaziland

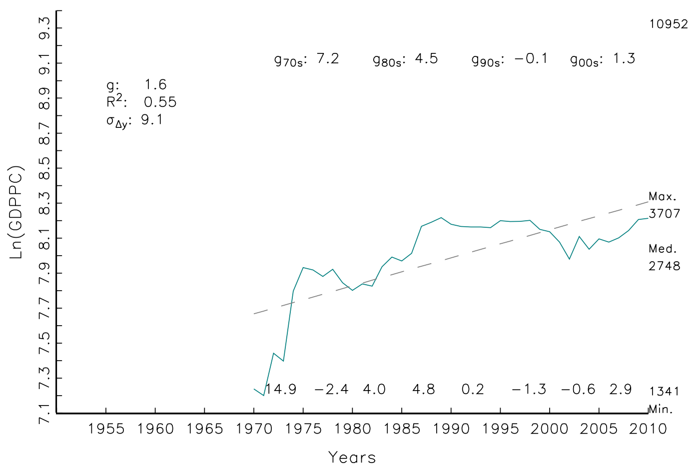


Figure 2: Initial and Final level of GDPPC: Swaziland

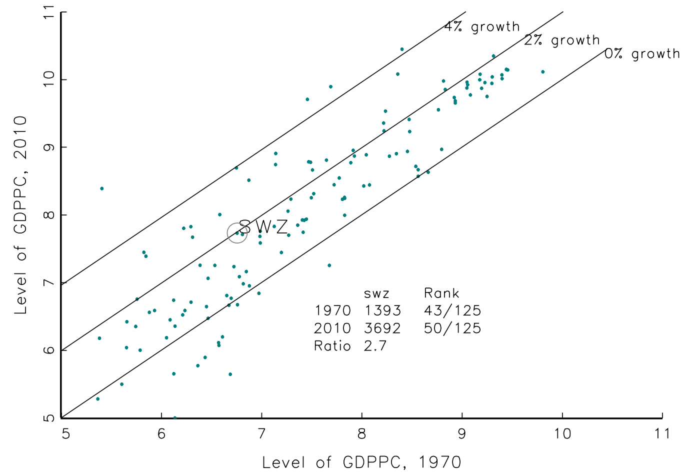


Figure 3: (ln) First Differences and five year MA: Swaziland

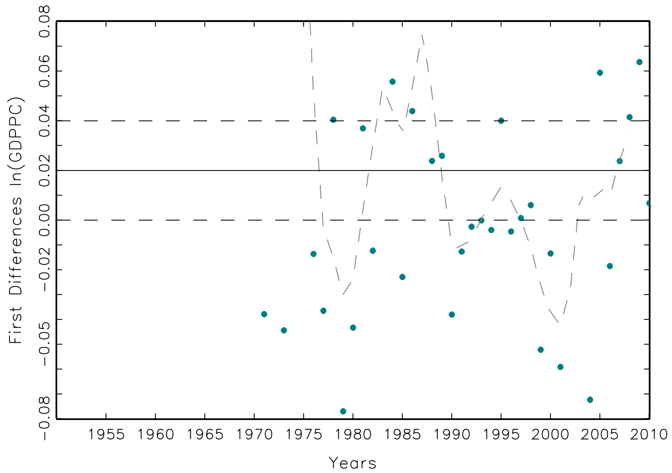
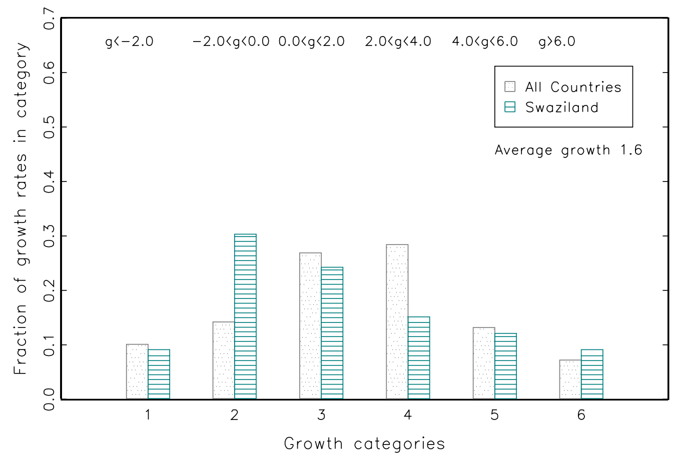


Figure 4: Distribution of all 8 year growth rates Swaziland vs. world



Sweden

Figure 1: Overall, ten, and five year growth rates: Sweden

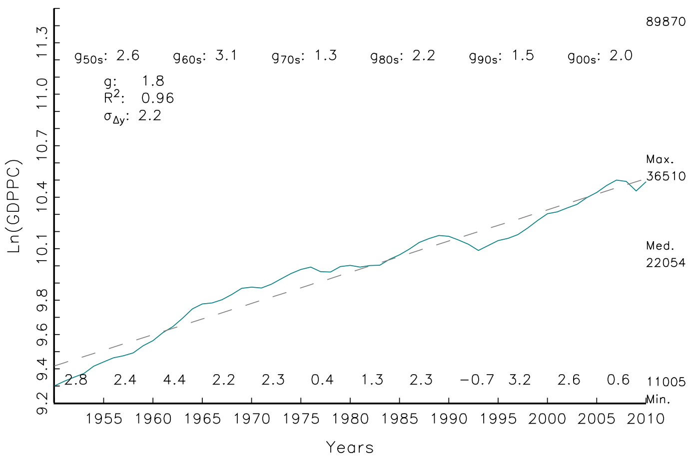


Figure 2: Initial and Final level of GDPPC: Sweden

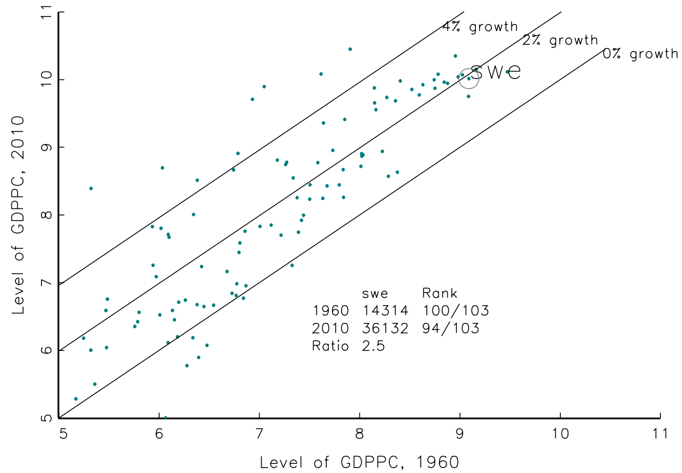


Figure 3: (ln) First Differences and five year MA: Sweden

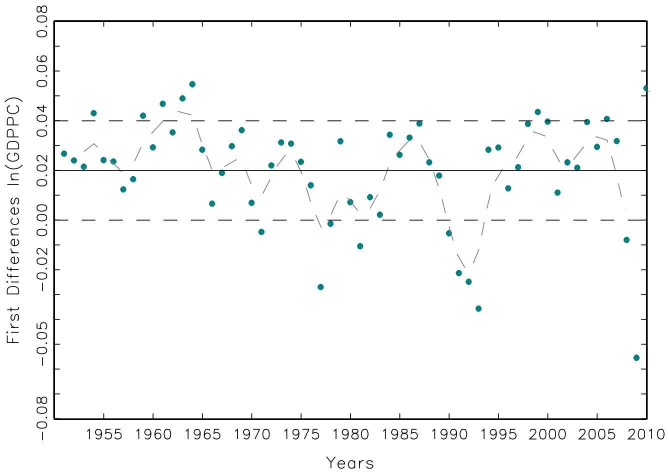
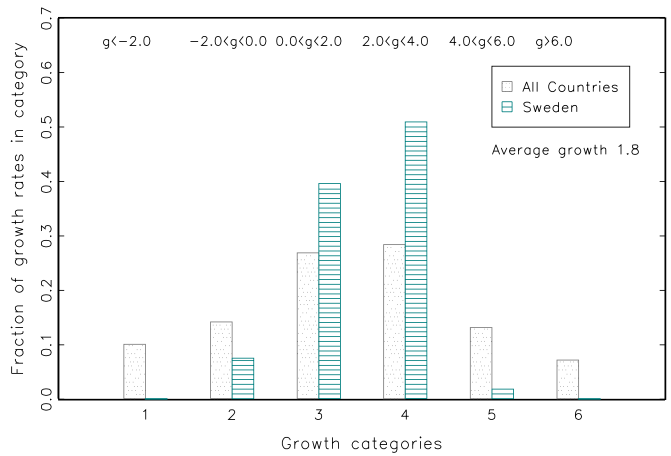


Figure 4: Distribution of all 8 year growth rates Sweden vs. world



Switzerland

Figure 1: Overall, ten, and five year growth rates: Switzerland

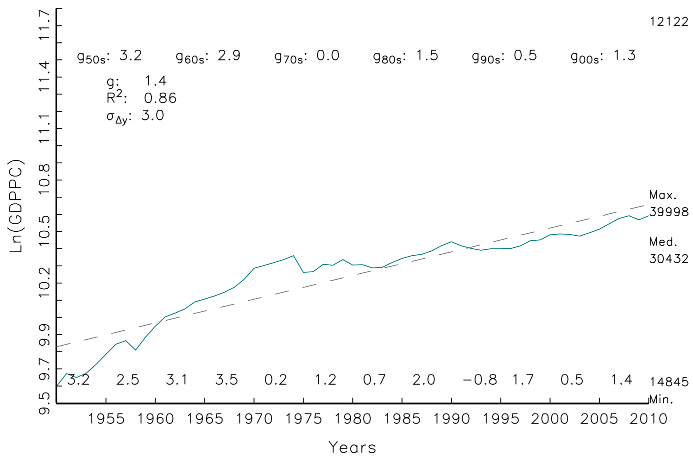


Figure 2: Initial and Final level of GDPPC: Switzerland

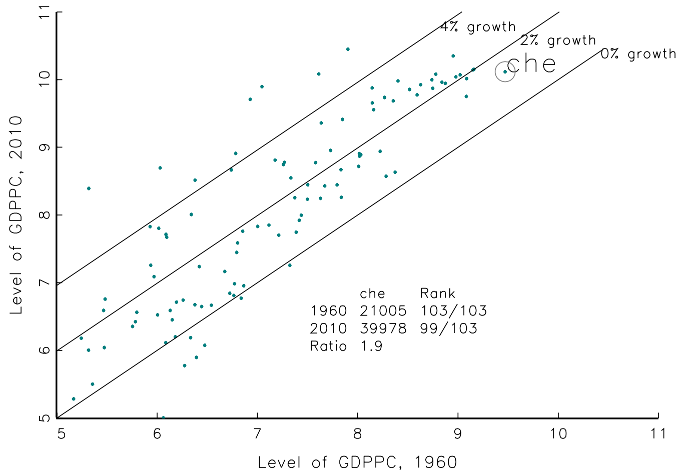


Figure 3: (ln) First Differences and five year MA: Switzerland

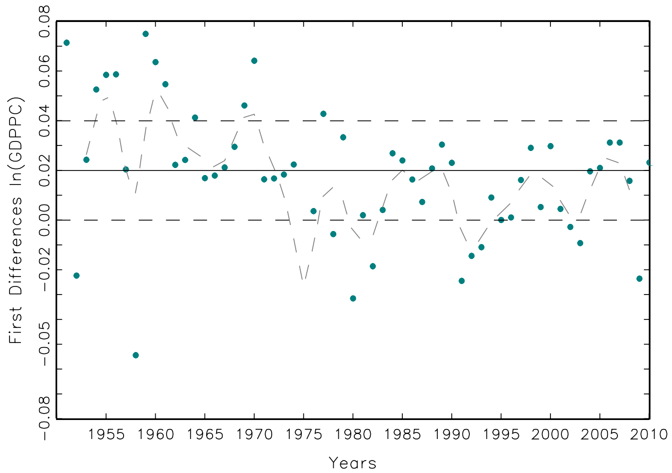
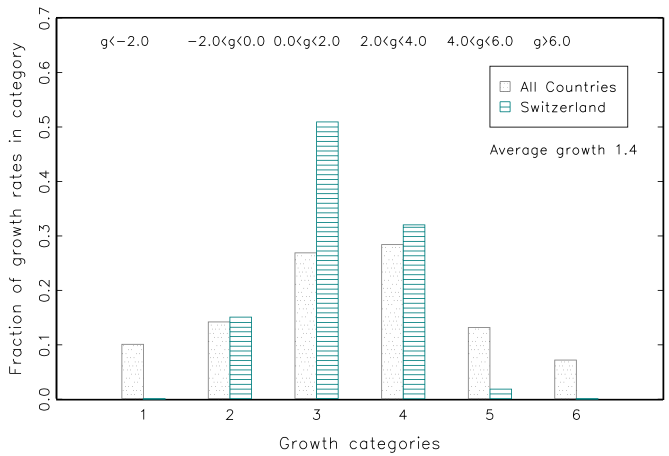


Figure 4: Distribution of all 8 year growth rates
Switzerland vs. world



Syrian Arab Republic

Figure 1: Overall, ten, and five year growth rates: Syria

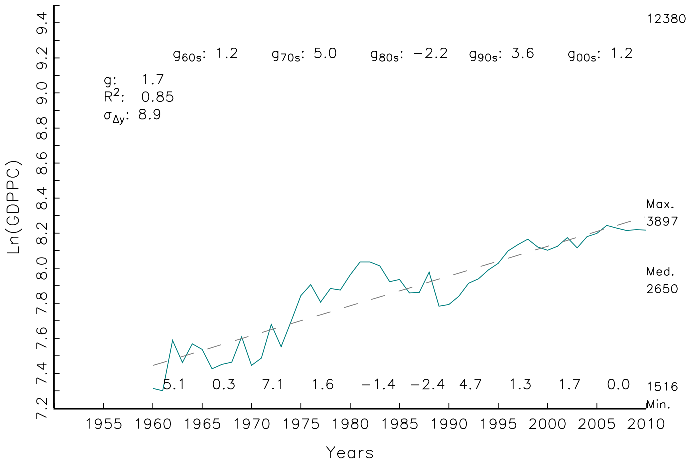


Figure 2: Initial and Final level of GDPPC: Syria

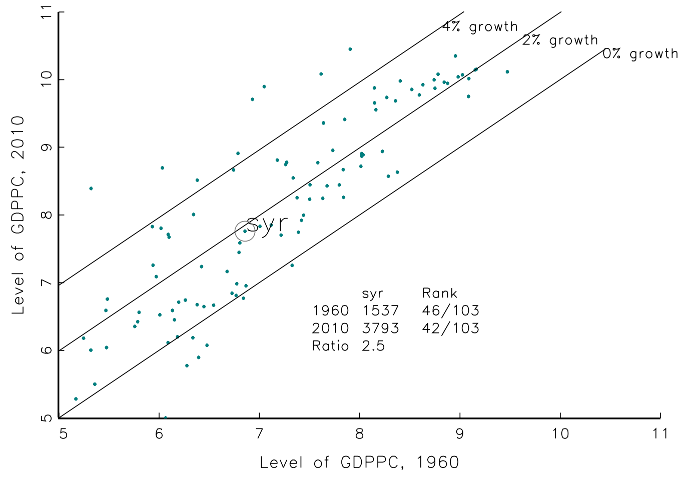


Figure 3: (ln) First Differences and five year MA: Syria

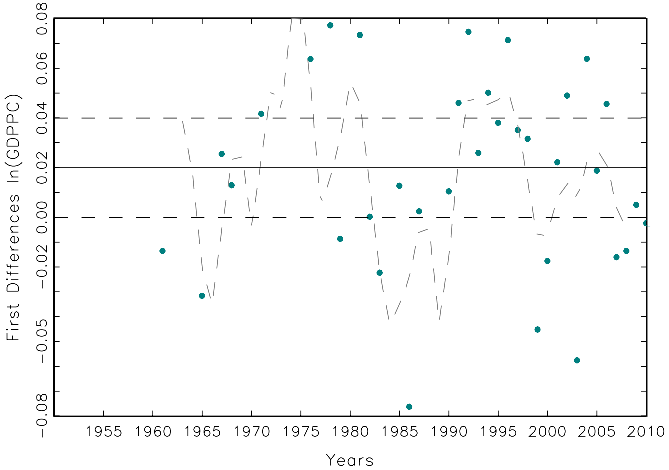
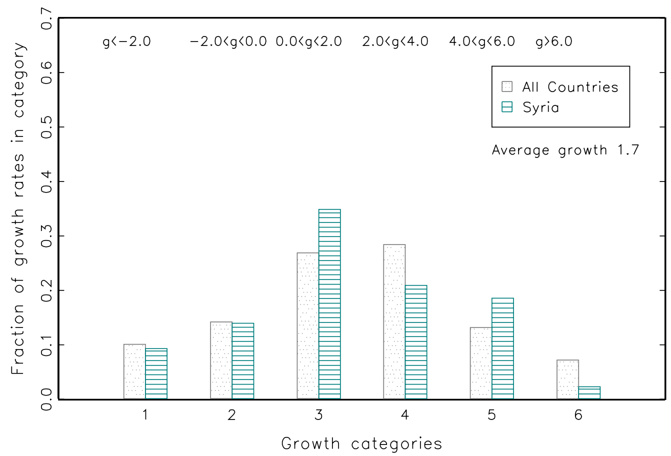


Figure 4: Distribution of all 8 year growth rates
Syria vs. world



Taiwan

Figure 1: Overall, ten, and five year growth rates: Taiwan

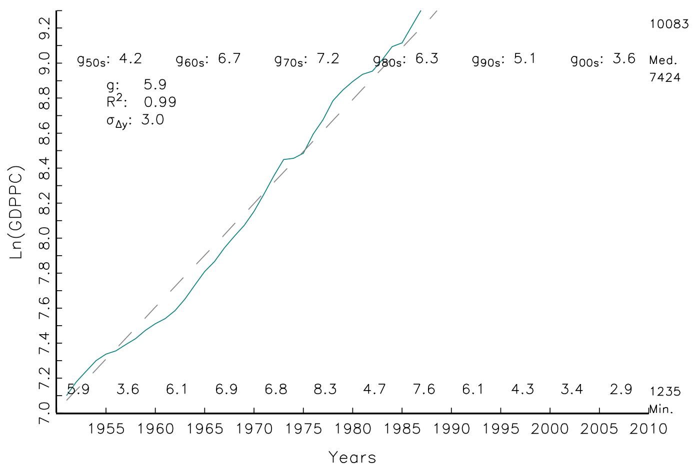


Figure 2: Initial and Final level of GDPPC: Taiwan

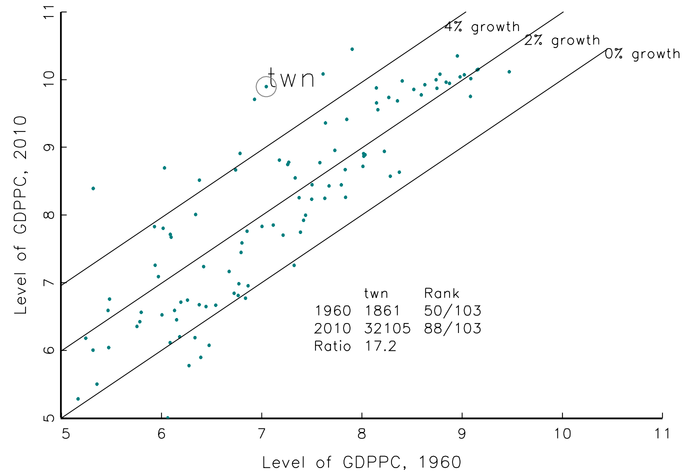


Figure 3: (ln) First Differences and five year MA: Taiwan

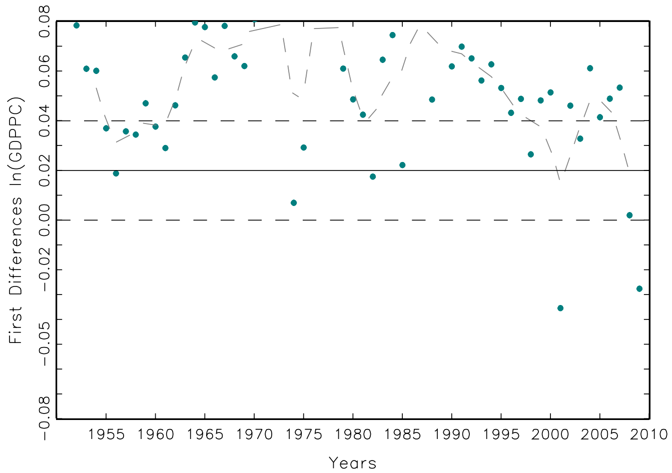
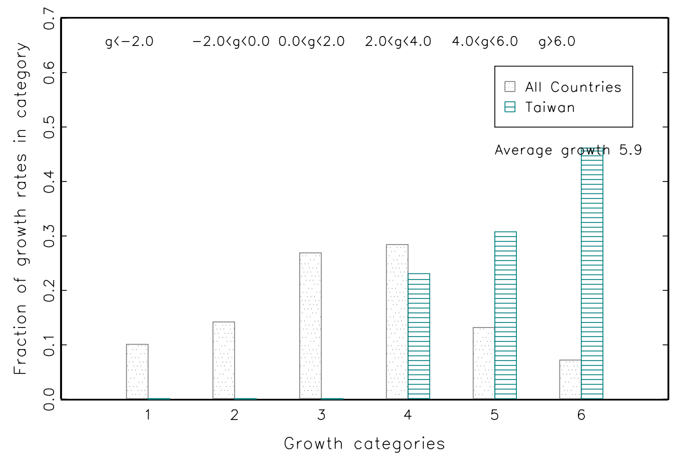


Figure 4: Distribution of all 8 year growth rates
Taiwan vs. world



Tanzania

Figure 1: Overall, ten, and five year growth rates: Tanzania

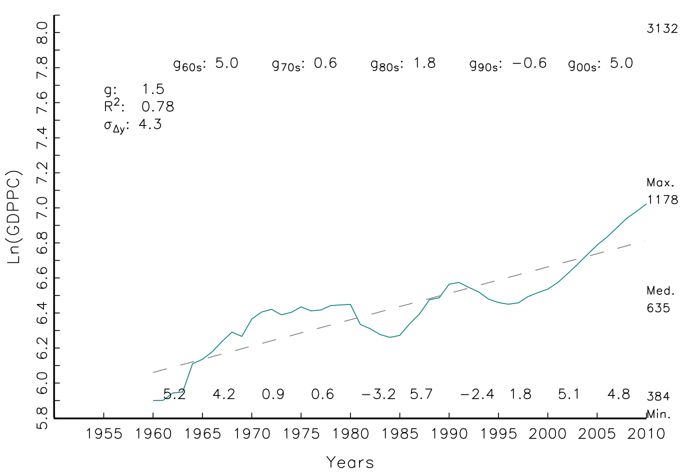


Figure 2: Initial and Final level of GDPPC: Tanzania

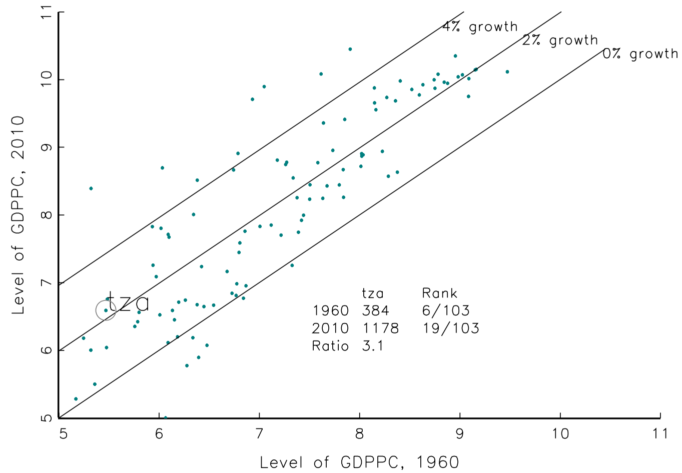


Figure 3: (ln) First Differences and five year MA: Tanzania

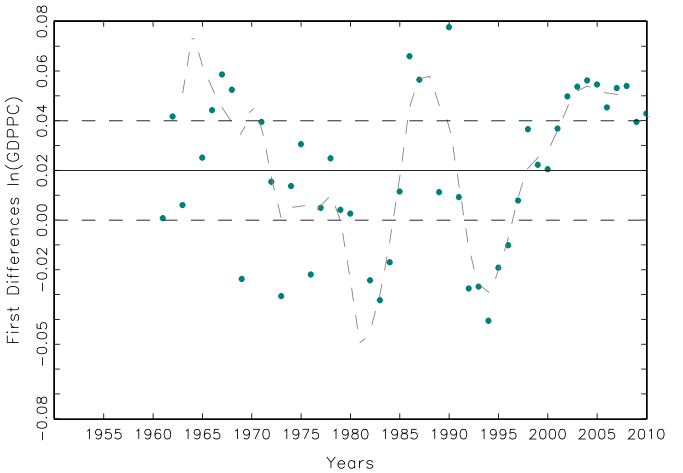
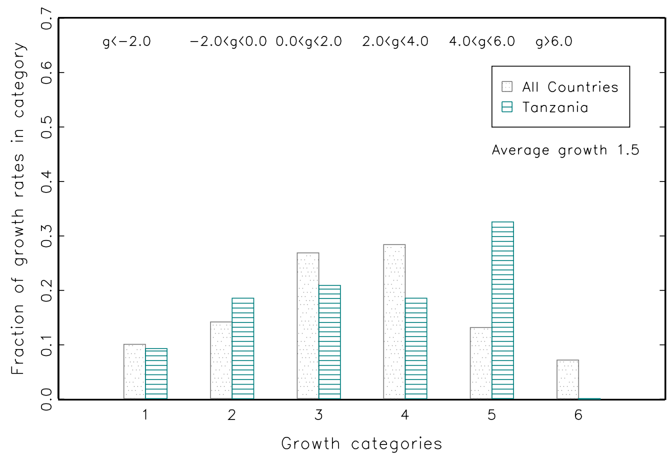


Figure 4: Distribution of all 8 year growth rates
Tanzania vs. world



Thailand

Figure 1: Overall, ten, and five year growth rates: Thailand

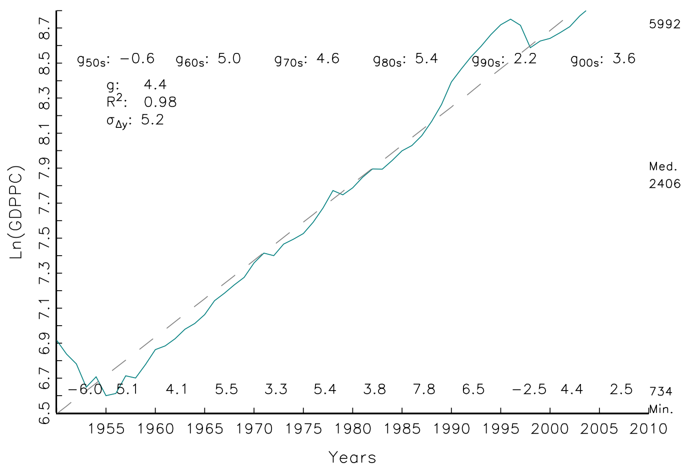


Figure 2: Initial and Final level of GDPPC: Thailand

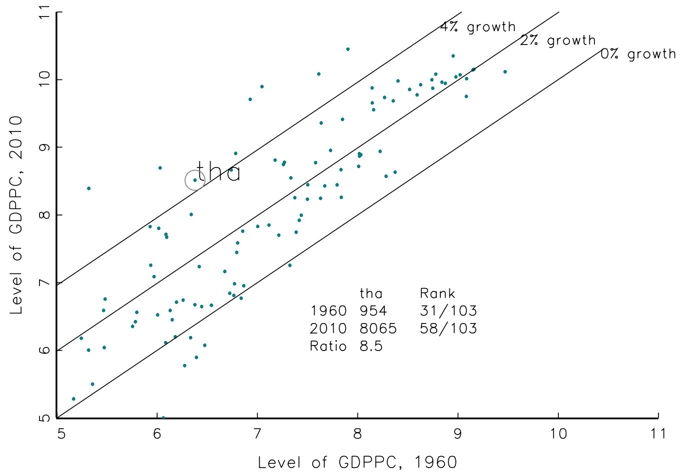


Figure 3: (ln) First Differences and five year MA: Thailand

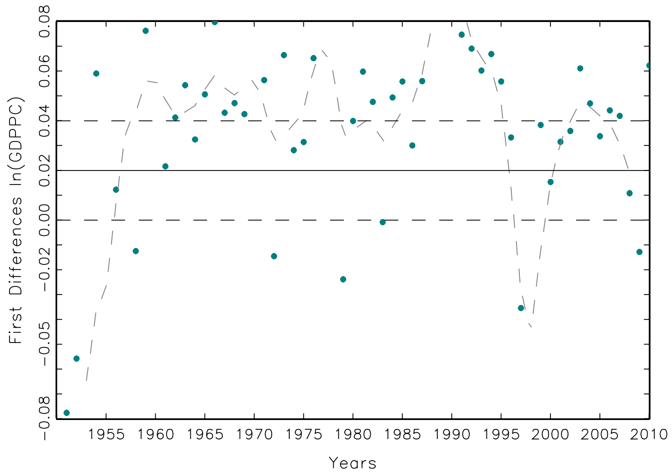
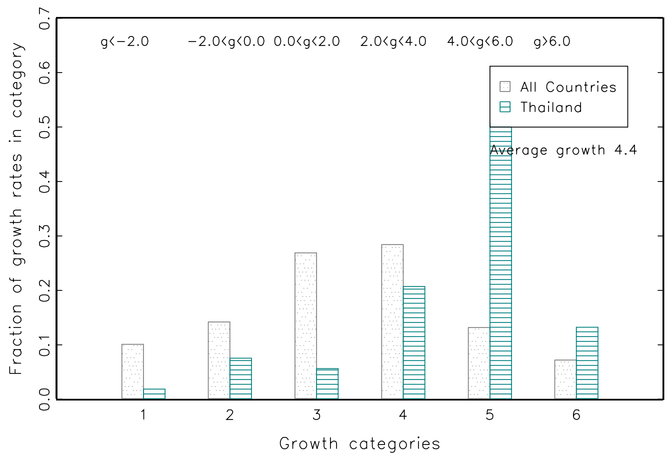


Figure 4: Distribution of all 8 year growth rates
Thailand vs. world



Togo

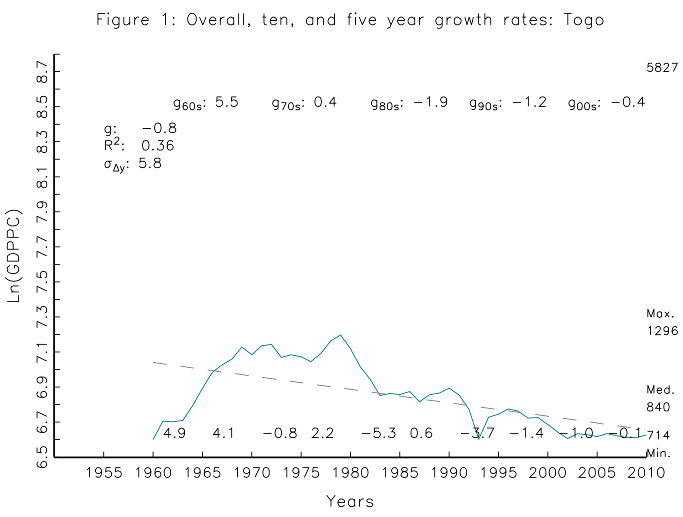


Figure 1: Overall, ten, and five year growth rates: Togo
g60s: 5.5
g70s: 0.4
g80s: −1.9
g90s: −1.2
g00s: −0.4
g: −0.8
R2: 0.36
σΔy: 5.8
5827
Max. 1296
Med. 840
714 Min.
4.9 4.1 −0.8 2.2 −5.3 0.6 −3.7 −1.4 −1.0 −0.1
Ln(GDPPC)
Years

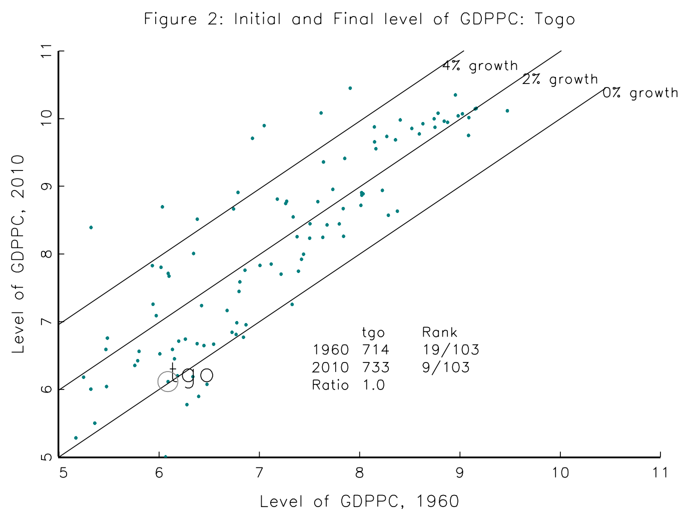


Figure 2: Initial and Final level of GDPPC: Togo
4% growth
2% growth
0% growth
tgo Rank
1960 714 19/103
2010 733 9/103
Ratio 1.0
tgo
Level of GDPPC, 2010
Level of GDPPC, 1960

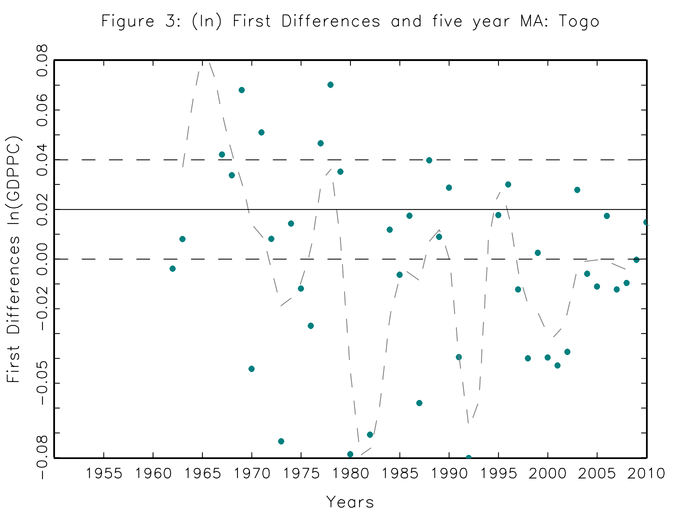


Figure 3: (ln) First Differences and five year MA: Togo
First Differences ln(GDPPC)
Years

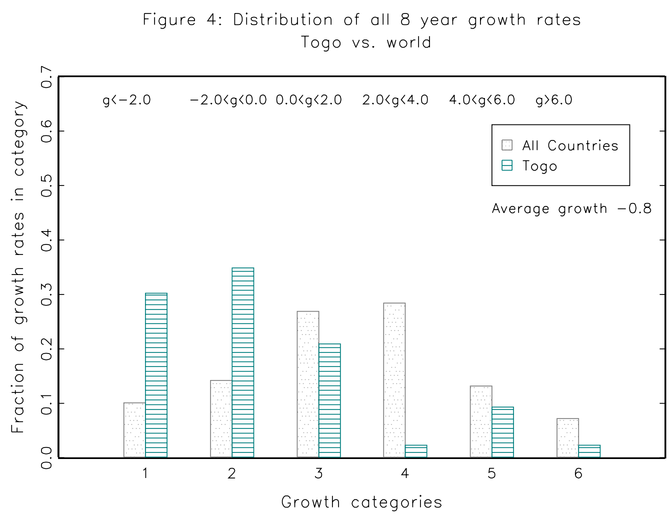


Figure 4: Distribution of all 8 year growth rates
Togo vs. world
g<−2.0 −2.0<g<0.0 0.0<g<2.0 2.0<g<4.0 4.0<g<6.0 g>6.0
All Countries
Togo
Average growth −0.8
Fraction of growth rates in category
Growth categories

Trinidad and Tobago

Figure 1: Overall, ten, and five year growth rates: Trinidad &Tobago

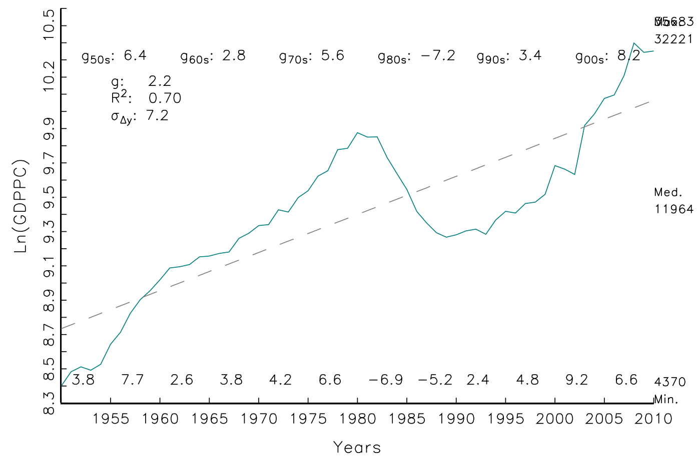


Figure 2: Initial and Final level of GDPPC: Trinidad &Tobago

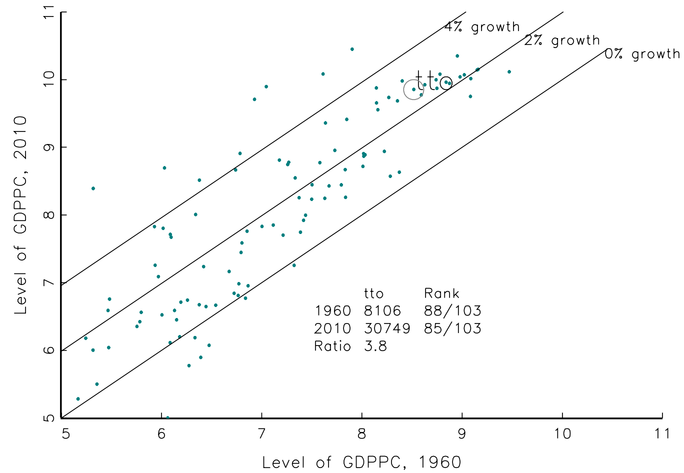


Figure 3: (ln) First Differences and five year MA: Trinidad &Tobago

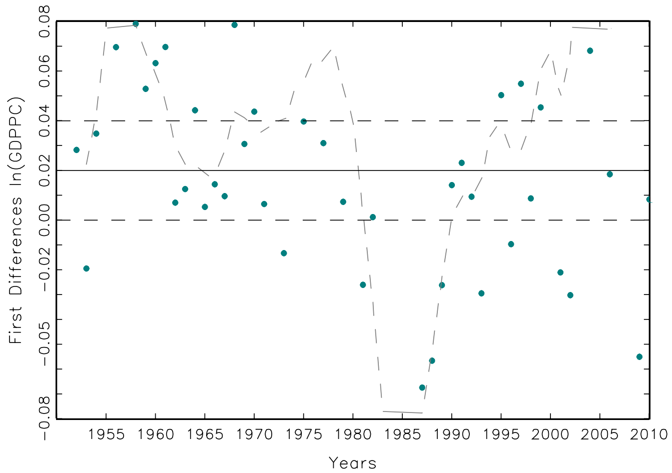
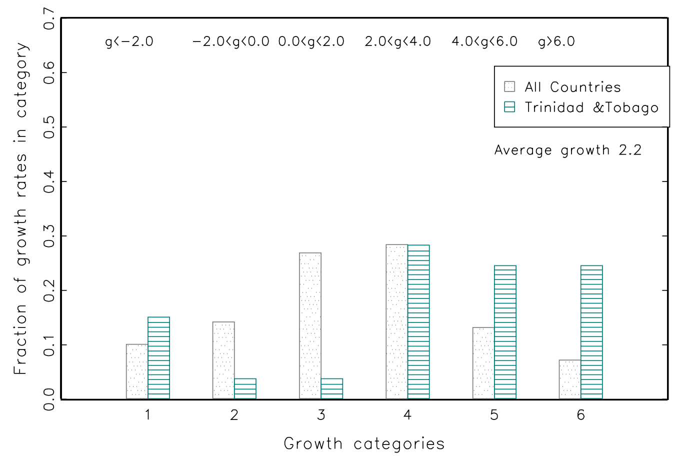


Figure 4: Distribution of all 8 year growth rates
Trinidad &Tobago vs. world



Tunisia

Figure 1: Overall, ten, and five year growth rates: Tunisia

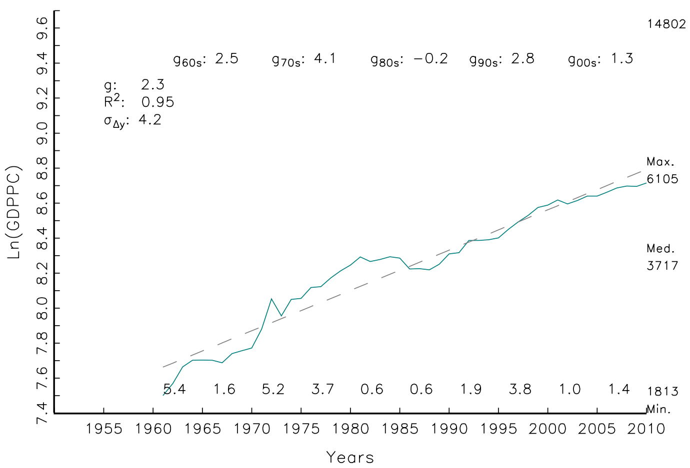


Figure 2: Initial and Final level of GDPPC: Tunisia

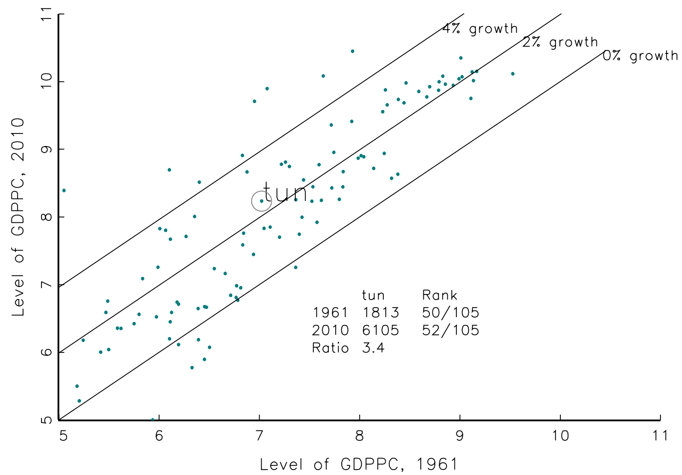


Figure 3: (ln) First Differences and five year MA: Tunisia

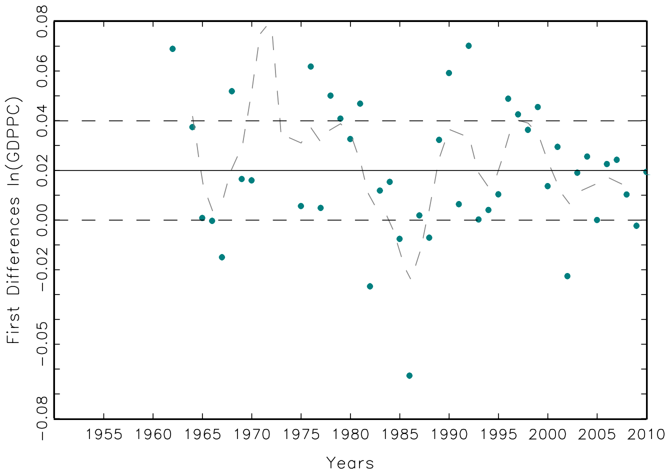
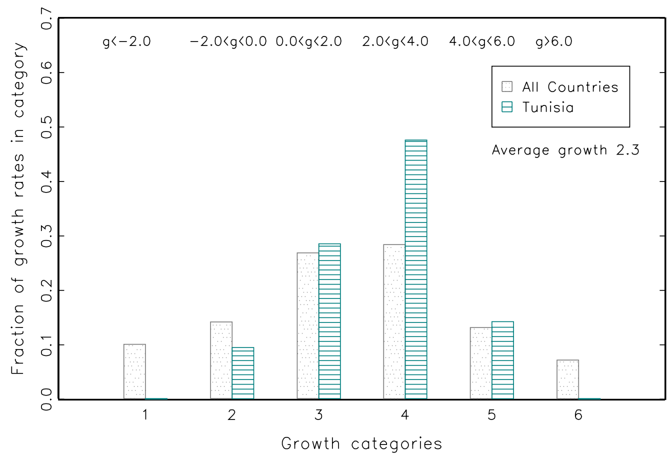


Figure 4: Distribution of all 8 year growth rates
Tunisia vs. world



Turkey

Figure 1: Overall, ten, and five year growth rates: Turkey

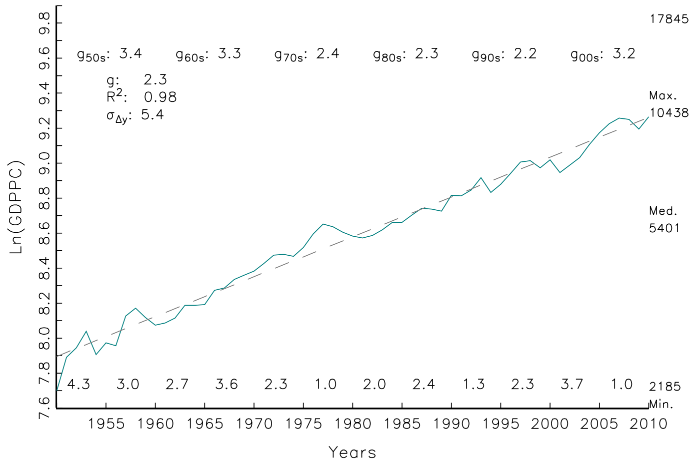


Figure 2: Initial and Final level of GDPPC: Turkey

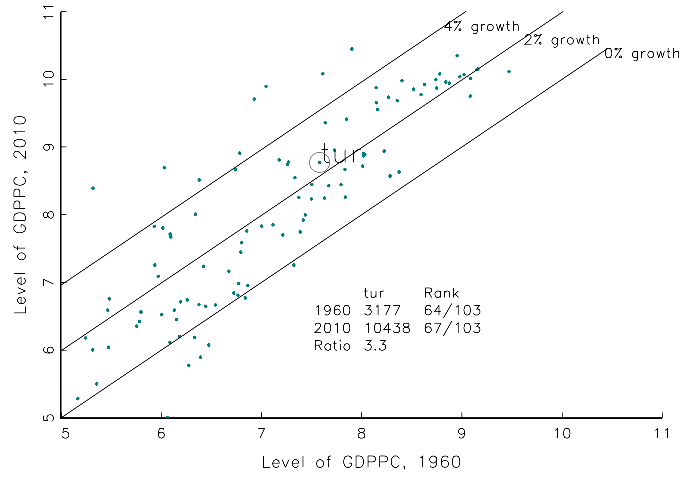


Figure 3: (ln) First Differences and five year MA: Turkey

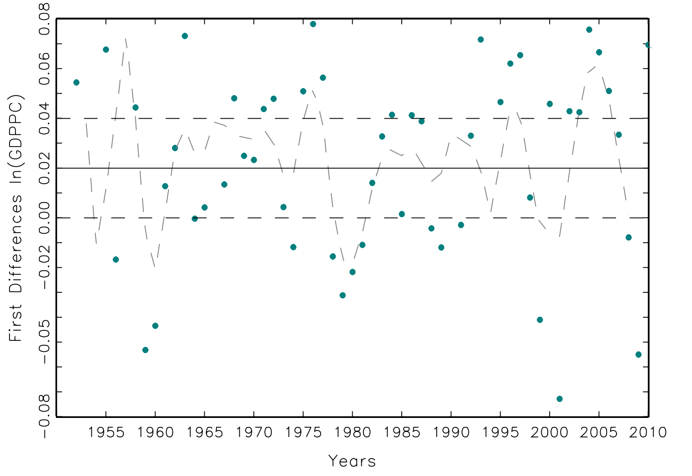
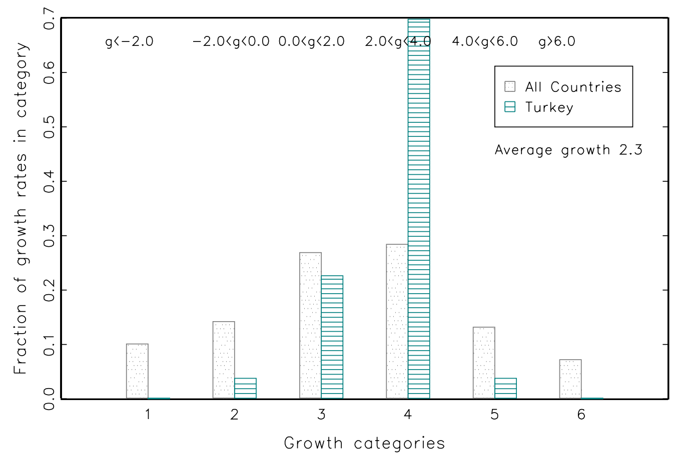


Figure 4: Distribution of all 8 year growth rates
Turkey vs. world



Uganda

Figure 1: Overall, ten, and five year growth rates: Uganda

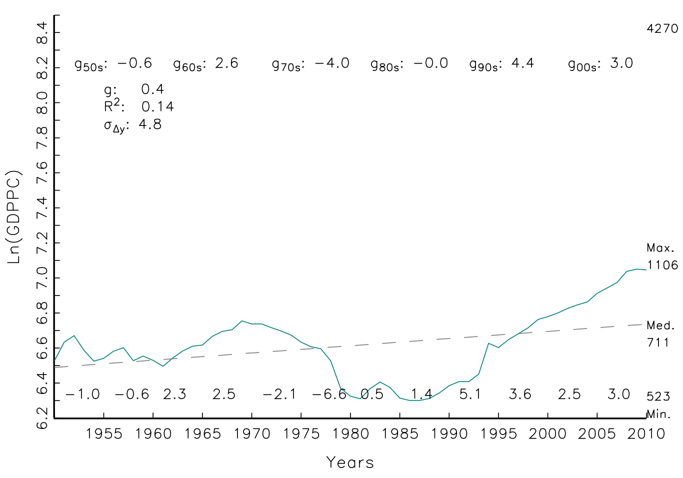


Figure 2: Initial and Final level of GDPPC: Uganda

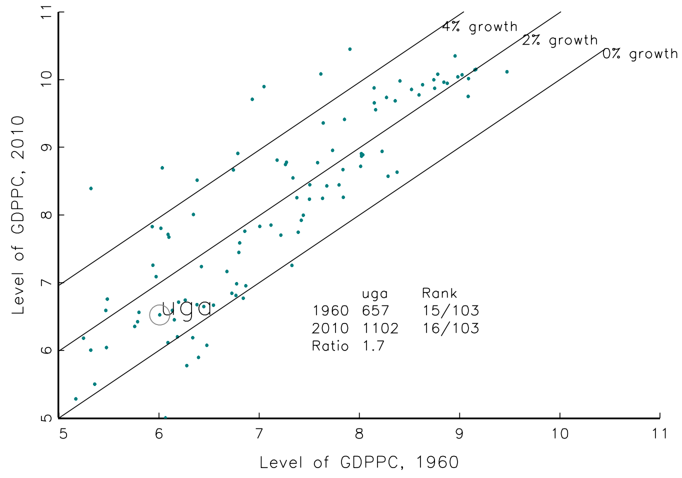


Figure 3: (ln) First Differences and five year MA: Uganda

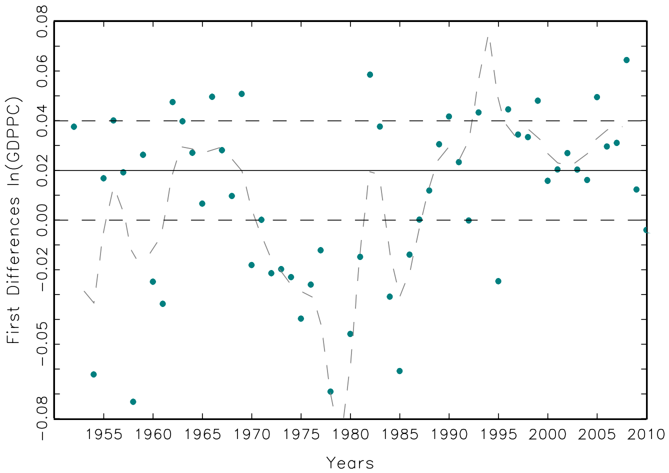
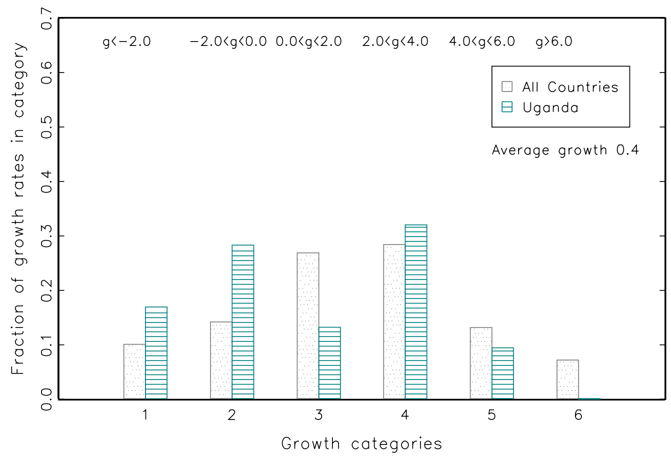


Figure 4: Distribution of all 8 year growth rates Uganda vs. world



United Kingdom

Figure 1: Overall, ten, and five year growth rates: United Kingdom

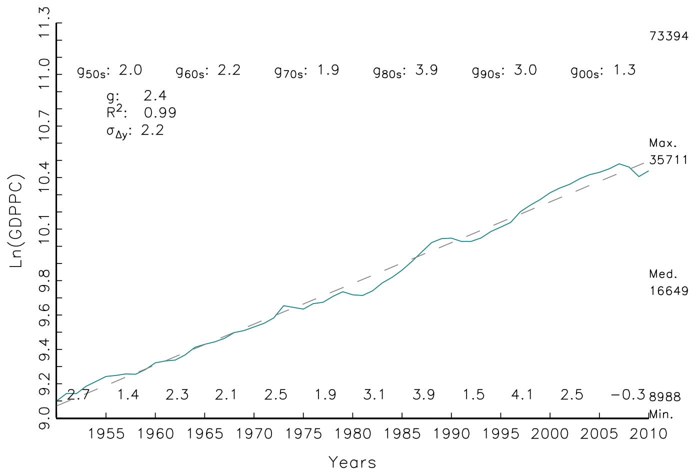


Figure 2: Initial and Final level of GDPPC: United Kingdom

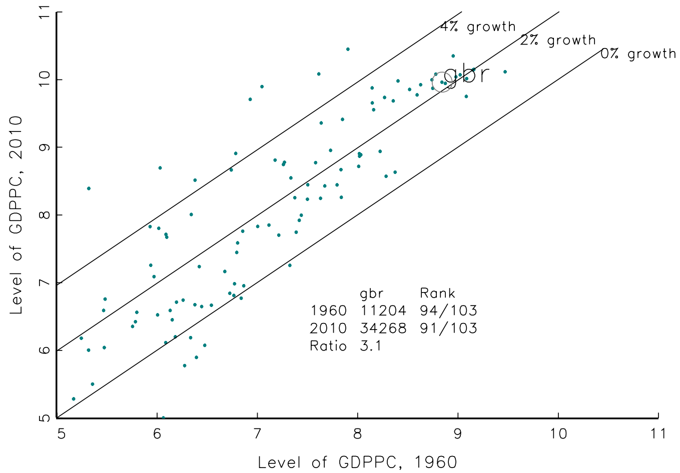


Figure 3: (ln) First Differences and five year MA: United Kingdom

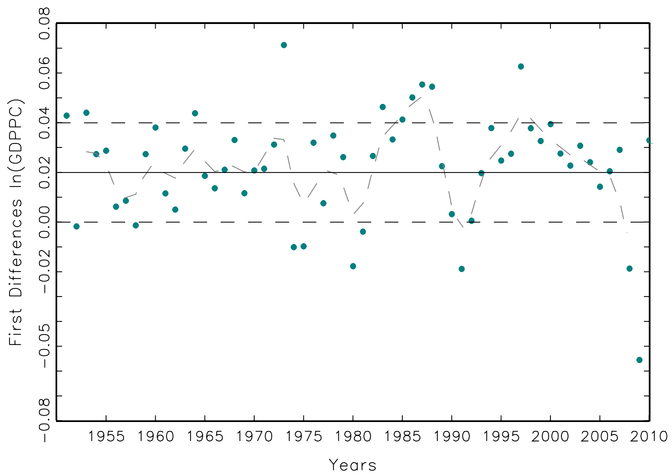
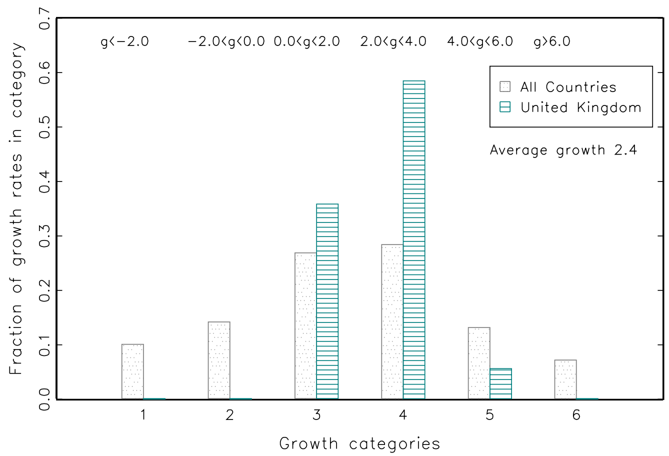


Figure 4: Distribution of all 8 year growth rates
United Kingdom vs. world



United States

Figure 1: Overall, ten, and five year growth rates: United States

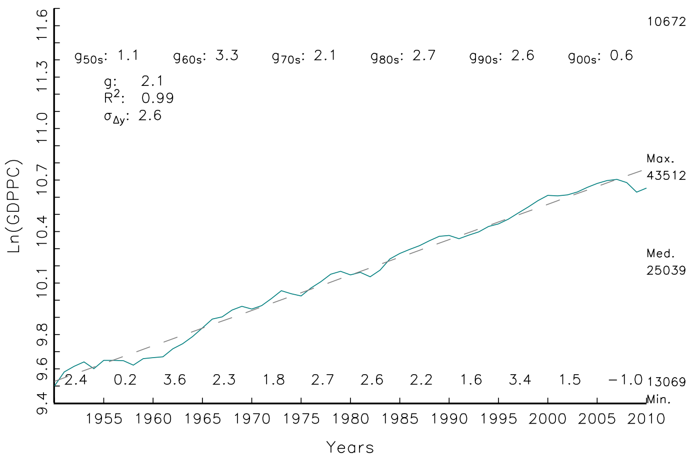


Figure 2: Initial and Final level of GDPPC: United States

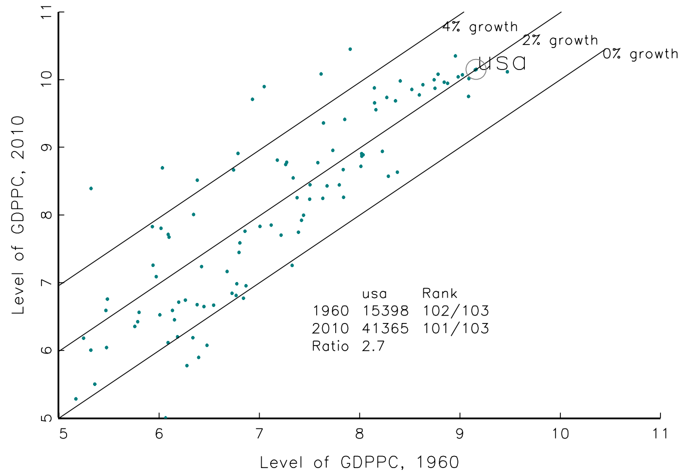


Figure 3: (ln) First Differences and five year MA: United States

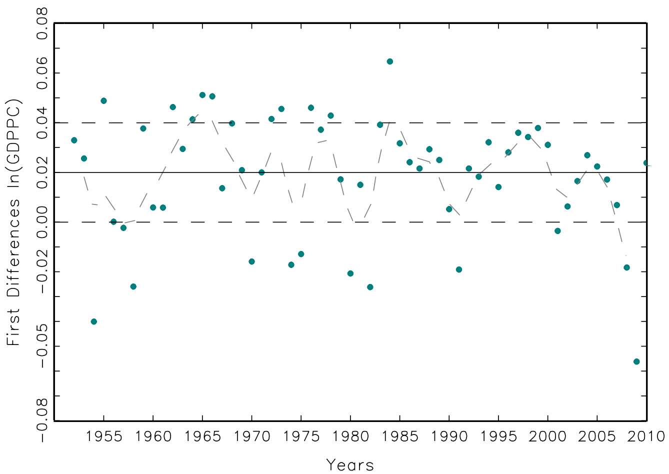
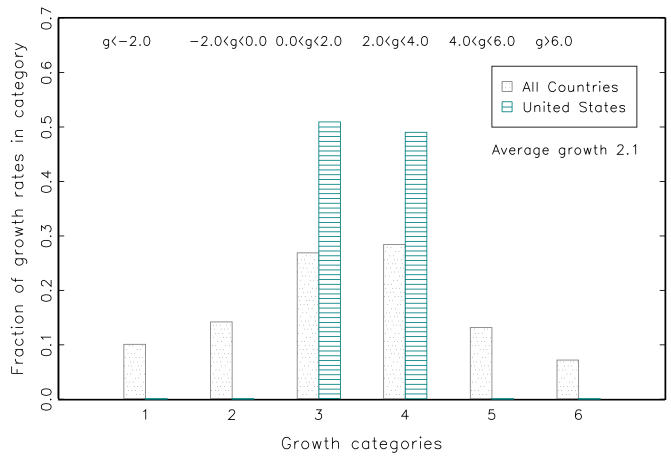


Figure 4: Distribution of all 8 year growth rates
United States vs. world



Uruguay

Figure 1: Overall, ten, and five year growth rates: Uruguay

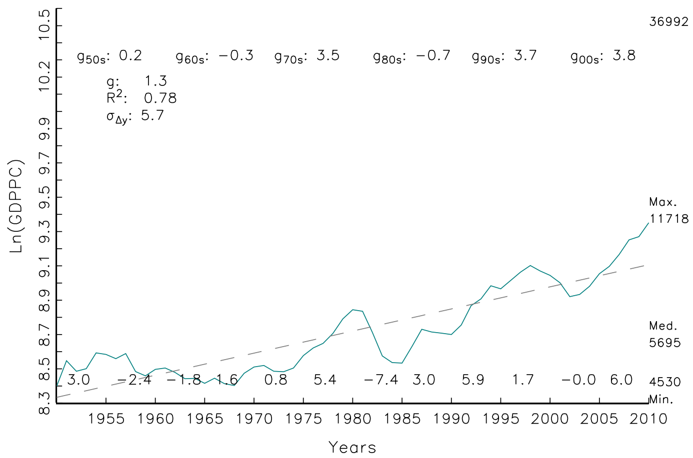


Figure 2: Initial and Final level of GDPPC: Uruguay

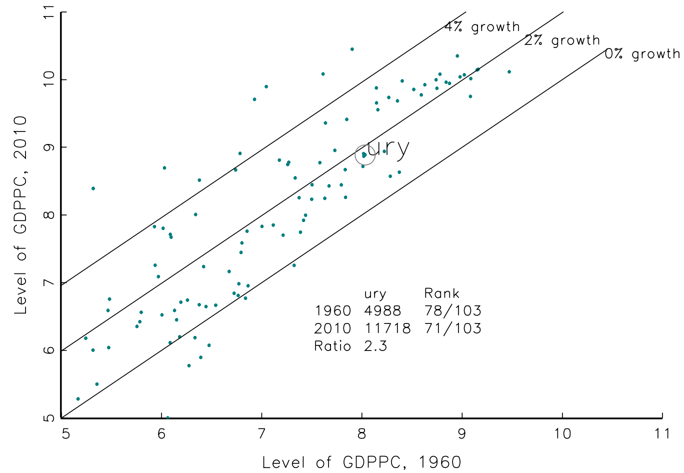


Figure 3: (ln) First Differences and five year MA: Uruguay

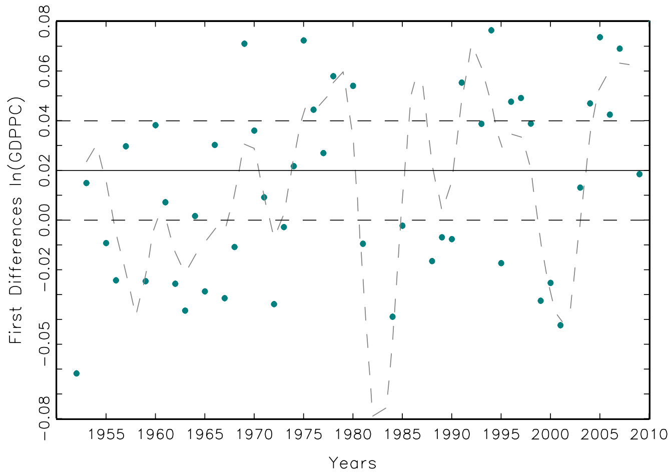
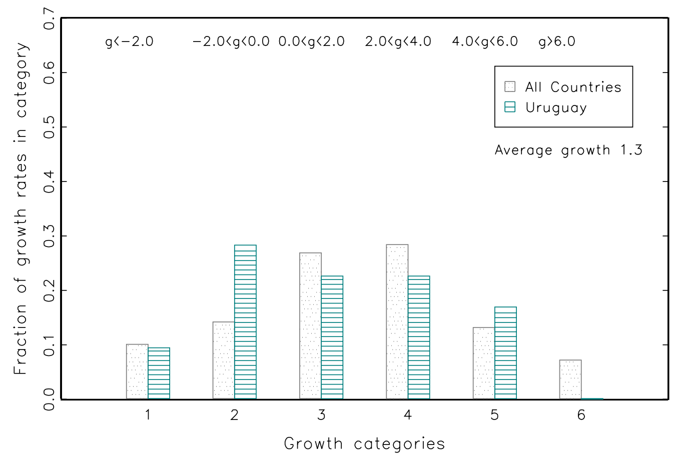


Figure 4: Distribution of all 8 year growth rates
Uruguay vs. world



Venezuela, RB

Figure 1: Overall, ten, and five year growth rates: Venezuela

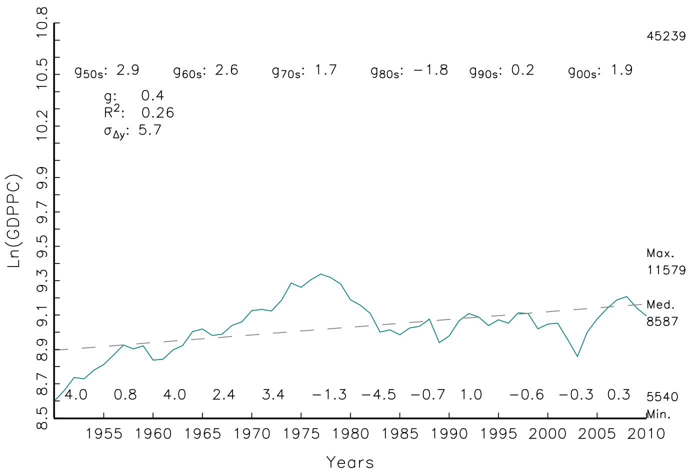


Figure 2: Initial and Final level of GDPPC: Venezuela

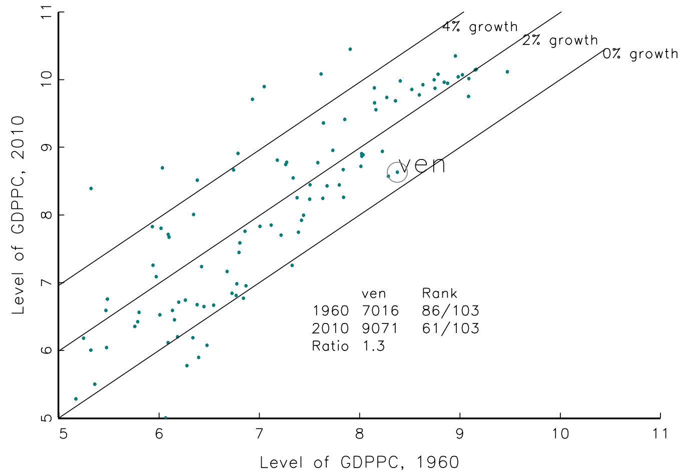


Figure 3: (ln) First Differences and five year MA: Venezuela

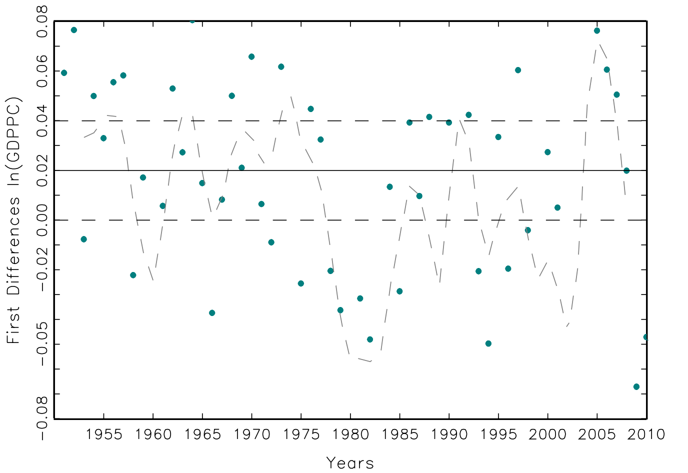
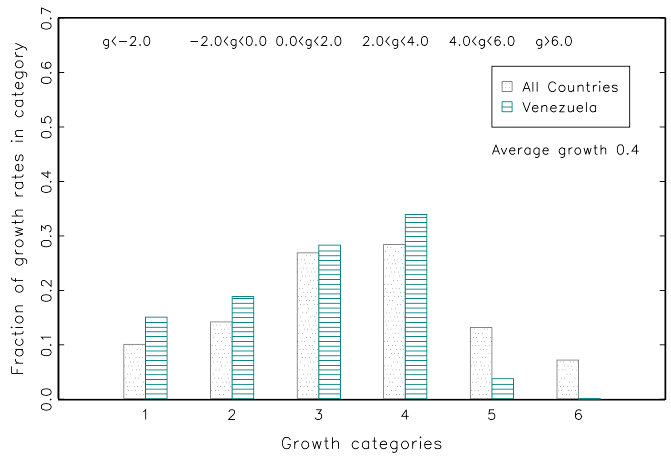


Figure 4: Distribution of all 8 year growth rates
Venezuela vs. world



Vietnam

Figure 1: Overall, ten, and five year growth rates: Vietnam

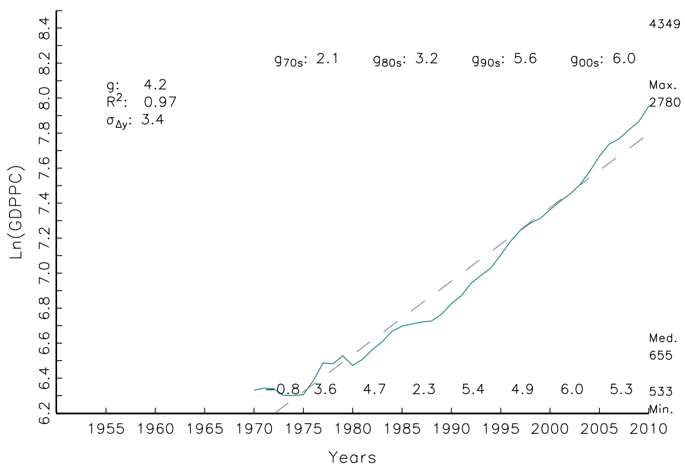


Figure 2: Initial and Final level of GDPPC: Vietnam

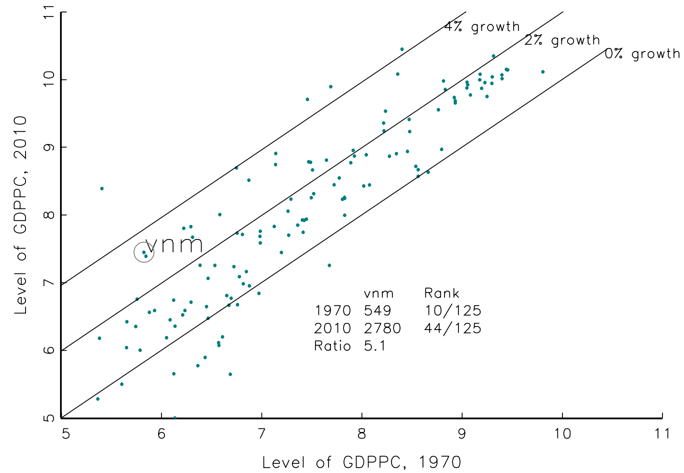


Figure 3: (ln) First Differences and five year MA: Vietnam

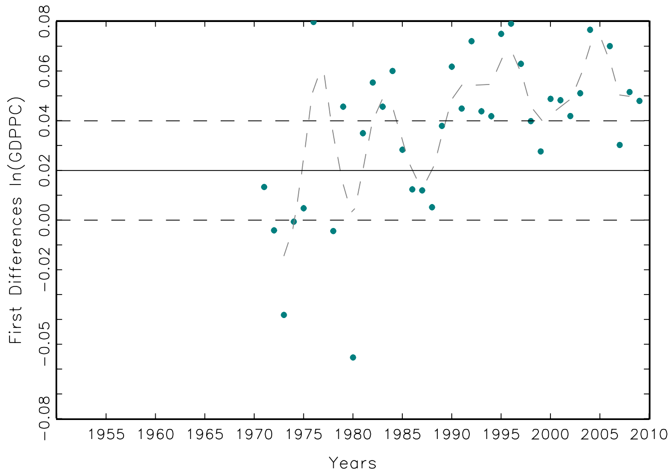
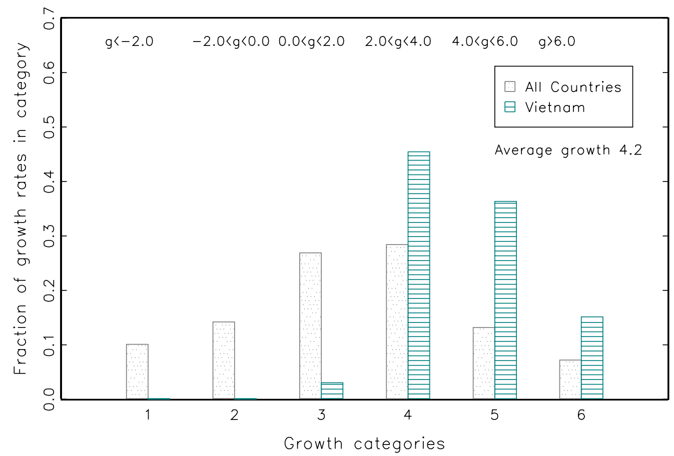


Figure 4: Distribution of all 8 year growth rates
Vietnam vs. world



Zambia

Figure 1: Overall, ten, and five year growth rates: Zambia

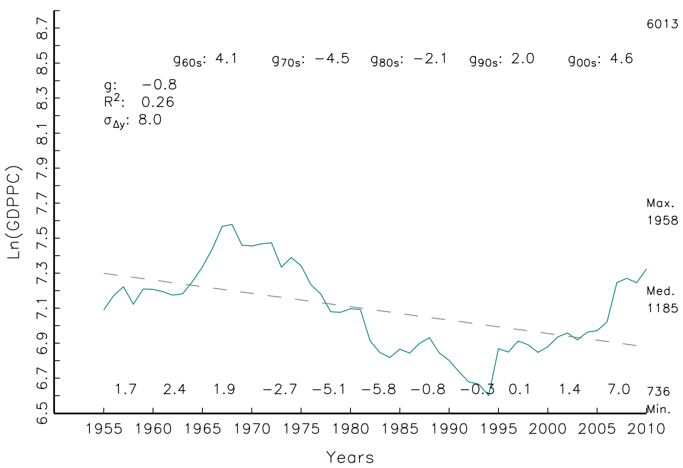


Figure 2: Initial and Final level of GDPPC: Zambia

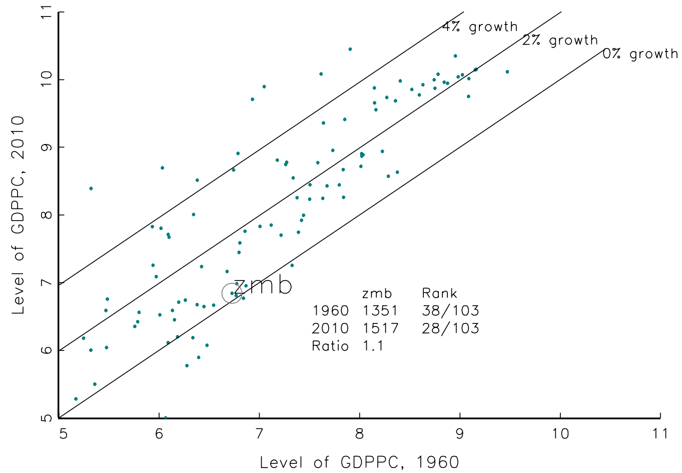


Figure 3: (ln) First Differences and five year MA: Zambia

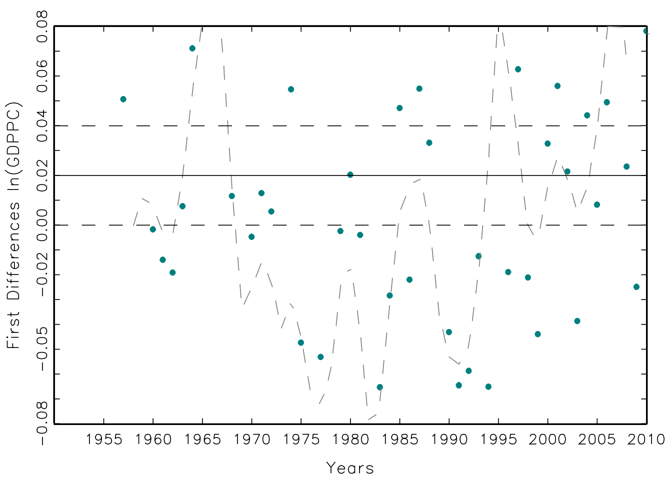
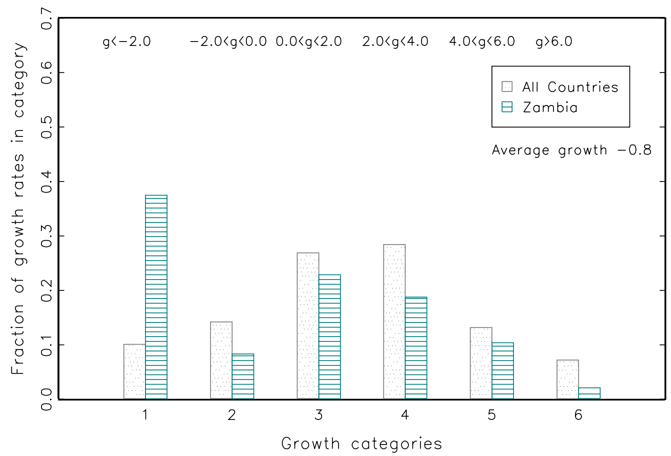


Figure 4: Distribution of all 8 year growth rates
Zambia vs. world



Zimbabwe

Figure 1: Overall, ten, and five year growth rates: Zimbabwe

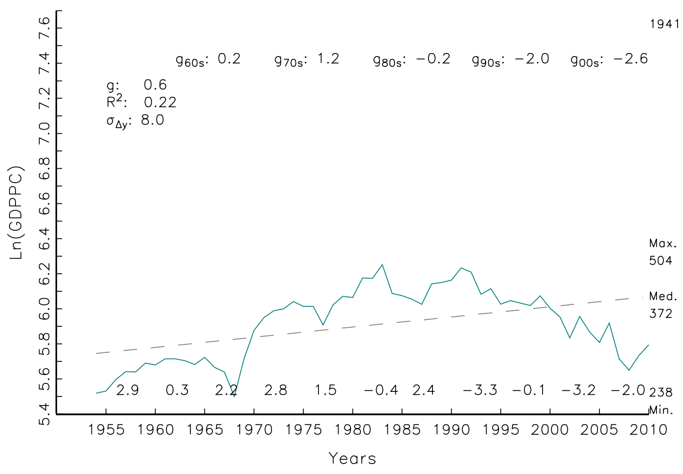


Figure 2: Initial and Final level of GDPPC: Zimbabwe

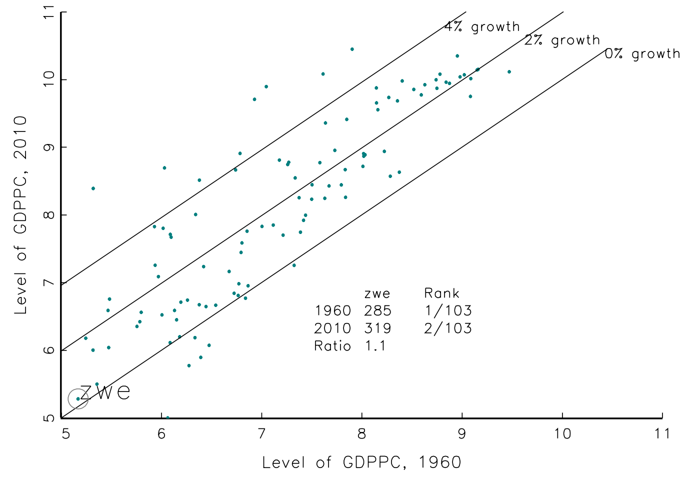


Figure 3: (ln) First Differences and five year MA: Zimbabwe

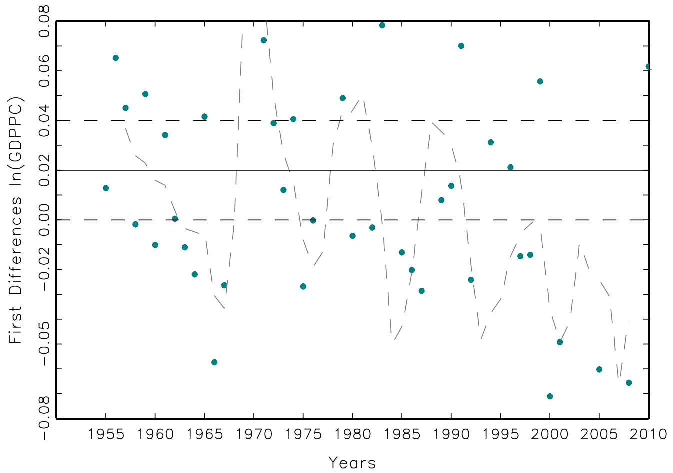
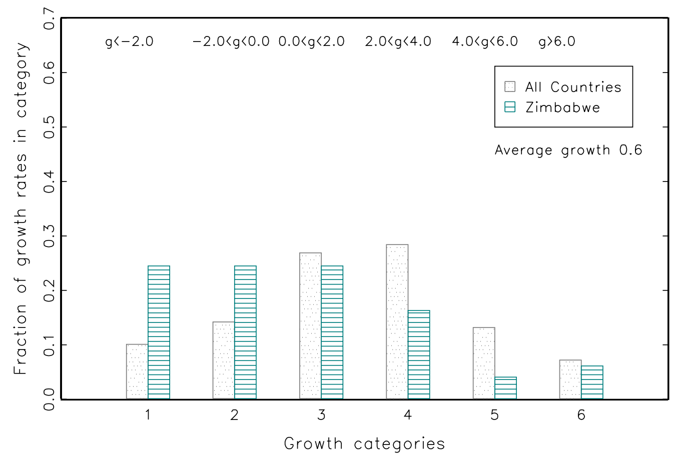
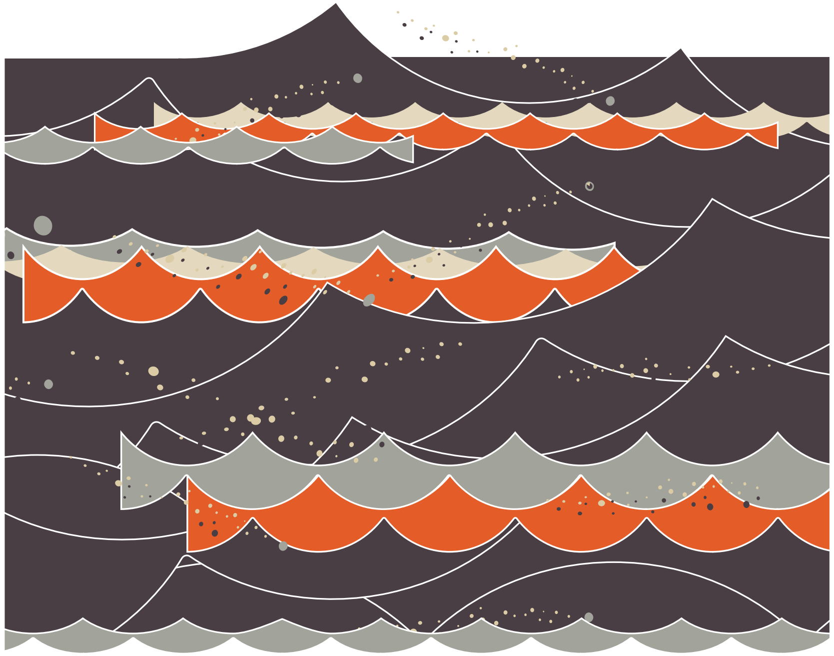


Figure 4: Distribution of all 8 year growth rates
Zimbabwe vs. world





Part III

Section I: Viewing Economic Growth as Transitions in Growth Regimes

Part III: Section I: Viewing Economic Growth as Transitions in Growth Regimes

We have seen in Part II that the average or long-run rate of economic growth is a poor approximation of country growth experiences, and that countries make frequent transitions between periods of high growth, periods of negative growth and periods of stagnation. To understand economic growth, we need to understand why most countries switch from one growth regime to another. This is not straightforward. How do we know when growth is accelerating when, in most low-income countries, income movements are highly volatile, so a movement up or down may be transitory, and not signal a shift in the growth rate? How do we identify a growth break, which is an episode involving a significant change in growth rates implying a transition from one growth regime to another?

In Part III, we present four more graphs per country. Figure 5 is a simple plot of log GDPPC, and also contains the three summary statistics of growth for each country – g, R^2 and $\sigma_{\Delta Y.}$ – that we discussed in Part II. Figure 6 presents our growth breaks – where we modify the Bai-Perron (1998) method using our economic filters. We also report the growth rates pre- and post-break, and the change in the growth rate (Δg) from one growth episode to the next. Figure 7 gives the breaks as identified by the Bai-Perron (henceforth, BP) method to compare with the breaks that we have identified. In most cases, the breaks that we have identified are the same as when we apply the Bai-Perron method without modification. However, in several instances (as in the case of Zimbabwe, for example), we obtain more breaks by our method than if we applied the BP method without modification. In some cases (for example, South Africa), the years identified by the BP break differ from ours – this occurs when we drop the potential break identified by BP, as it does not meet the criteria of a break by our filters; and where the iterative procedure followed by BP leads to a different growth break year. In Figure 8, we report magnitudes of growth in each growth episode using the second of the methods in computing growth magnitudes discussed previously.

Figure 5 replicates Figure 1 (since the figures come either singly or in panels, with four graphs per panel, this makes sure the raw ln(GDPPC) data and graph is present in both panels).

Figure 7 displays the results of one procedure for identifying structural breaks in growth (we describe Figure 7, first since understanding Figure 6 depends on understanding Figure 7).

The widely used BP methodology (1998, 2003a, 2003b, 2006) estimates the dates of structural breaks in time series. BP is a two-step method. The first step estimates the years to place a given number of breaks that would most increase a test-statistic, while the second step sequentially tests how many of these breaks are statistically significant.

In the first step, it is assumed that the growth rate is a stationary dependent variable that equals a regime-specific mean growth rate plus an error term. To implement a BP procedure the user has to specify the minimum length of any growth regime (e.g. so the breaks cannot be in sequential years and must be, say, five years apart) and the maximum number of potential candidate breaks. The first step of the BP procedure recursively minimizes the sum of squared residuals, both with respect to the break dates and with respect to the regime-specific mean growth rates, subject to the user provided constraint on the minimum length of a growth regime, up to the maximum number of breaks specified.[8]

We implement BP using a "growth regime" minimum of eight-years. One can user shorter or longer periods, but shorter periods (e.g. three or five years) risk conflation with "business cycle fluctuations" or truly "short run" shocks (e.g. droughts). Longer periods (e.g. 10 or 12 years) for a given length of data reduce the number of potential breaks.

We specify a maximum number of candidate breaks for each country, depending on the length of the series. A country with:

i) Forty years of data (only since 1970), a maximum of two breaks
ii) More than 40 years and up to 55 years (data since 1955), a maximum of three breaks
iii) More than 55 years (before 1955), a maximum of four breaks

The second step of the BP procedure decides which of the candidate breaks are statistically significant. BP suggests a sequential testing procedure that starts at zero breaks and then proceeds until one fails to reject the null hypothesis of n breaks against n+ 1 breaks. The test statistic $supF_T$, is the supremum of all the F-statistics testing the equality of means across regimes over all admissible k-partitions. The value of the test statistic is compared with simulated critical values, which depend on the number of breaks and a trimming parameter (which in turn depends on the minimum size of the regime).[9]

The BP procedure identifies both accelerations and decelerations. For instance, the Republic of Korea accelerated in 1962 from a growth of 1.4 ppa to 6.0 ppa, an acceleration of 4.6 ppa. Growth in Nicaragua is estimated to have decelerated in 1977 from 3 to -1.2, a deceleration of 4.2 ppa. Some countries are estimated to have had multiple BP breaks in their growth. For instance, Jamaica is estimated to have experienced a massive deceleration in 1972, from 4.3 ppa before to -3.5 ppa after, a deceleration of 7.8 ppa. But this lasted only until 1980, when growth accelerated from -3.5 ppa to the modest, but positive, pace of 0.7 ppa, an acceleration of 4.2 ppa.

Figure 6 displays the results of transitions in growth that combine the first stage of the BP procedure to identify the "candidate" breaks with a filter for "genuine" breaks that depends on the *magnitudes* and *directions* of the changes in growth, not a purely *statistical* procedure.

In a separate paper we describe and justify our method versus a "pure" BP approach (Kar *et al.*, 2013) and here we just show the graphs of the output. Our filter takes the break years that BP identifies as the best candidates (with four, three, or two candidate years, depending on the length of

8 The Bai-Perron test is robust in that the error term may have different variances across growth regimes and exhibit autocorrelation.

9 In some cases, it is difficult to reject the null of zero against one break, but easy to reject the null of zero against a higher number of breaks. In these cases the testing procedure breaks down. In order to take care of this, Bai and Perron (2006) recommend an adjustment to the procedure that uses an alternative procedure in the first step when the null hypothesis of zero breaks is tested. Here, instead of testing zero against one break point, the hypothesis tests the null of $m = 0$ against the alternative of $1 \leq m \leq M$, where M is chosen exogenously. After this altered first step, the rest of the test proceeds exactly as before.

the data series). We then apply the following filter to rule out changes in growth that are "too small" to be "genuine" breaks in growth (and might just be due to random fluctuations in the data).

i) In case of the first candidate break, since it is not known whether it follows an acceleration or deceleration, any change of more than 2 ppa (up or down) we count as a growth break.

After that, the threshold depends on the previous history:

ii) If a candidate acceleration follows a previous deceleration or a candidate deceleration follows a previous acceleration, then to qualify as a genuine growth break the absolute magnitude of the growth difference has to be 3 ppa.

iii) If, however, a candidate acceleration follows a previous acceleration or a candidate deceleration follows a previous deceleration, then a change of only 1 ppa (in absolute value) qualifies as a genuine break.

Using this method, which is "BP to identify candidate break years plus a magnitude filter"[10], we find a total of 318 structural breaks from the group of 125 countries.

These are provided in Table 2, with the country, year, date of the structural break, growth before the break and growth after the break and the years each growth episode lasts.

The method, the outcome, and the differences with a pure statistically approach like BP are best illustrated with a few examples.

The BP procedure finds only one growth break as statistically significant for Brazil, in 1980, separating growth before 1950-1980 of 4.8 ppa from growth from 1980 to 2010 of 0.7 ppa. The first step of the BP procedure identifies four candidate break years: 1967, 1980, 1992 and 2002. In 1967 growth accelerated from 3.7 in 1950-1967 to 6.3 ppa from 1967 to 1980. Since this is the first and above the 2 ppa threshold, we include it as a break. In 1980 growth decelerates from 6.3 ppa to -1.1 ppa from 1980 to 1992, a deceleration of 7.4 ppa, and easily passes the "deceleration following acceleration" threshold of 3 ppa. In 1992 growth accelerates from -1.1 ppa to 1.4 ppa, a change of 2.5 ppa. However, as this is an acceleration following a deceleration it would have to be above 3 ppa and hence we do not include 1992 as a "genuine" growth break. In 2002 growth accelerated again, this time to 2.5 ppa, and since this was an acceleration following a previous candidate acceleration it only had to pass the 1 ppa threshold.

So our procedure characterizes Brazil's growth regimes as "strong growth" of 3.7 from 1950 to1967, "rapid growth" of 6.3 ppa from 1967 to 1980, "stagnation" from 1980 to 2002, followed by "strong growth" again from 2002 to 2010.

The BP procedure finds only one statistically significant growth break for Ghana, from growth of 0.1 from 1955 to 1983 to growth of 2.6 from 1983 to 2010. Our "BP plus magnitude filter" method classifies all four of the BP candidate break years as breaks and hence has five growth regimes in

10 See Appendix 1 for further discussion of the different methods to identify growth breaks.

Ghana: slow growth 1955-1966; a burst of growth from 1955 to 1966 (g = 3.7); a growth disaster from 1974 to 1983 (g = -4.5); slow growth from 1983 to 2002 (g = 1.9); and strong growth from 2002 to 2010 (g = 4.2).

Our method clearly creates a richer description of the dynamics, but at the risk of identifying periods that were not "true" growth regime switches. There is nothing special about our proposed filter (other than using the "focal point" thresholds of 1, 2, 3), but there is nothing special for purposes of describing growth regimes in a fetishism of "statistical significance" either.

What do the breaks identified by our methodology tell us about the nature of growth transitions? Do we observe any "stylized facts" about transitions based on these results? More specifically, how much do these transitions change the average growth rates of an economy? Table 2 answers some of these questions by classifying all transitions in terms of a four-by-four matrix that captures the relationship between average growth rates before and after a transition. The vertical axis represents growth rates corresponding to the regime before the break, while the horizonal axis represents growth rates corresponding to the regime after the break. Consistent with our approach in Part II, we divide the distribution of average growth rates in both the axes into four bins centred on the world average growth rate of 2% (but combining the lower and upper bins). Thus, the four bins are: (i) $g < 0\%$; (ii) $0\% \leq g < 2\%$; (iii) $2\% \leq g \leq 4\%$; and (iv) $g > 4\%$, where g is the average growth rate of a regime, either before or after a break.

The individual cells of the matrix report all transitions that belong to the corresponding bins in the vertical and horizontal axis, in terms of the country names and the year of transition. Further, for the first column (i.e., for $g < 0$), entries in light coloured shades (pink) represent transitions to growth rates between 0% and -2%, while entries with dark coloured shades (red) represent transitions to growth rates less than -2%. Thus entries with darker shades in this column represent transitions into bigger crisis compared with those with lighter ones. Similarly for the fourth column (i.e., for $g > 4$), entries in light coloured shades (light blue) represent transitions to average growth rates between 4% and 6%, while those with dark colours (dark blue) represent transitions to growth rates higher than 6%. Thus dark coloured entries represent transitions to stronger miracle growth.

Table 2 shows that there are multiple growth transitions corresponding to all 16 cells of the matrix. Moreover, apart from the diagonals that have a lesser possibility of transition by definition (particularly for column two and three that cover a small range of growth rates), all other cells have a large and comparable number of entries. This tells us that the growth transitions resemble a Markov process with comparable probabilities for all types of transitions. Thus, the stylized fact is that when it comes to transitions, anything is possible!

Table 2: Regime Transitions for each Bai-Perron+Filter Break

		Growth After Break			
		g<0	0≤g<2	2≤g≤4	g>4
Growth Before Break	g<0	BGD (1967), CAF (1986), CAF (1996), ZAR (1989), COG (1994), ETH (1983), GAB (1987), GIN (2002), MUS (1963), NER (1979), NER (1987), TGO (1993), UGA (1980), ZMB (1975), ZMB (1983), ZWE (2002)	ARG (1985), BDI (2000), BEN (1994), BGD (1982), BOL (1958), BOL (1986), CHL (1976), CMR (1994), GHA (1983), GMB (1995), GNB (1981), GTM (1988), HTI (1994), MDG (2002), MEX (1989), MOZ (1986), NAM (1985), NIC (1979), NIC (1995), PHL (1985), SEN (1973), TCD (1980), VEN (1985)	ZAR (2000), COL (2002), CRI (1991), DZA (1994), ECU (1999), ETH (1992), FJI (1988), GUY (1990), HTI (1972), IRN (1988), JOR (1991), KHM (1982), LBN (1982), LKA (1959), LSO (1986), MLI (1974), MNG (1993), MRT (2002), NGA (1987), PER (1992), PNG (1984), PRY (2002), SLV (1987), TTO (1989), UGA (1961), UGA (1988), ZAF (1993), ZMB (1994)	AFG (1994), AGO (1993), ALB (1992), ARG (2002), BGR (1997), CUB (1995), CYP (1975), FIN (1993), IDN (1968), IRQ (1991), JAM (1986), JOR (1974), LBR (1994), MAR (1960), MUS (1971), MWI (2002), NGA (1968), PAK (1960), POL (1991), ROM (1994), RWA (1994), SDN (1996), SLE (1999), SYR (1989), THA (1958), URY (1985), URY (2002)
	0≤g<2	ALB (1982), ARG (1977), ARG (1994), BOL (1977), CHL (1968), ZAR (1974), COL (1994), GMB (1982), GNB (1997), GUY (1981), ITA (2001), MDG (1974), MOZ (1976), NER (1968), NGA (1960), NIC (1987), PER (1981), PRY (1989), ROM (1986), RWA (1981), SLE (1990), SLV (1978), SOM (1978), TCD (1971), TGO (1979), URY (1977), ZWE (1991)	COL (1967), EGY (1965), KEN (1967)	AUS (1961), BFA (1971), BGD (1996), BRA (2002), CMR (1976), DOM (1991), DZA (1971), GTM (1962), HND (1970), IRL (1958), LAO (1979), MAR (1995), NAM (2002), NPL (1983), NZL (1958), PRI (1982), PRT (1985), VEN (2002), ZWE (1968)	BEN (1978), CHL (1986), CHN (1968), DNK (1958), DOM (1968), ECU (1970), EGY (1976), GHA (1966), GHA (2002), HKG (2002), IRL (1987), KOR (1962), MOZ (1995),MWI (1964), MYS (1987), PAN (1959), PAN (2002), PER (1959), PRY (1971), TCD (2000), TZA (2000)

Growth Before Break		Growth After Break			
		g<0	0≤g<2	2≤g≤4	g>4
	2≤g≤4	AFG (1986), BDI (1992), CIV (1978), CMR (1984), CRI (1979), CYP (1967), DZA (1979), ETH (1969), FIN (1985), FJI (1979), GTM (1980), HTI (1980), JAM (1972), MEX (1981), MNG (1982), MRT (1976), NAM (1974), NIC (1967) PHL (1977), PNG (1973), PRI (2000), SDN (1978), SWZ (1989), SYR (1981), UGA (1969), VEN (1977), ZAF (1981), ZMB (1967)	AUS (1969), BFA (1979), CHE (1974), DOM (1960), FJI (2000), GBR (2002), HND (1979), IRL (1979), ITA (1990), JPN (1991), MLI (1986), NLD (1974), NZL (1974), PNG (1993), PRT (2000), TUN (1981), ZWE (1983)	FIN (1974), GBR (1981), IND (1993), LBN (1991), TUN (1972)	BEL (1959),BRA (1967), ETH (2002), IND (2002), KHM (1998), LAO (2002), LKA (1973), LSO (1970), MYS (1970), SGP (1968), TTO (2002), TTO (1961), VNM (1989)
	g>4	BEN (1986), BGR (1988) COG (1984), CUB (1984), ECU (1978), GAB (1976), GHA (1974),GNB (1970), IRL (2002), IRN (1976), IRQ (1979), JAM (1994), JOR (1965), JOR (1982), LSO (1978), MWI (1978), NGA (1976), POL (1979), TTO (1980), URY (1994)	AUT (1979), BEL (1974), BRA (1980), CHN (1960), ZAR (1958), CYP (1992), DNK (1969), DOM (1976), FIN (2001), GRC (1973), HKG (1994), HUN (1978), ISR (1975), LBR (2002), MAR (1977), MYS (1979), OMN (1985), PAN (1982), PER (1967), PRI (1972), PRT (1973), PRY (1980), ROM (1978), SLE (1970), SYR (1998), TGO (1969), TZA (1971)	BWA (1990), CHL (1997), CRI (1958), EGY (1992), ESP (1974), IDN (1996), ITA (1974), JAM (1961), JPN (1970), KOR (2002), LKA (1981), MRT (1968), MUS (1979), MYS (1996), PAK (1970), PHL (1959), SWZ (1978), THA (1995), TUR (1958), TWN (1994)	AGO (2001), BWA (1973), BWA (1982), CHN (1977), CHN (1991), COG (1976), CYP (1984), GAB (1968), GRC (1960), HKG (1981), ISR (1967), JPN (1959), KOR (1982), KOR (1991), MAR (1968), PRT (1964), RWA (2002), SGP (1980), THA (1987), TWN (1962)

One limitation of a matrix-based approach is that it is sensitive to the choice of the bins. Alternatively, one can estimate the transition probability functions that are based on an infinite number of bins, each with a range tending to zero. In other words, we estimate a continuous version of the matrix in Table 2. The transition probability function corresponding to our transitions is diagrammatically represented in Figures 9 and 10. Figure 9 is a surface plot, with the Y-axis representing growth before the break and the X-axis representing growth after the break. The Z-axis represents the probability of a transition. Figure 10 is a contour plot representing the same transition probability function, with the iso-probability lines representing all transitions that have a similar probability.

Figures 9 and 10 confirm the conclusions of Table 2, for the specific ranges of the bin that were chosen for that table. Thus, starting from any of those four ranges of growth rates on the Y-axis (growth before a break), the surface plot and the contour plot show that there are significant probabilities of a transition to any of the other three ranges on the X-axis (growth after a break). Significantly, Figures 9 and 10 reveal something more about the transitions. They indicate that, irrespective of the growth rates before the transitions, there is a strong tendency to move towards the world average growth rate of about 2% after the transition. This is evident from the shape of the transition probability function, with the highest probability points being bunched parallel to the Y-axis and perpendicular to the X-axis corresponding to the 2% growth rate. This supports the evidence that there is a tendency towards mean-reversion in growth dynamics.

Figure 8 graphs the "magnitude" of the growth accelerations/decelerations in Figure 7. Figures 6 and 7 give alternate breaking of countries' growth experiences into "regimes" or "episodes". However, neither, in and of themselves, provide a sense of the *cumulative magnitude* of episodic shifts. This question is complex for two reasons.

First, the cumulative magnitude is a combination of the magnitude of the shift in growth *rates* per annum and the number of years the episode lasts. So a growth acceleration from 2 ppa to 6 ppa that lasts only eight years produces less cumulative impact than an acceleration from 2 ppa to 4 ppa that lasts 28 years. If we conceptualize the growth process as a probabilistic shift across growth regimes, then cumulative growth performance is obviously the product of duration in each regime times the growth rate while in that regime. As we have seen, the rich industrial countries did not get rich by having very rapid growth rates; rather it was the result of staying consistently in regimes of moderate (or slow) growth.

Second, establishing the cumulative impact of a growth regime transition has to involve some *counter-factual* of what growth would have been without the growth regime transition that was observed. This is, of course, impossible to know with any certainty. There are three obvious possibilities. One is that the country would have stayed at its existing rate of growth. But this ignores one of the most widely replicated and consistent facts about growth – that there is "regression to the mean" over time and little inter-temporal correlation of growth rates (e.g. Easterly *et al.*, 1993), so predicting that a country will remain at its current growth rate is generally a bad prediction. A second is to assume full regression to the mean and that a country's growth rate would have been the world average growth rate over the post-regime transition. This, however, ignores completely the country's previous growth experience and also any tendencies to "convergence".

The graphs here rely on a method described more fully in a separate paper (Pritchett *et al.*, 2013) and calculate "simple predicted" growth by running a separate prediction regression for each growth transition and predicting a country's growth on the basis of its previous growth and its level of GDPPC (convergence). Then the total impact of a growth regime transition is the difference between the actual growth after the transition and the predicted growth in the post-transition period times the duration of the transition. Again, this is best illustrated with an example (and a graph), for which we will use Uganda.

Our method shows four growth regime transitions – an acceleration in 1961, a deceleration in 1969, an acceleration in 1980 and another acceleration in 1988. Let us illustrate the method with two examples.

In 1969 growth decelerated from 3.0 to -3.6 ppa and this lower rate of growth lasted until 1980 (11 years).[11] The regression prediction of the growth rate from 1969 to 1980 of a country that was growing at a rate of 3.0 from 1961 to 1969 and at Uganda's level of GDPPC in 1969 of USD824 is 2.3 ppa.[12] So the cumulative loss from the growth regime transition in 1969 is (-3.6 – 2.3)*11 = -65.7% – that is, Uganda's GDPPC in 1980 was 66% lower than it would have been had it grown at the predicted rate versus the actual rate.

Table 3: Growth Magnitudes for Uganda

Country	Start year	Level of income at start	Growth before episode	Growth during episode	Simple predicted growth during episode	Episode duration	Cumulative magnitude of growth regime transition gain/loss
Uganda	1961	636	-0.7%	3.0%	1.7%	8	10.4%
Uganda	1969	824	3.0%	-3.6%	2.3%	11	-65.7%
Uganda	1980	536	-3.6%	-0.5%	-1.4%	8	6.8%
Uganda	1988	529	-0.5%	3.5%	1.4%	22	46.0%

In 1980 there was a acceleration that was the end of the collapse from 1969 to 1980 and then in 1988 there was another acceleration. The acceleration of 1988 took growth from -0.5 to 3.5 and the predicted growth from 1988 to 2010 of a country growing at -0.5 ppa from 1980 to 1988 and at Uganda's level of GDPPC in 1988 was 1.4 ppa.[13] So the total gain from the 1988 growth acceleration was (3.5-1.4)*22 = 46% – Uganda's output was 46% higher due to the 1988 growth acceleration than the counter-factual of 1.4 ppa growth.

$$g^{Predicted}_{1988-2010} = .0065 + .191 * g_{1980-1988} + 0.001 * \mathit{ln}(GDPPC_{1988})$$

11 There is some discrepancy between these growth rates and the numbers in Figure 6 because the growth rates in Figure 6 are the result of the output of the BP procedure, whereas the numbers in the table (and used in Figure 8) are OLS estimated growth rates.

12 The equation, with coefficients estimated from all countries except Uganda, is: $g^{Predicted}_{1969-1980}$ Hence plugging in the values of g1961-1969=.030 and ln(824)=6.71, produces $g^{Predicted}$=.023.

13 The equation for this episode is (the prediction equation is estimated for each episode):

$g^{Predicted}_{1988-2010} = .0065 + 91 * g_{1980-1988} + .001 * \mathit{ln}(GDPPC_{1988})$ And plugging in of $g_{1980-1988}$=-.005 and ln(529)=6.27, produces $g^{Predicted}$=.014.

Uganda

Figure 5: Single trend for Uganda

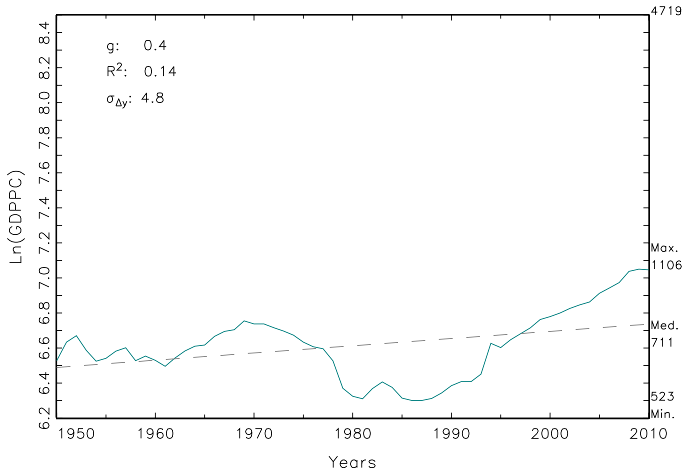


Figure 6: Breaks filtered from four possible B–P breaks: Uganda

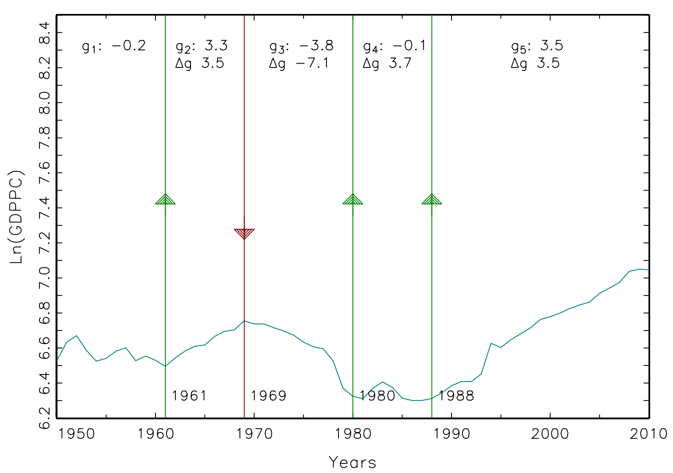


Figure 7: Bai–Perron Identified Break(s) for Uganda

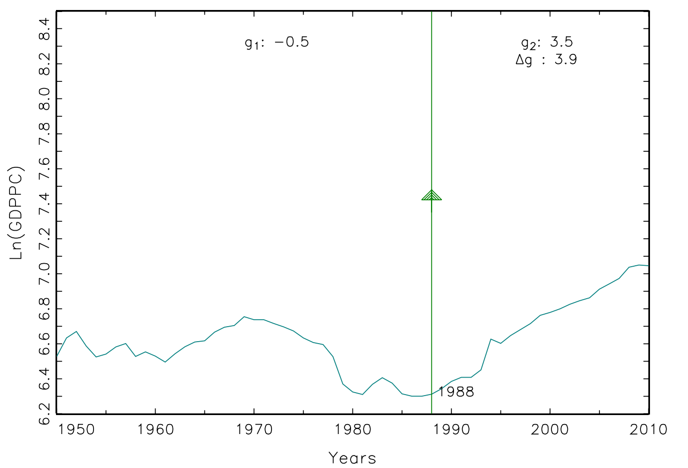
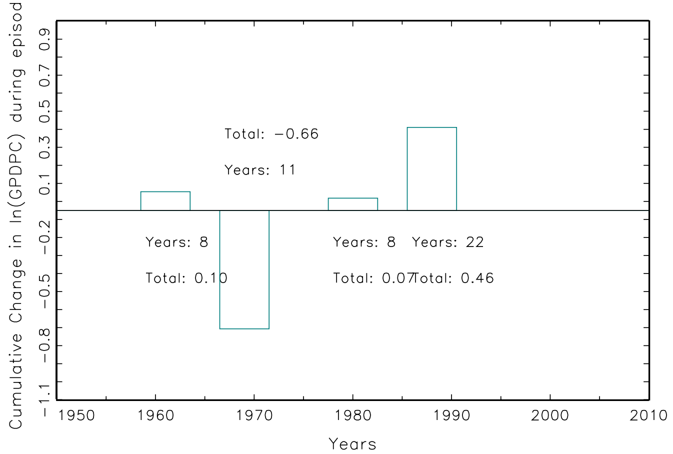


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Uganda



Section II: Country Graphs

Afghanistan

Figure 5: Single trend for Afghanistan

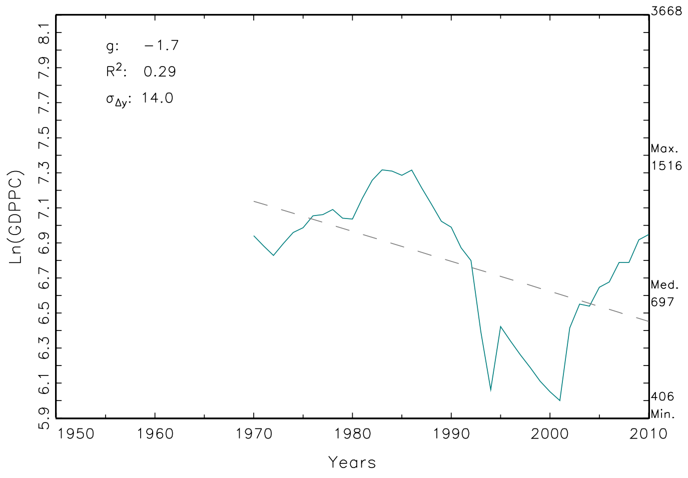


Figure 6: Breaks filtered from two possible B−P breaks: Afghanistan

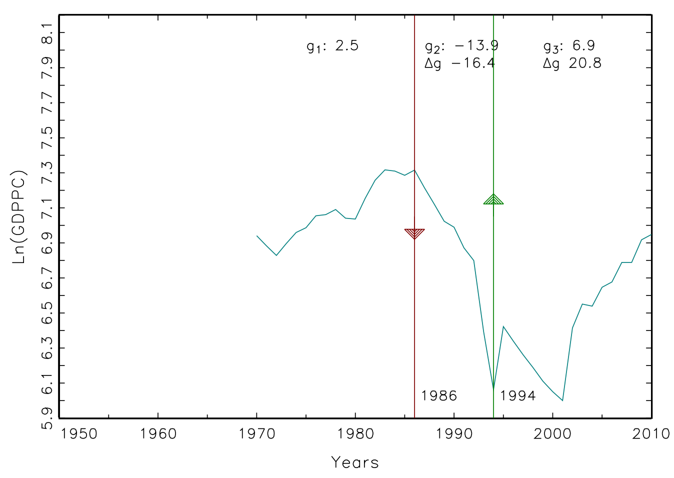


Figure 7: Bai−Perron Identified Break(s) for Afghanistan

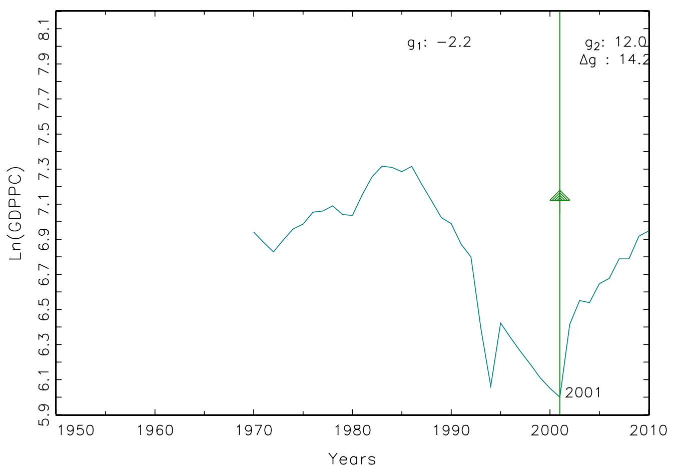
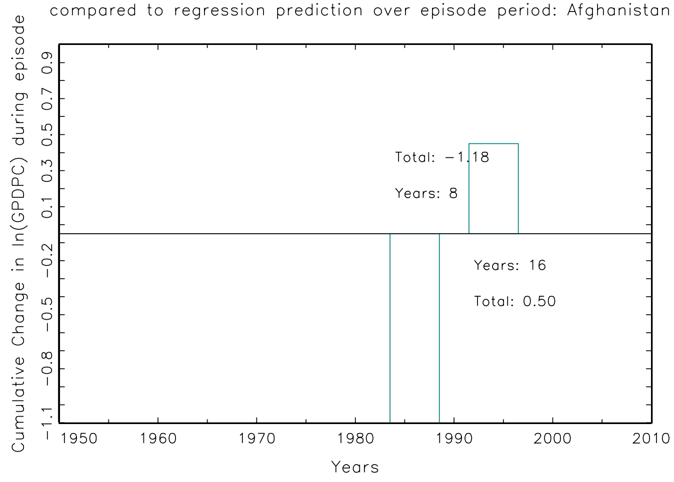


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Afghanistan



Albania

Figure 5: Single trend for Albania

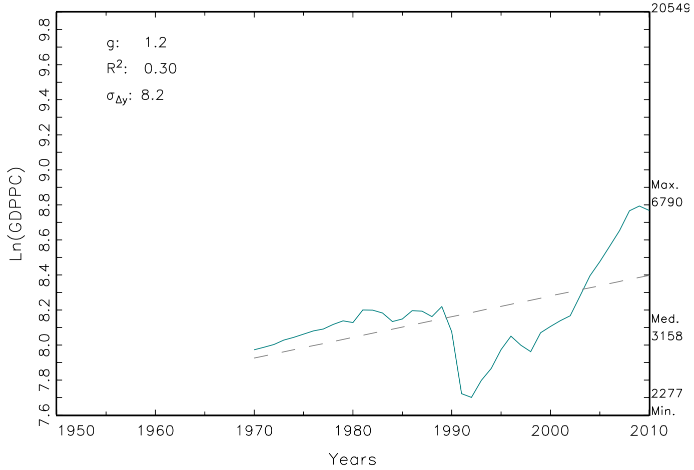


Figure 6: Breaks filtered from two possible B–P breaks: Albania

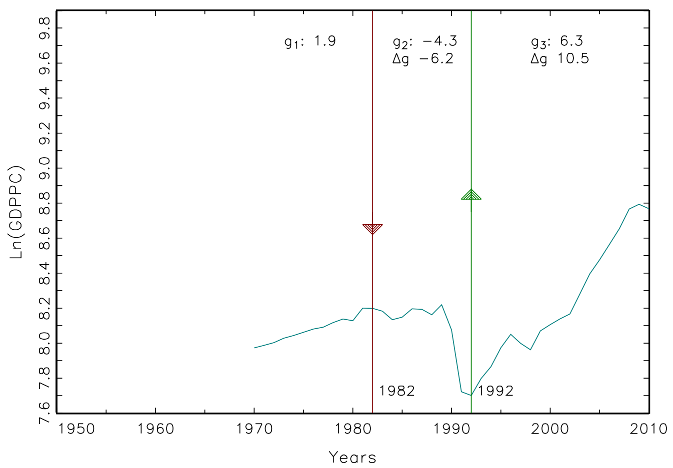


Figure 7: Bai–Perron Identified Break(s) for Albania

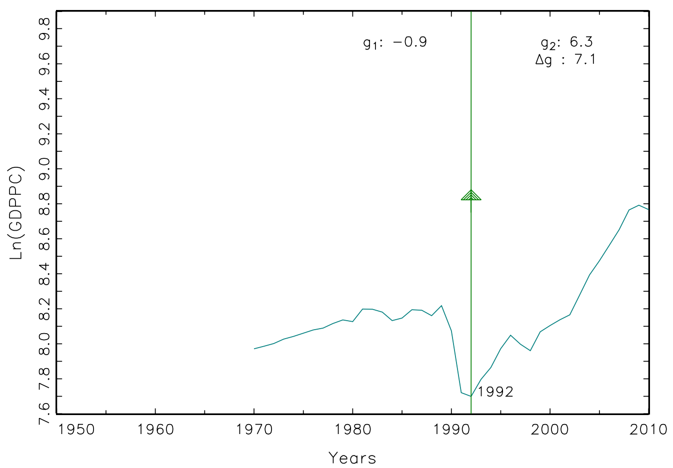
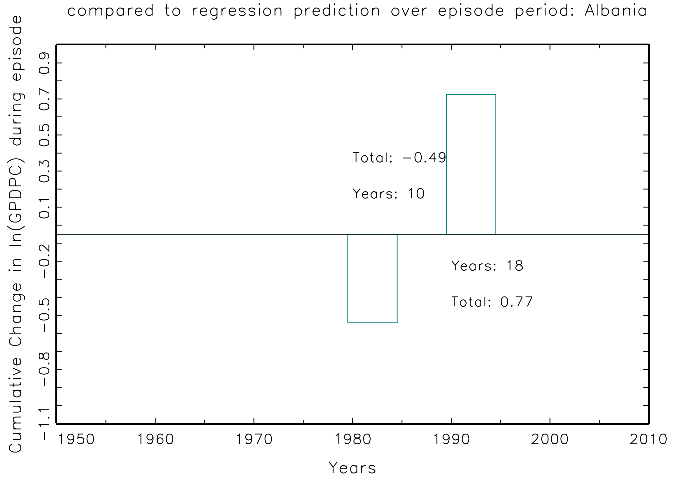


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Albania



Algeria

Figure 5: Single trend for Algeria

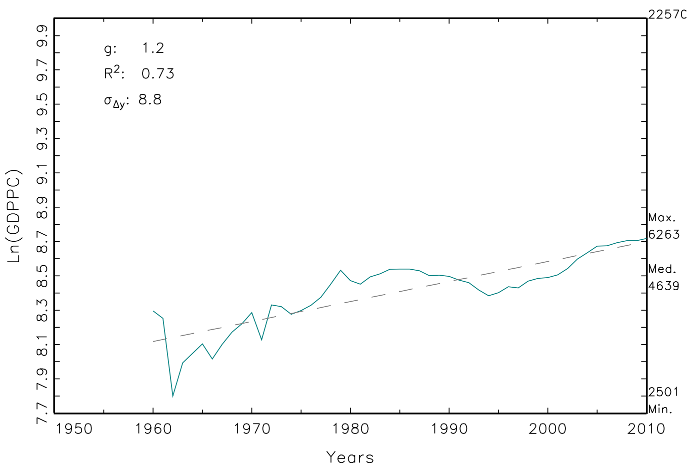


Figure 6: Breaks filtered from three possible B–P breaks: Algeria

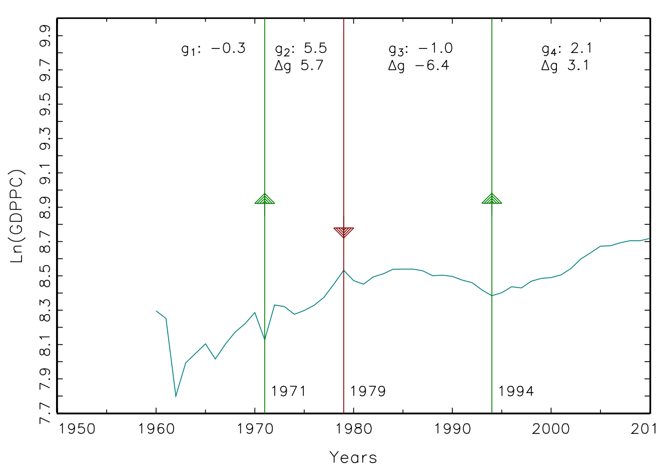


Figure 7: Bai–Perron Identified Break(s) for Algeria

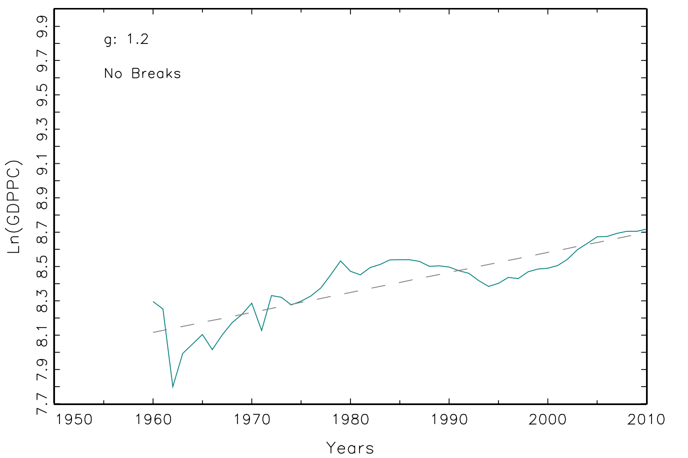
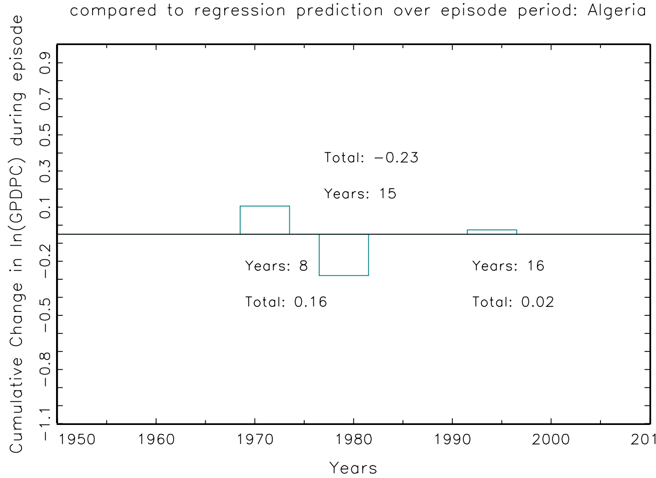


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Algeria



Angola

Figure 5: Single trend for Angola

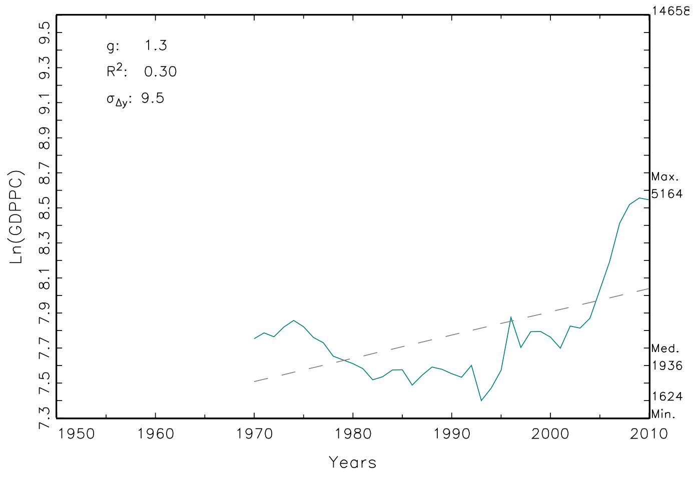


Figure 6: Breaks filtered from two possible B–P breaks: Angola

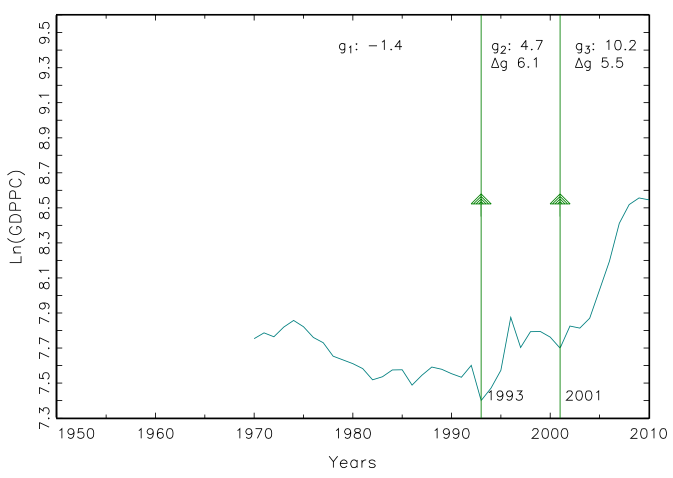


Figure 7: Bai–Perron Identified Break(s) for Angola

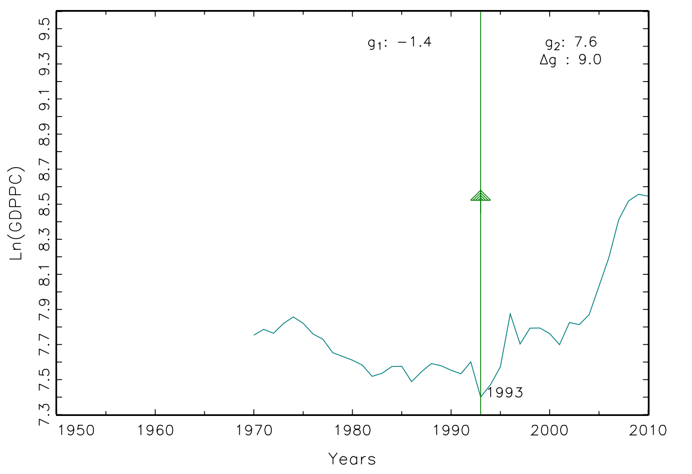
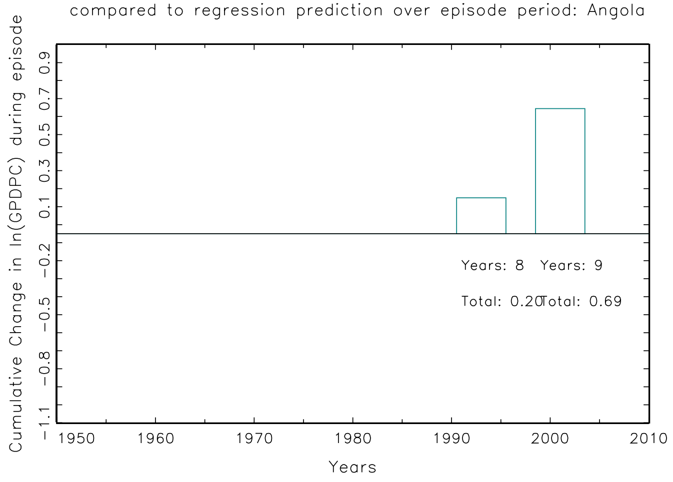


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Angola



Argentina

Figure 5: Single trend for Argentina

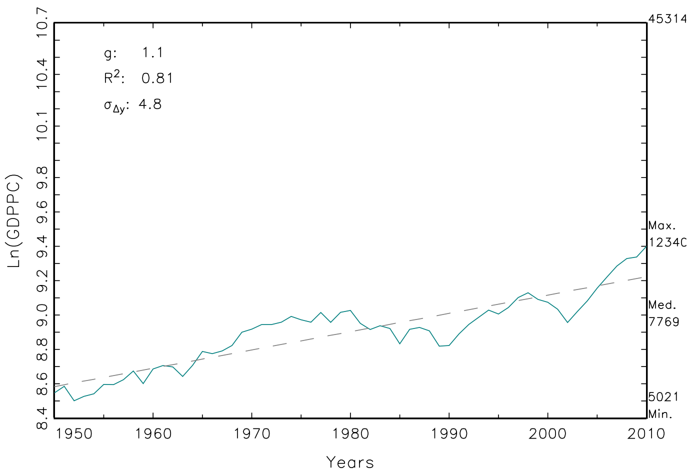


Figure 6: Breaks filtered from four possible B–P breaks: Argentina

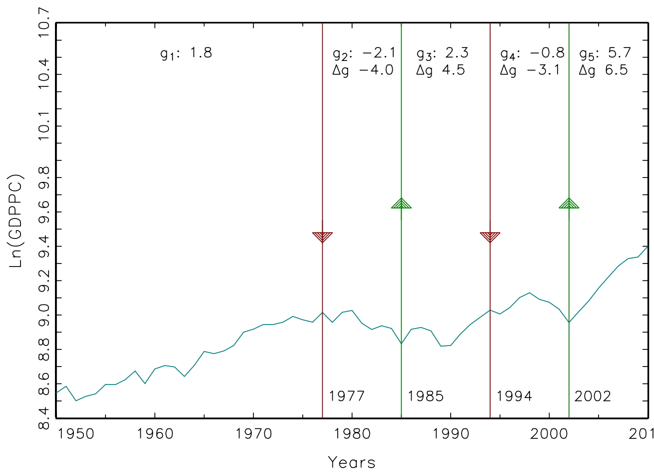


Figure 7: Bai–Perron Identified Break(s) for Argentina

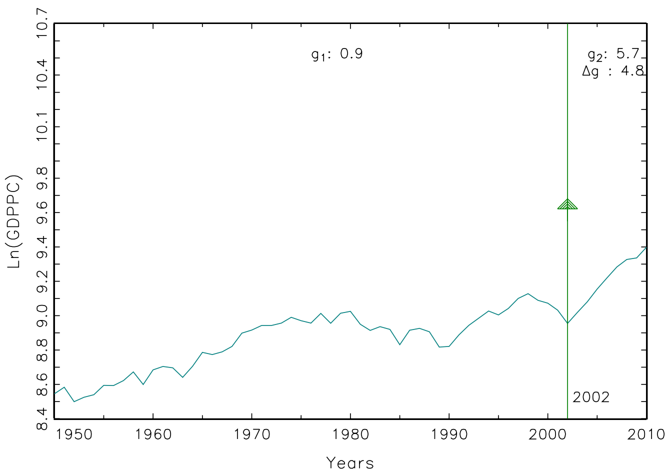
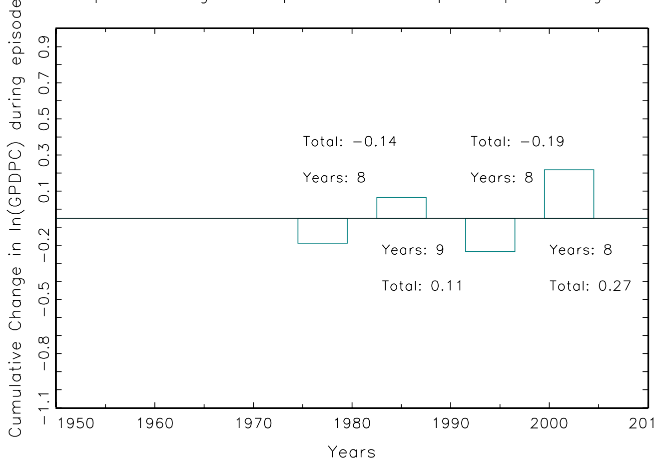


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Argentina



Australia

Figure 5: Single trend for Australia

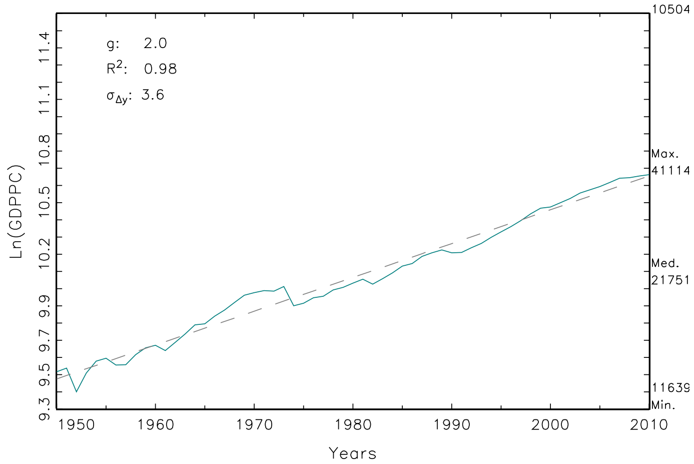


Figure 6: Breaks filtered from four possible B–P breaks: Australia

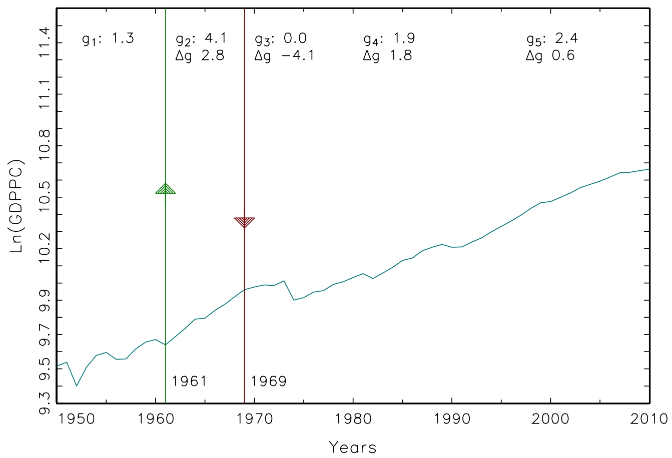


Figure 7: Bai–Perron Identified Break(s) for Australia

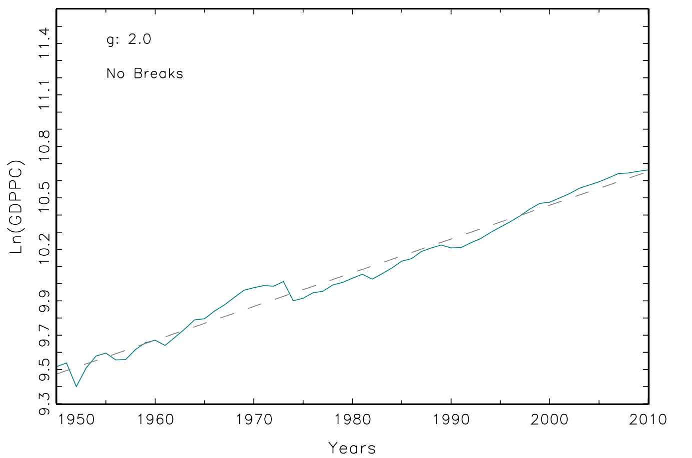
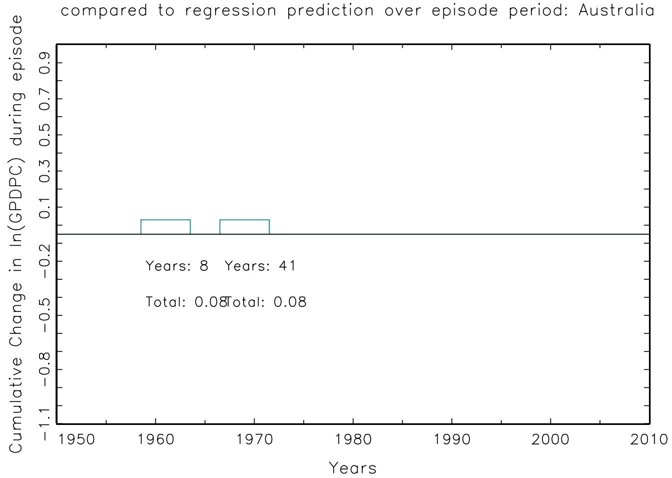


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Australia



Austria

Figure 5: Single trend for Austria

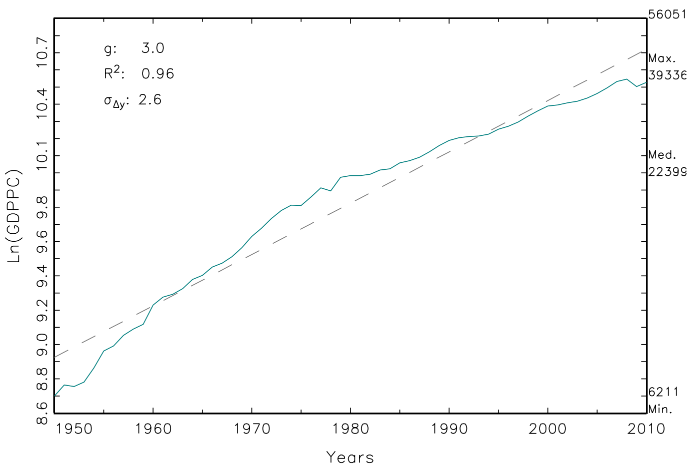


Figure 6: Breaks filtered from four possible B−P breaks: Austria

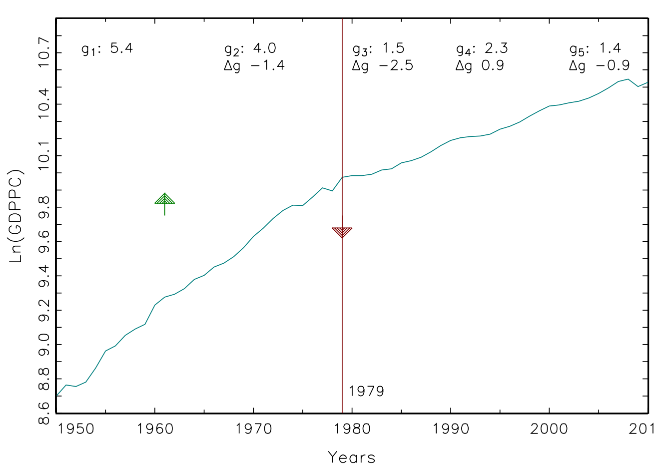


Figure 7: Bai−Perron Identified Break(s) for Austria

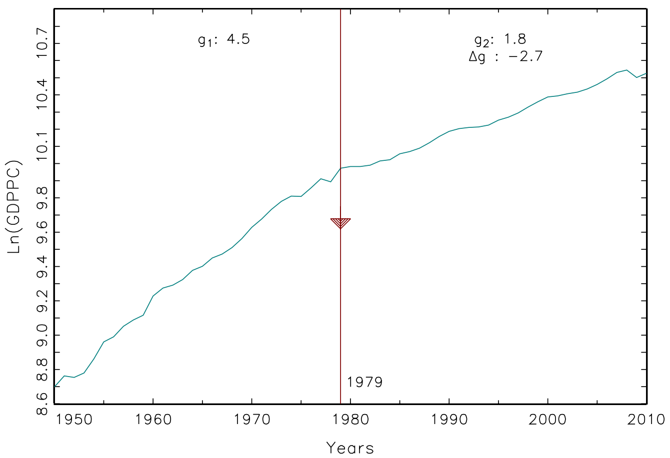
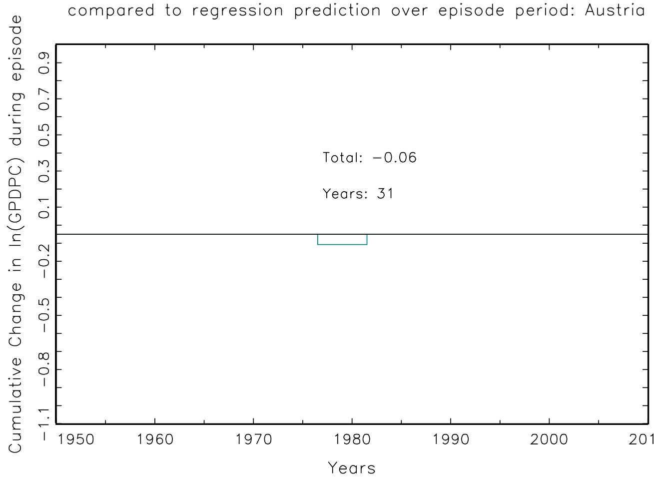


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Austria



Bangladesh

Figure 5: Single trend for Bangladesh

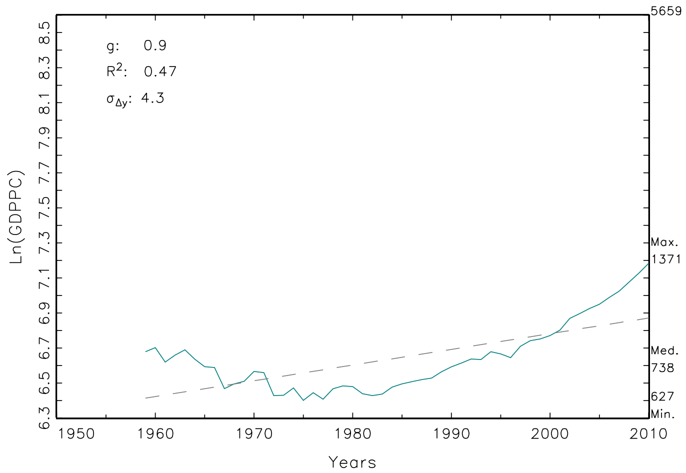


Figure 6: Breaks filtered from three possible B–P breaks: Bangladesh

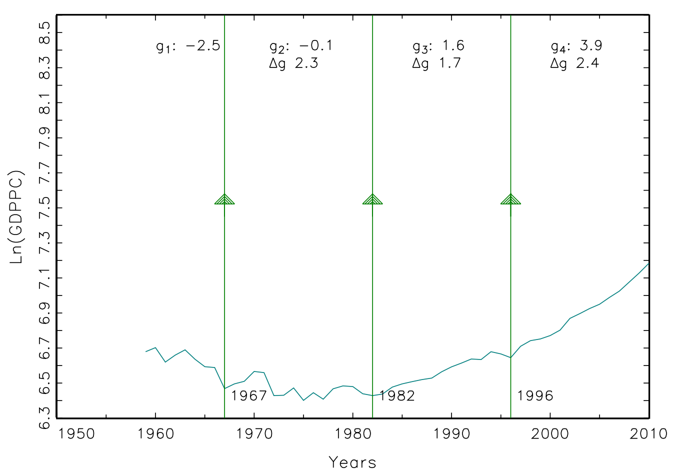


Figure 7: Bai–Perron Identified Break(s) for Bangladesh

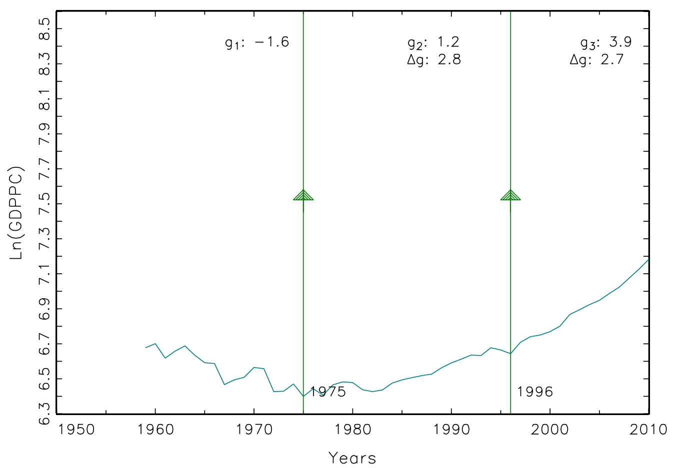
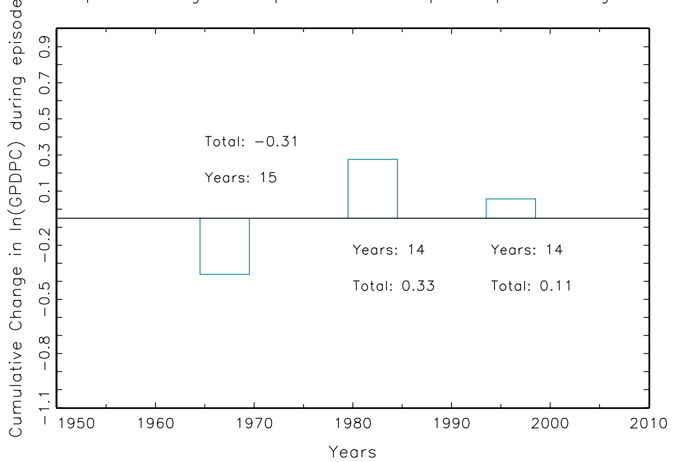


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Bangladesh



Belgium

Figure 5: Single trend for Belgium

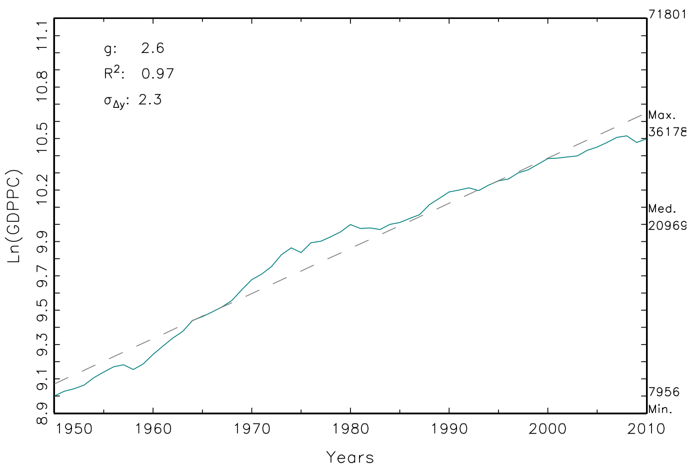


Figure 6: Breaks filtered from four possible B–P breaks: Belgium

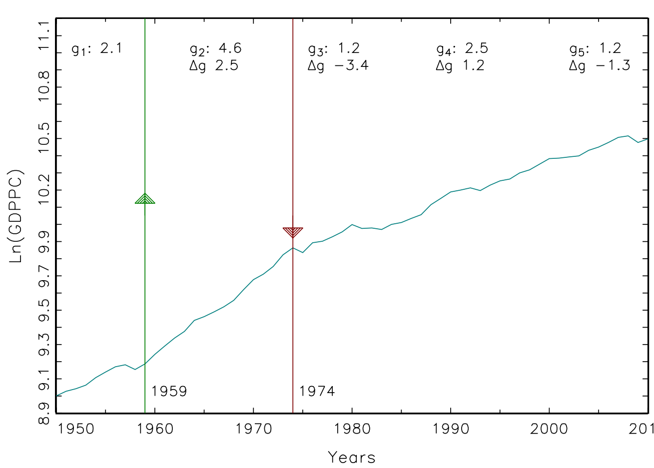


Figure 7: Bai–Perron Identified Break(s) for Belgium

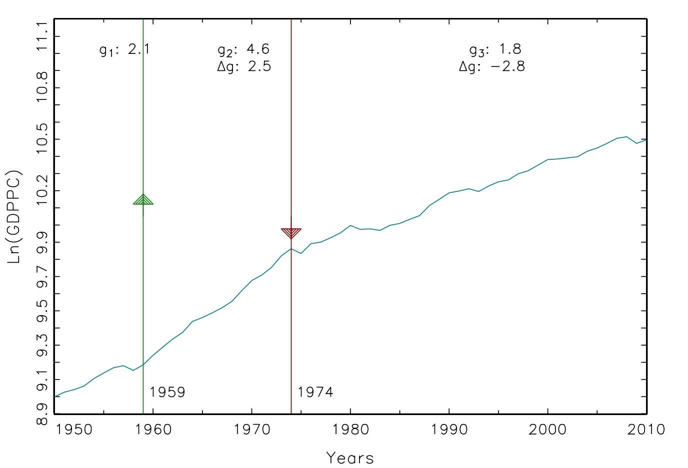
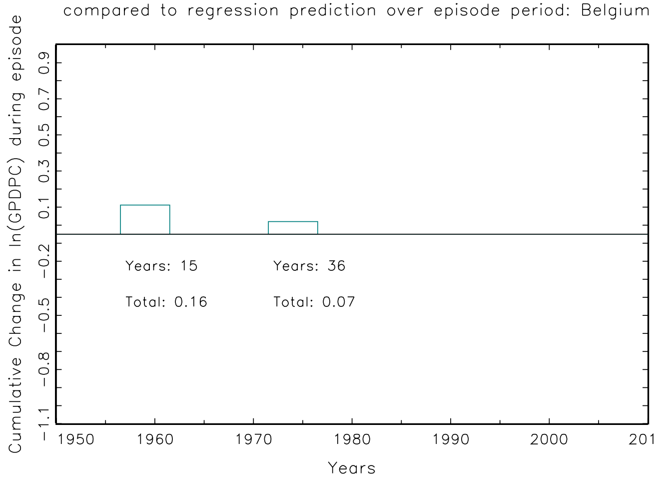


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Belgium



Benin

Figure 5: Single trend for Benin

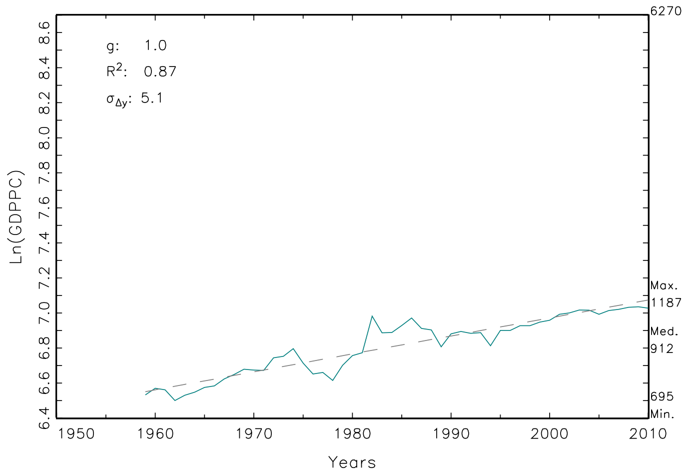


Figure 6: Breaks filtered from three possible B–P breaks: Benin

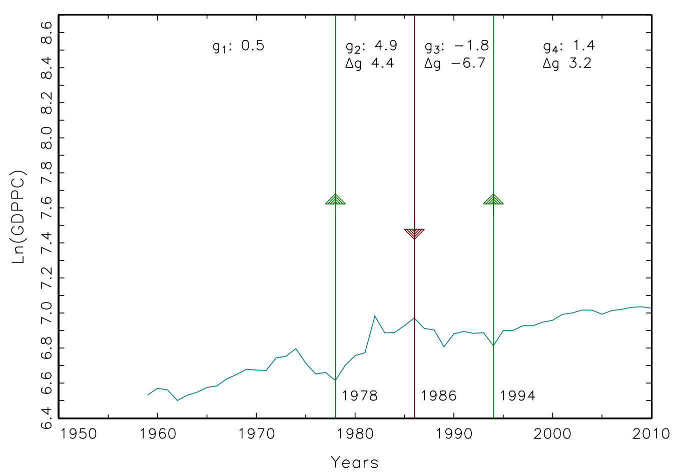


Figure 7: Bai–Perron Identified Break(s) for Benin

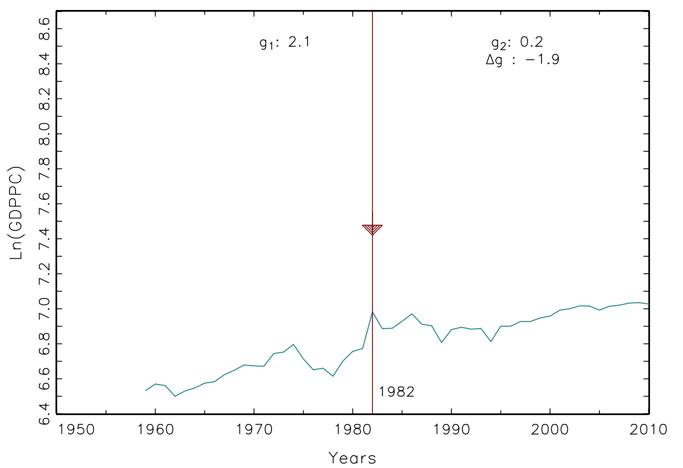
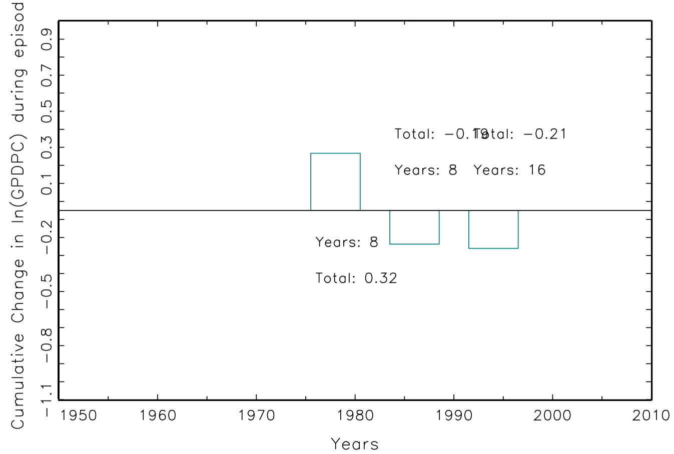


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Benin



Bolivia

Figure 5: Single trend for Bolivia

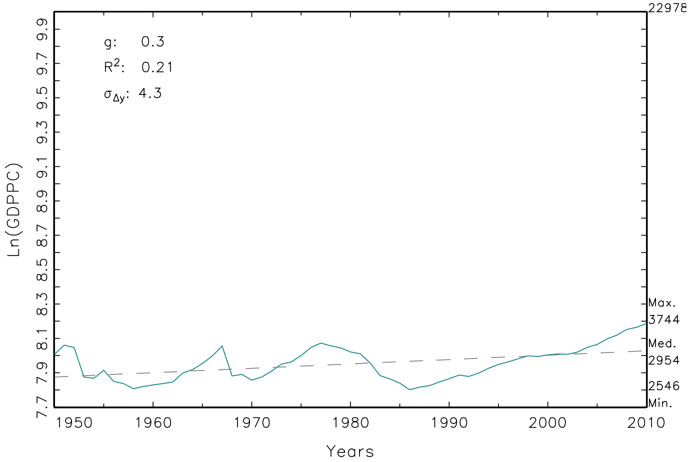


Figure 6: Breaks filtered from four possible B−P breaks: Bolivia

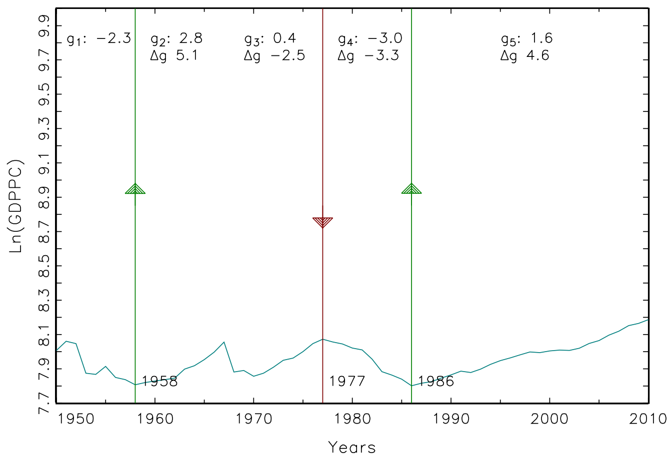


Figure 7: Bai−Perron Identified Break(s) for Bolivia

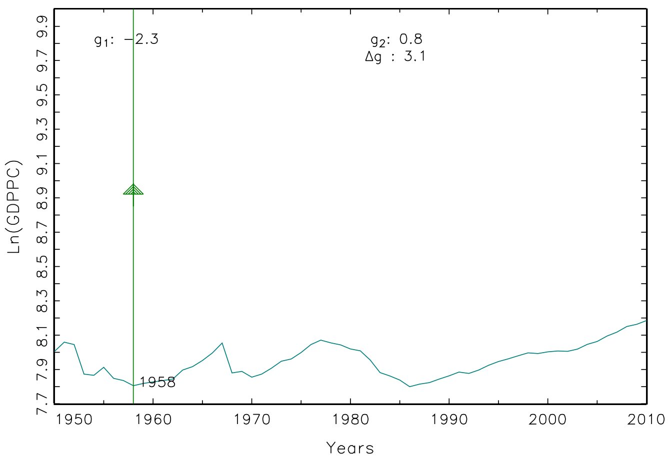
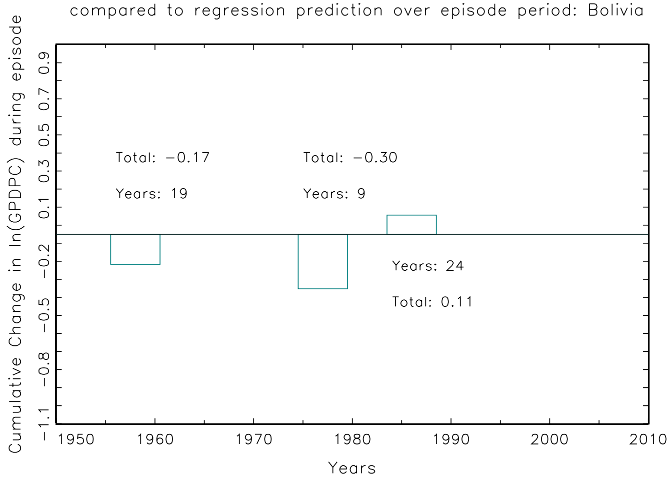


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Bolivia



Botswana

Figure 5: Single trend for Botswana

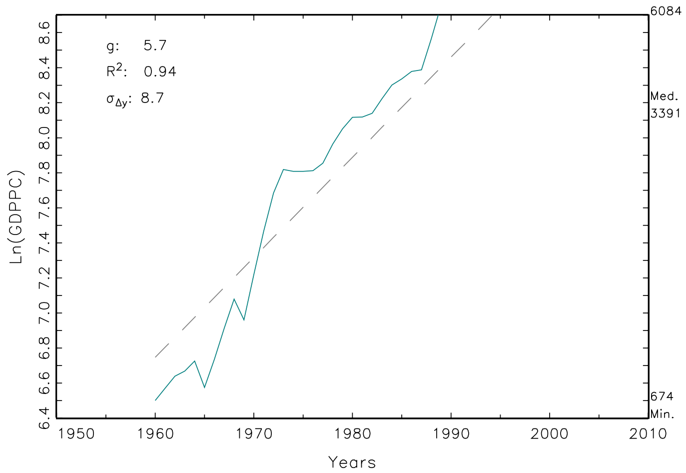


Figure 6: Breaks filtered from three possible B–P breaks: Botswana

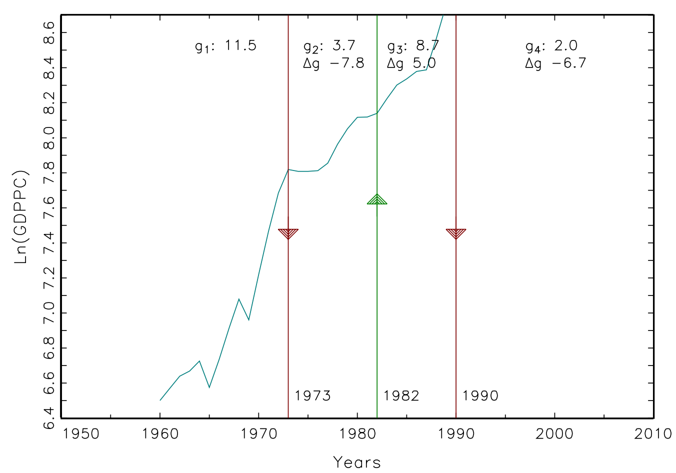


Figure 7: Bai–Perron Identified Break(s) for Botswana

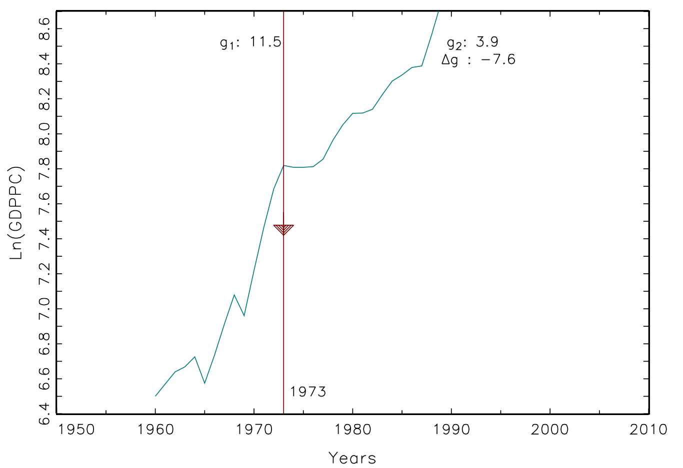
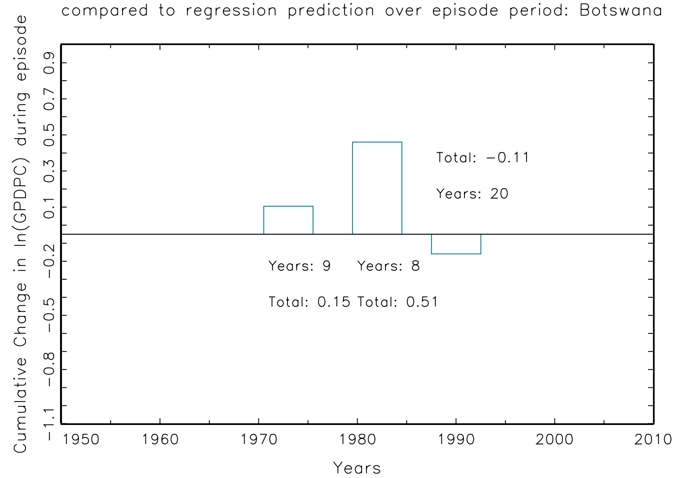


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Botswana



Brazil

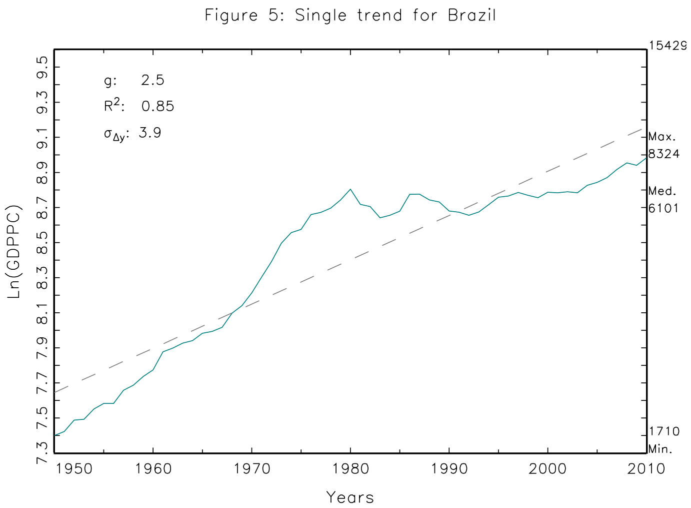


Figure 5: Single trend for Brazil
g: 2.5
R2: 0.85
σΔy: 3.9
15429
Max.
8324
Med.
6101
1710
Min.
Ln(GDPPC)
Years

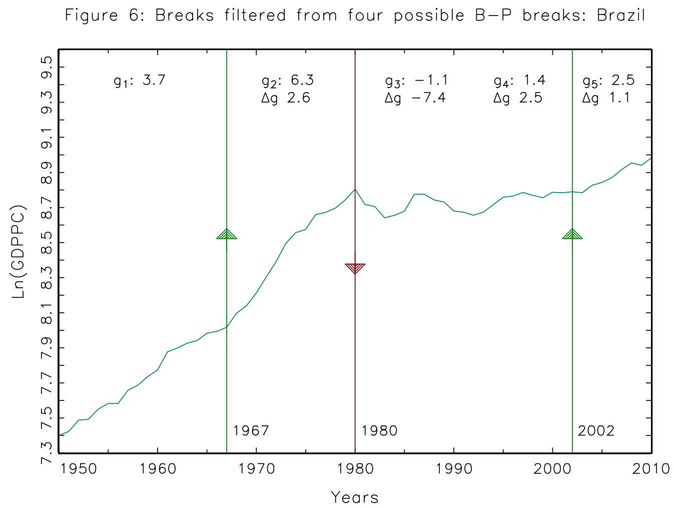


Figure 6: Breaks filtered from four possible B–P breaks: Brazil
g1: 3.7
g2: 6.3
Δg 2.6
g3: −1.1
Δg −7.4
g4: 1.4
Δg 2.5
g5: 2.5
Δg 1.1
1967
1980
2002
Ln(GDPPC)
Years

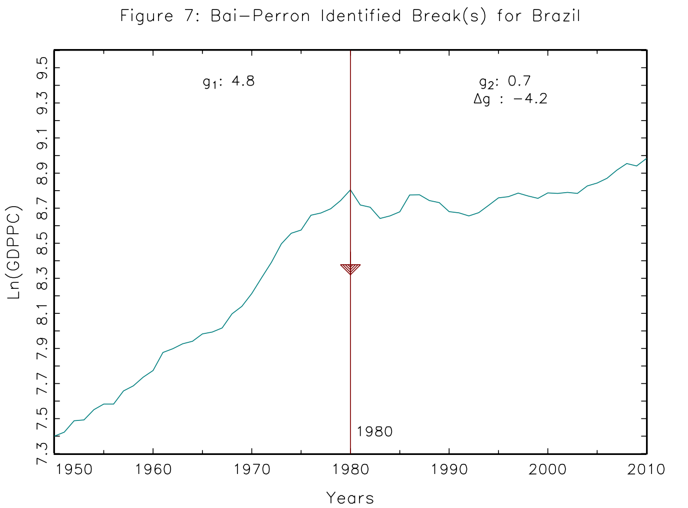


Figure 7: Bai–Perron Identified Break(s) for Brazil
g1: 4.8
g2: 0.7
Δg : −4.2
1980
Ln(GDPPC)
Years

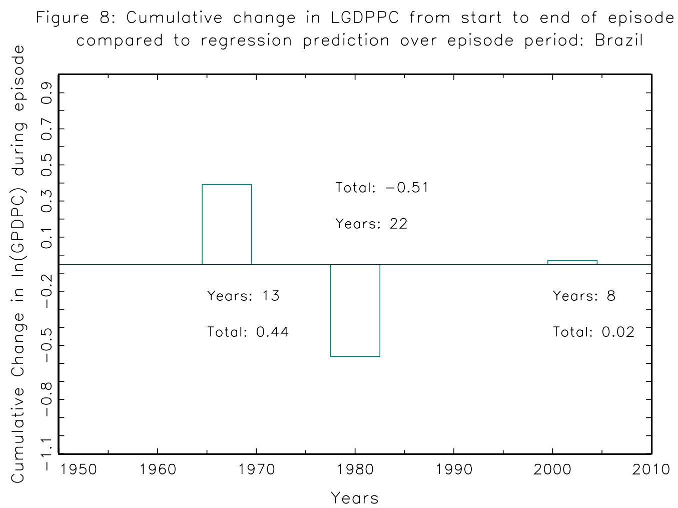


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Brazil
Total: −0.51
Years: 22
Years: 13
Total: 0.44
Years: 8
Total: 0.02
Cumulative Change in ln(GPDPC) during episode
Years

Bulgaria

Figure 5: Single trend for Bulgaria

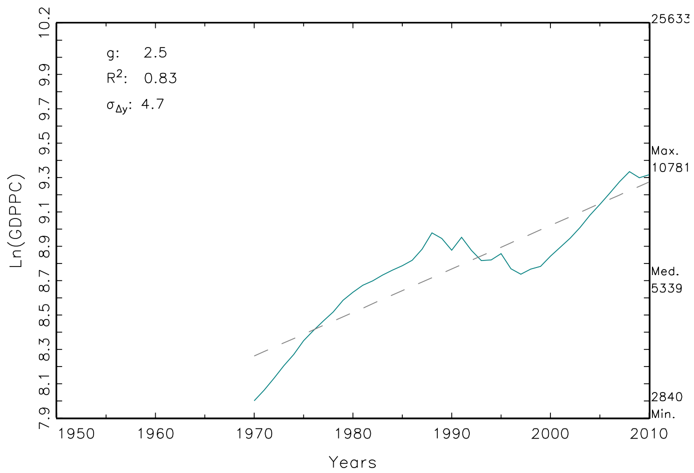


Figure 6: Breaks filtered from two possible B–P breaks: Bulgaria

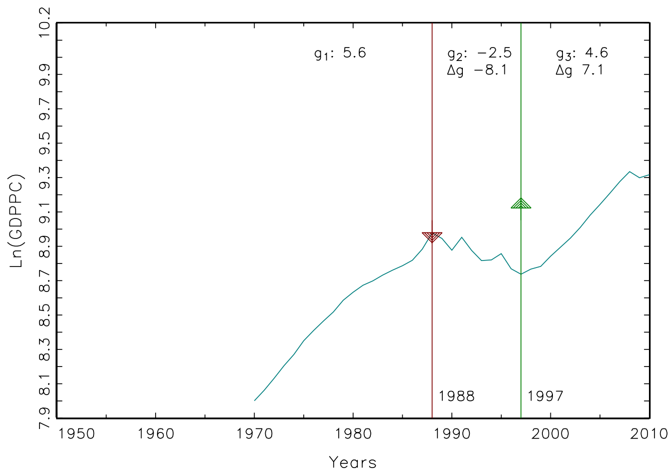


Figure 7: Bai–Perron Identified Break(s) for Bulgaria

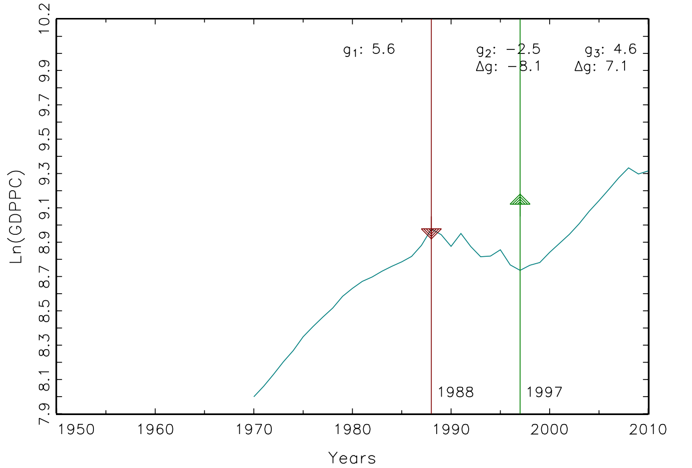
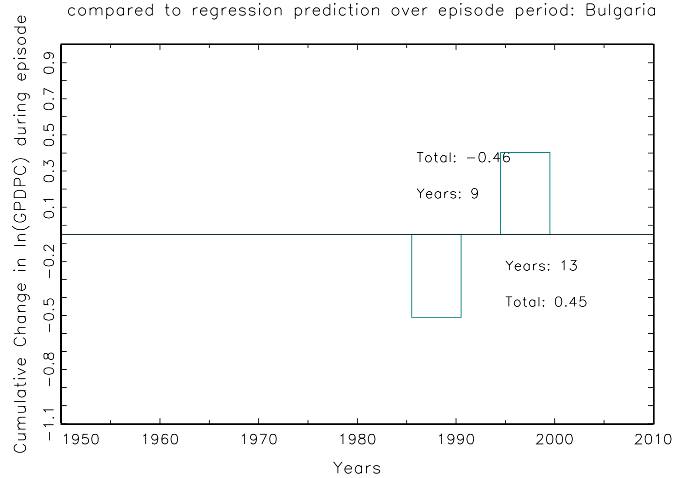


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Bulgaria



Burkina Faso

Figure 5: Single trend for Burkina Faso

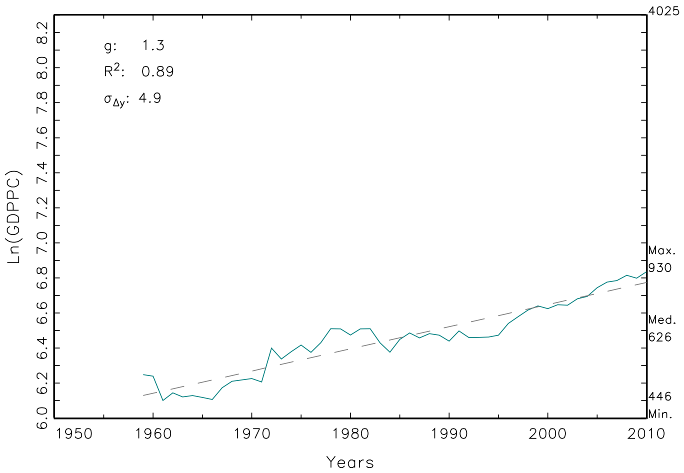


Figure 6: Breaks filtered from three possible B–P breaks: Burkina Faso

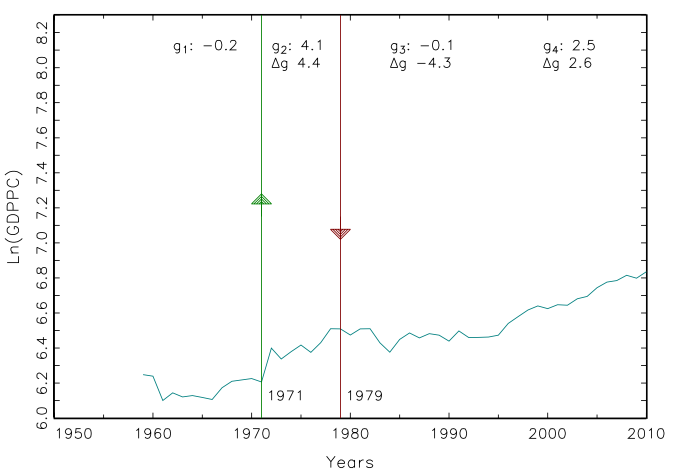


Figure 7: Bai–Perron Identified Break(s) for Burkina Faso

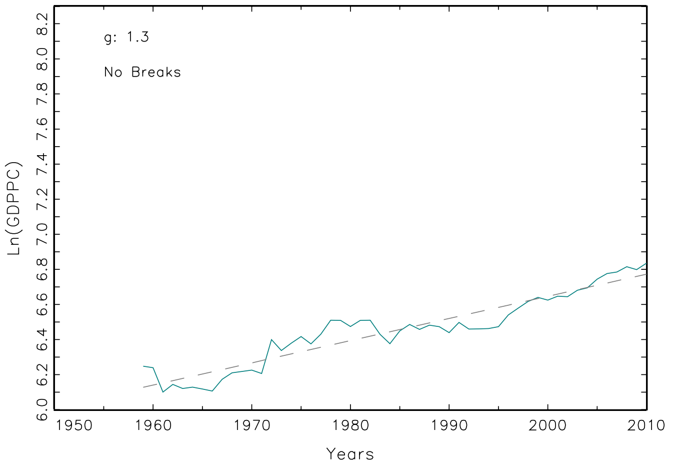
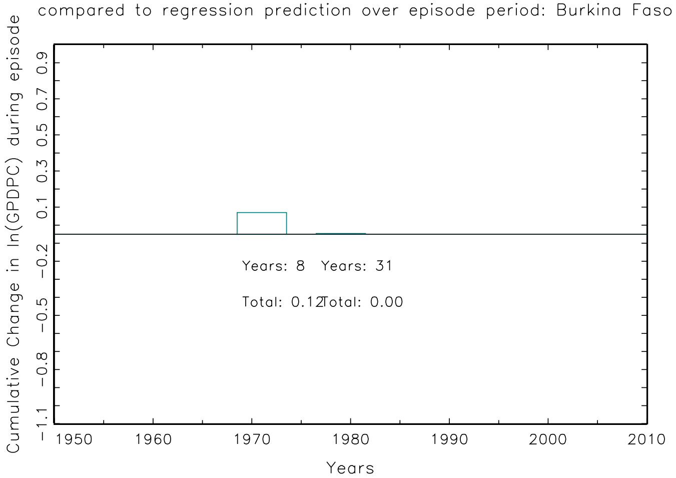


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Burkina Faso



Burundi

Figure 5: Single trend for Burundi

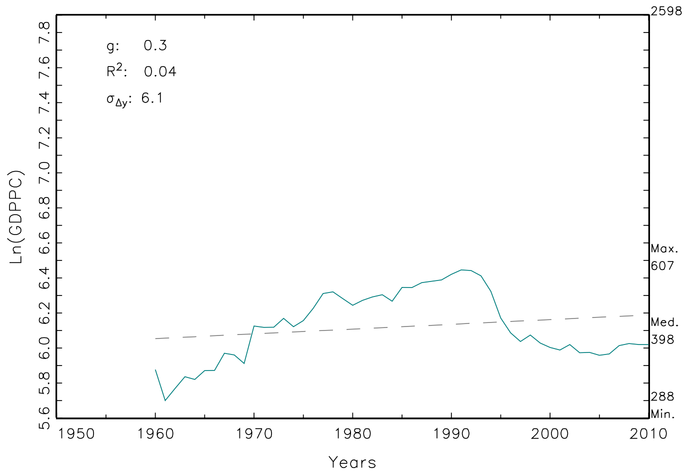


Figure 6: Breaks filtered from three possible B–P breaks: Burundi

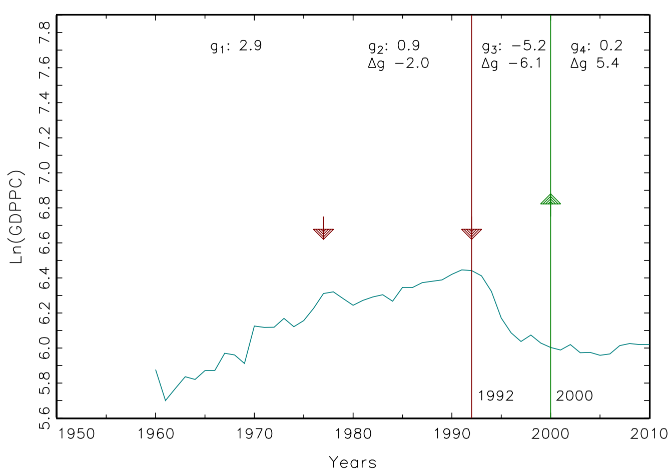


Figure 7: Bai–Perron Identified Break(s) for Burundi

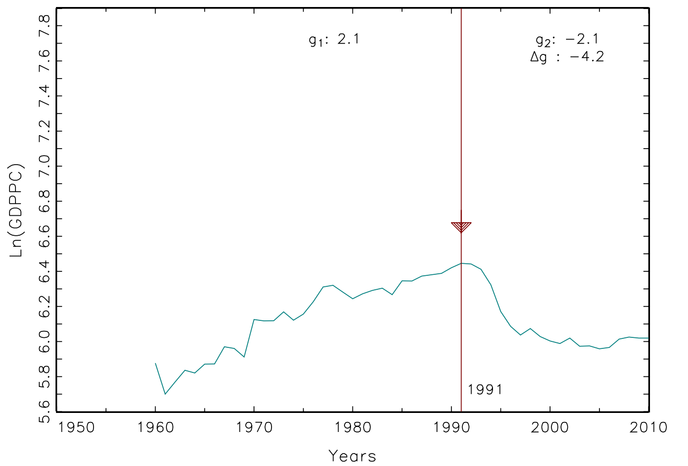
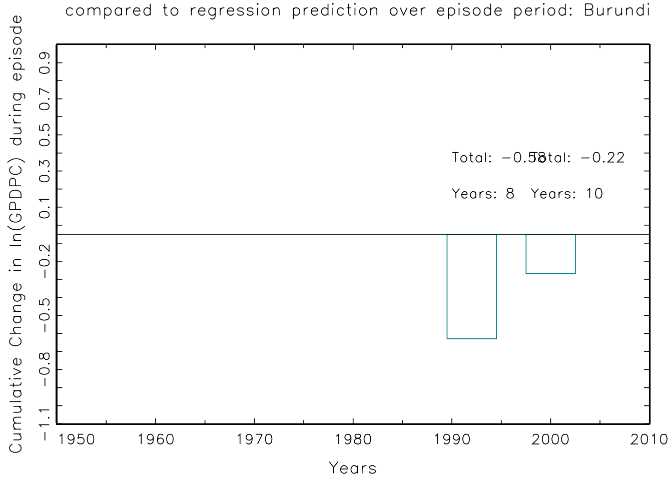


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Burundi



Cambodia

Figure 5: Single trend for Cambodia

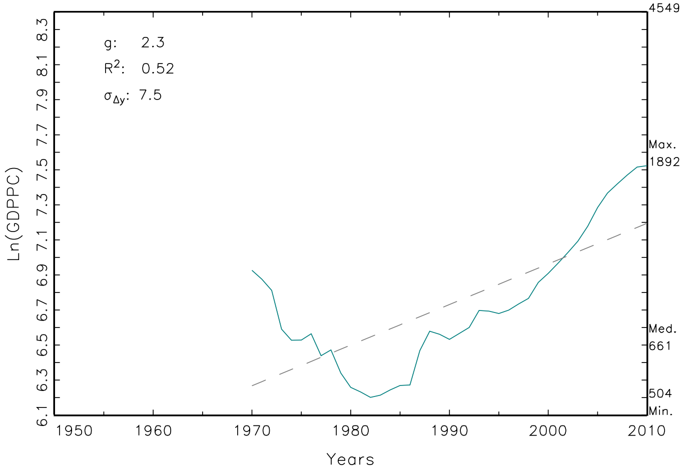


Figure 6: Breaks filtered from two possible B−P breaks: Cambodia

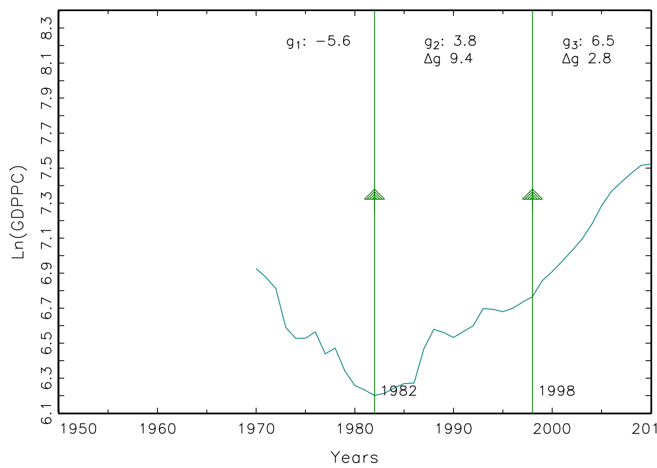


Figure 7: Bai−Perron Identified Break(s) for Cambodia

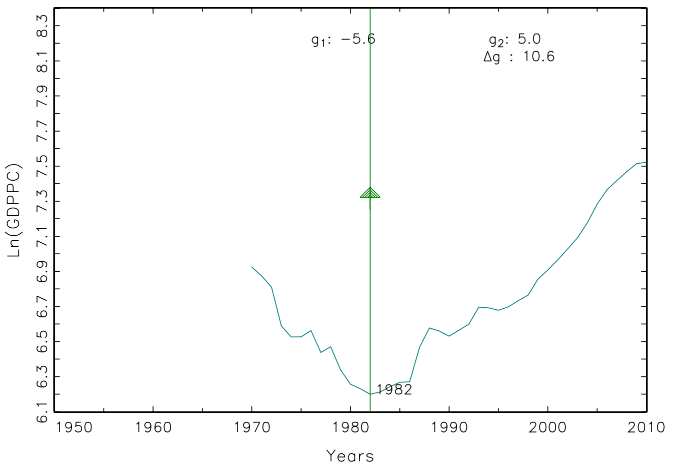
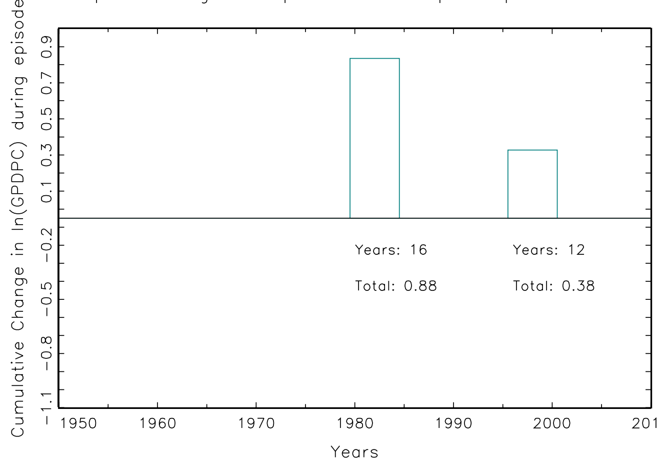


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Cambodia



Cameroon

Figure 5: Single trend for Cameroon

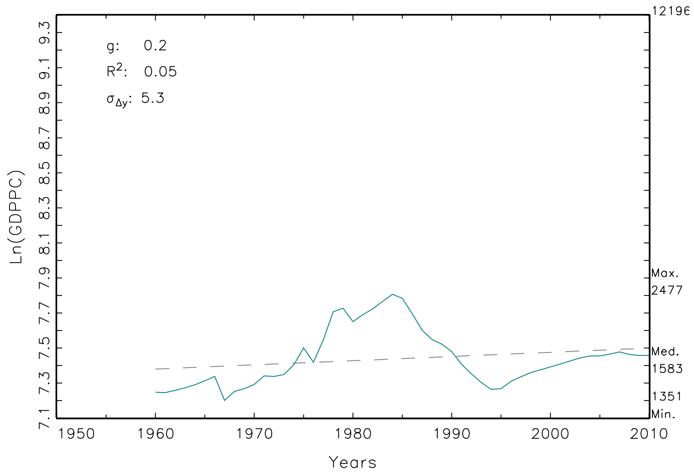


Figure 6: Breaks filtered from three possible B–P breaks: Cameroon

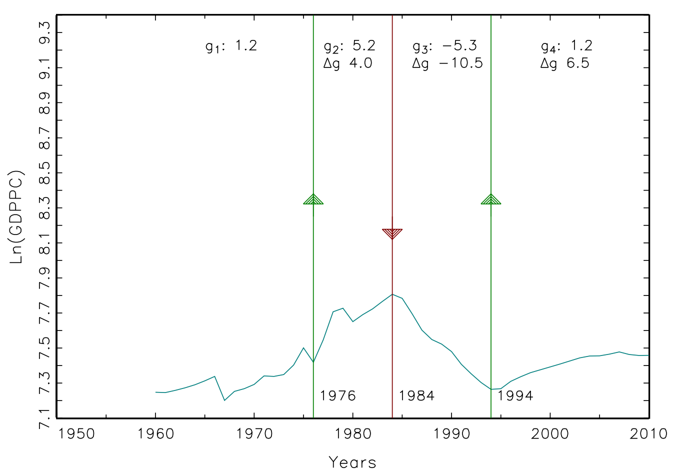


Figure 7: Bai–Perron Identified Break(s) for Cameroon

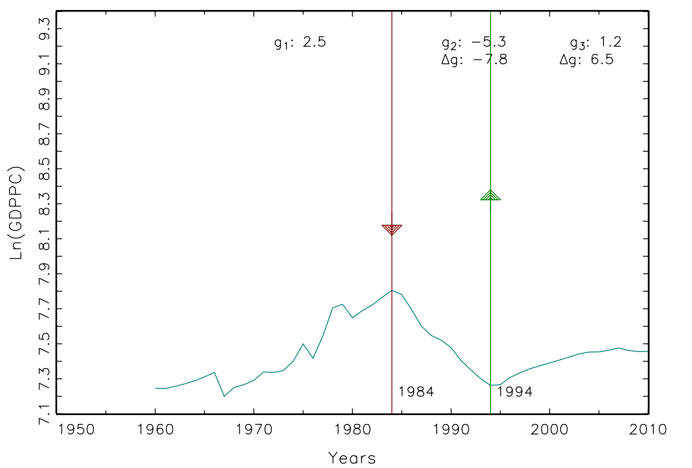
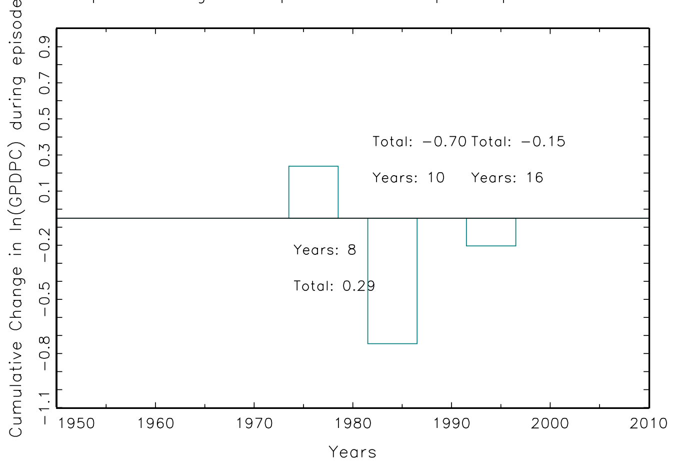


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Cameroon



Canada

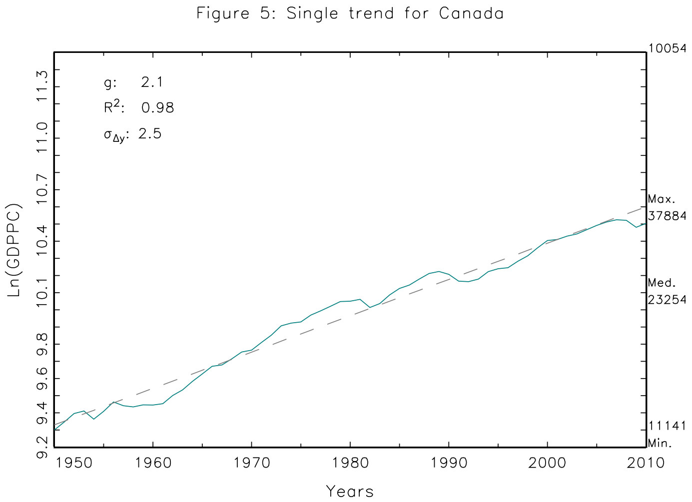


Figure 5: Single trend for Canada
g: 2.1
R2: 0.98
σΔy: 2.5
10054
Max.
37884
Med.
23254
11141
Min.
Ln(GDPPC)
Years

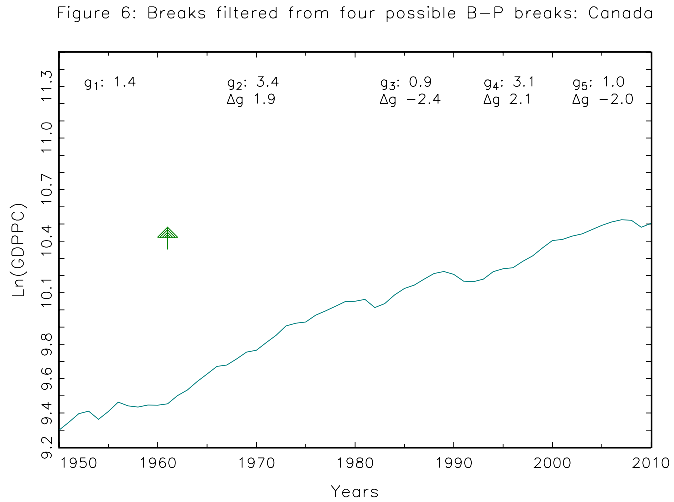


Figure 6: Breaks filtered from four possible B–P breaks: Canada
g1: 1.4
g2: 3.4
Δg 1.9
g3: 0.9
Δg −2.4
g4: 3.1
Δg 2.1
g5: 1.0
Δg −2.0
Ln(GDPPC)
Years

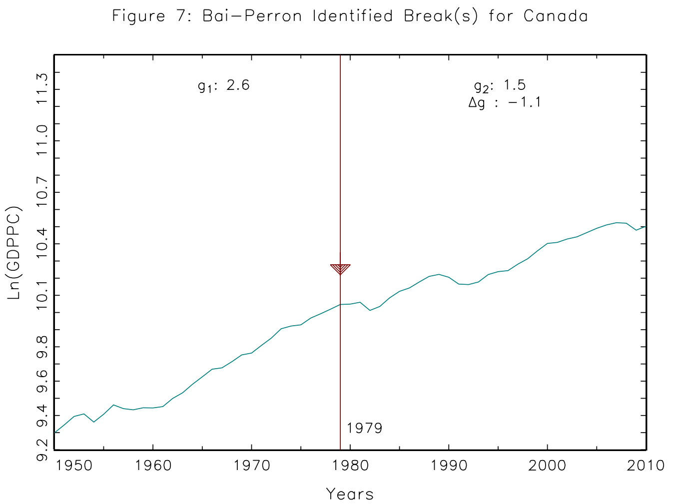


Figure 7: Bai–Perron Identified Break(s) for Canada
g1: 2.6
g2: 1.5
Δg : −1.1
1979
Ln(GDPPC)
Years

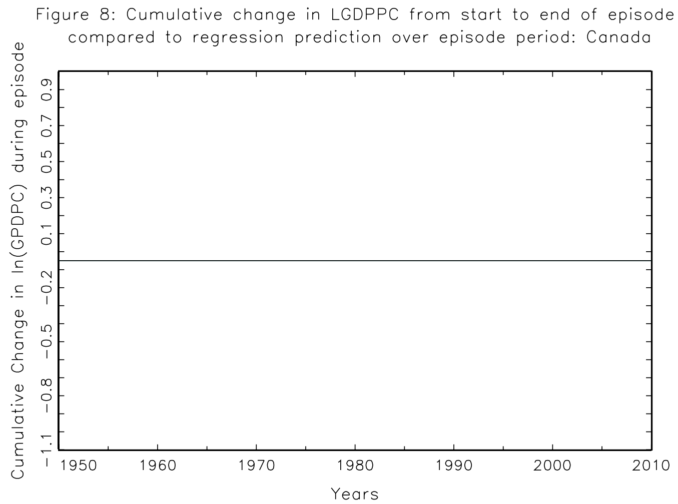


Figure 8: Cumulative change in LGDPPC from start to end of episode
compared to regression prediction over episode period: Canada
Cumulative Change in ln(GPDPC) during episode
Years

Central African Republic

Figure 5: Single trend for Central African Republic

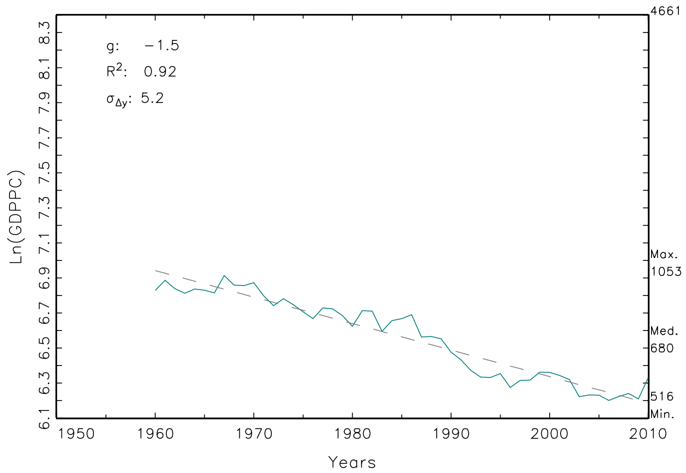


Figure 6: Breaks filtered from three possible B–P breaks: Central African Rep

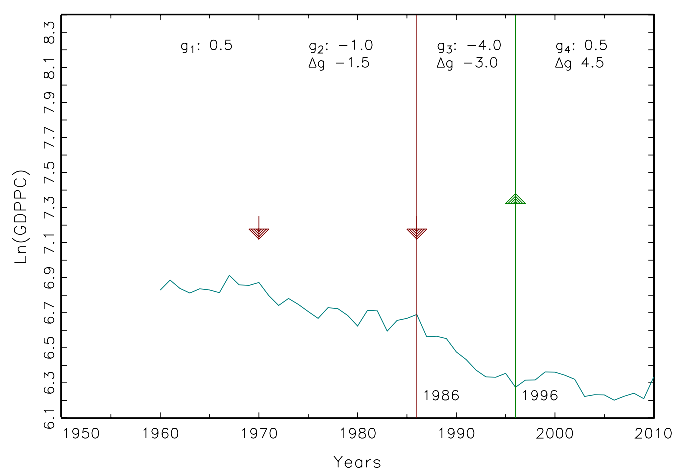


Figure 7: Bai–Perron Identified Break(s) for Central African Republic

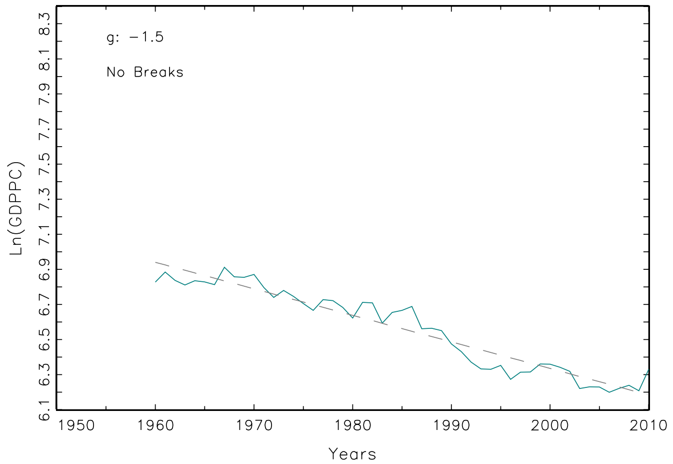
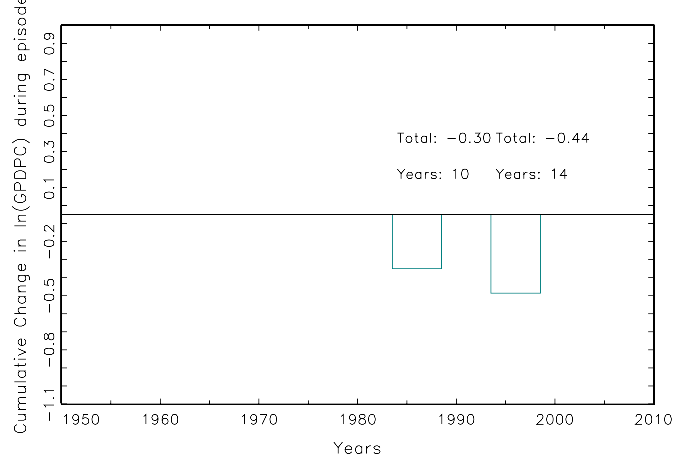


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Central African Repu



Chad

Figure 5: Single trend for Chad

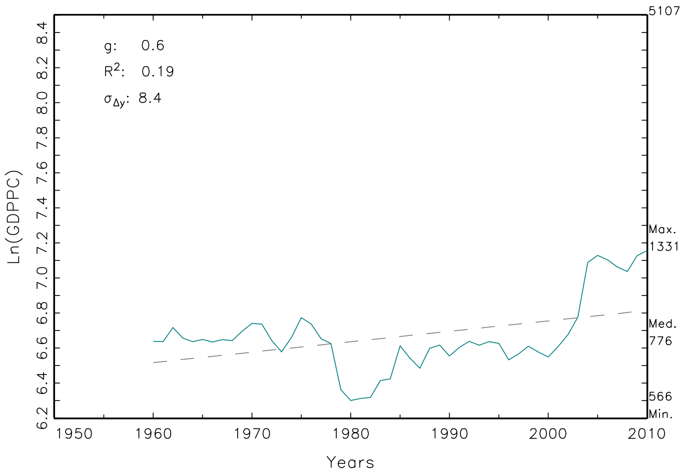


Figure 6: Breaks filtered from three possible B–P breaks: Chad

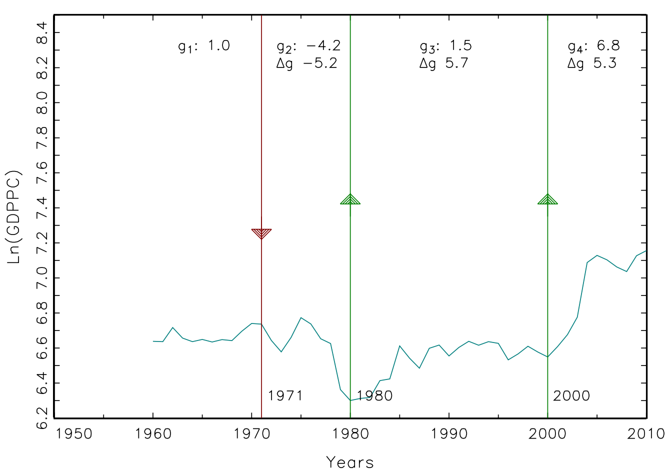


Figure 7: Bai–Perron Identified Break(s) for Chad

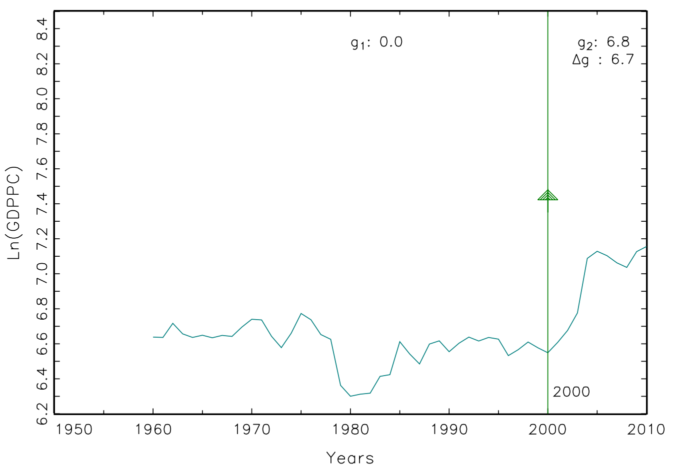
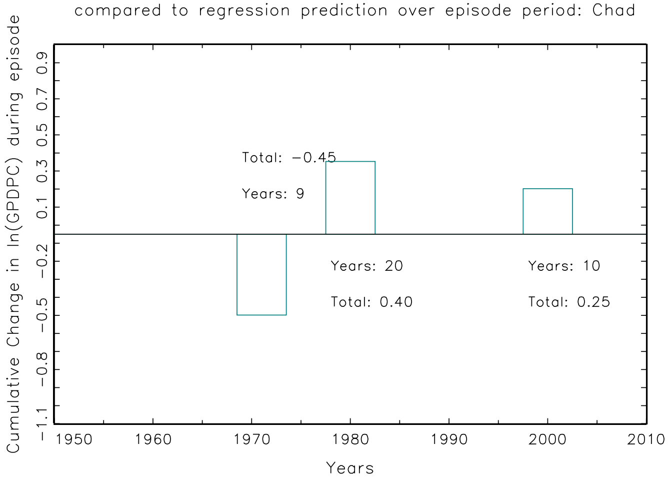


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Chad



Chile

Figure 5: Single trend for Chile

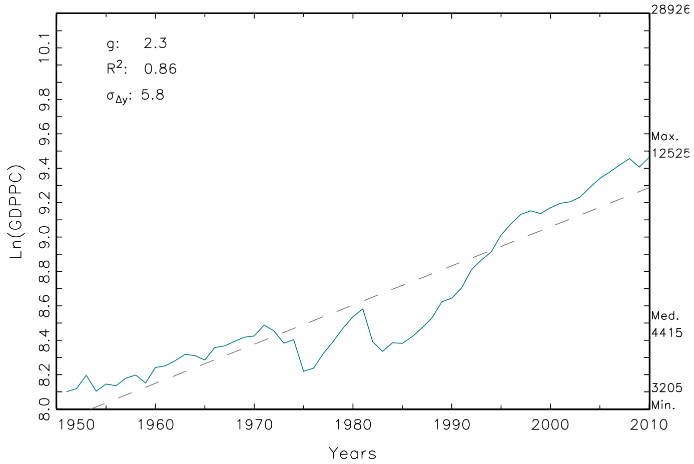


Figure 6: Breaks filtered from four possible B–P breaks: Chile

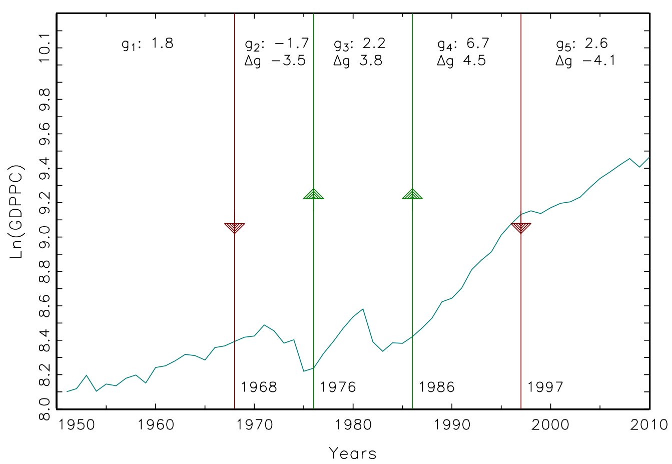


Figure 7: Bai–Perron Identified Break(s) for Chile

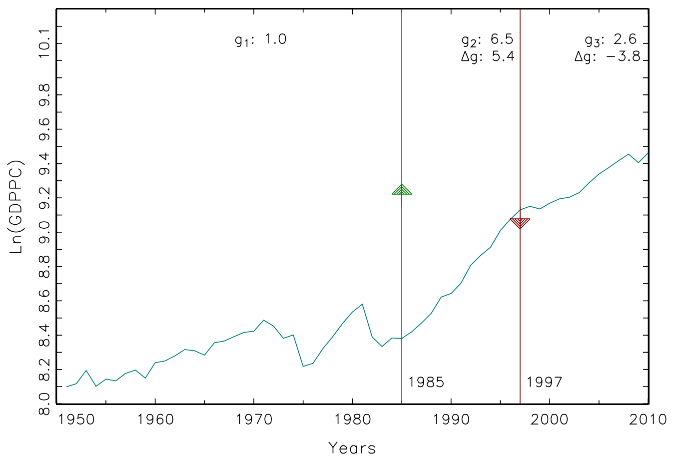
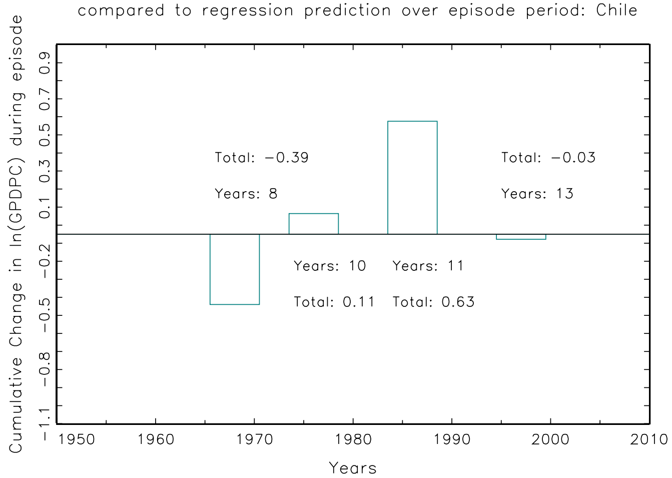


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Chile



China

Figure 5: Single trend for China Version 1

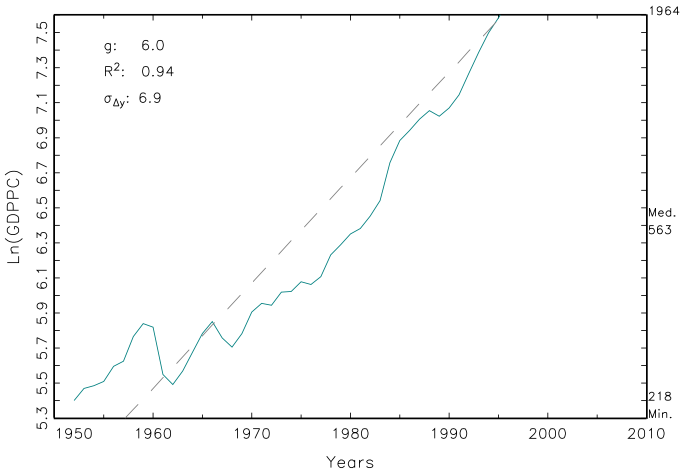


Figure 6: Breaks filtered from four possible B–P breaks: China Version 1

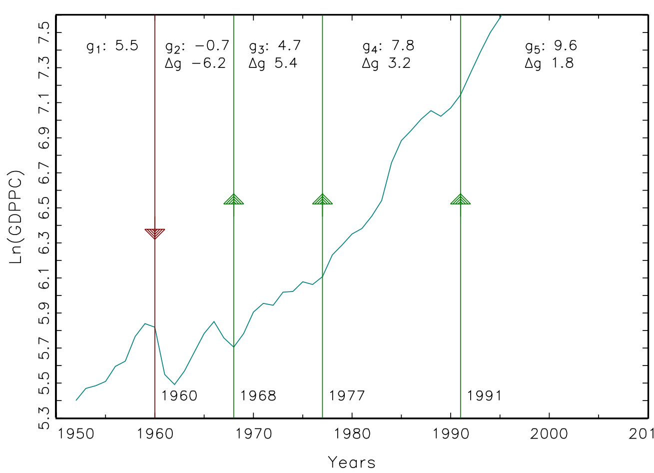


Figure 7: Bai–Perron Identified Break(s) for China Version 1

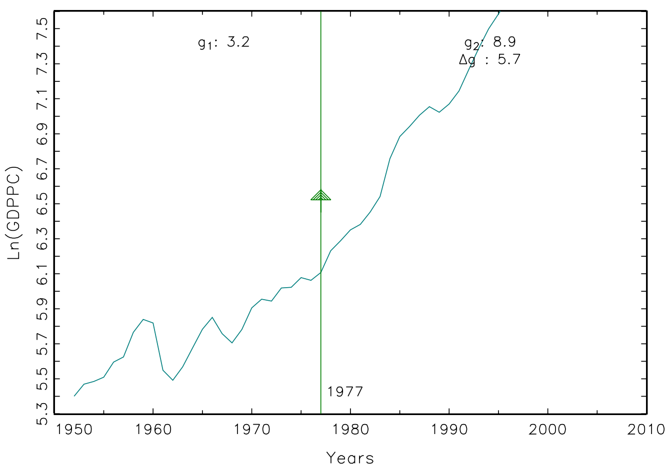
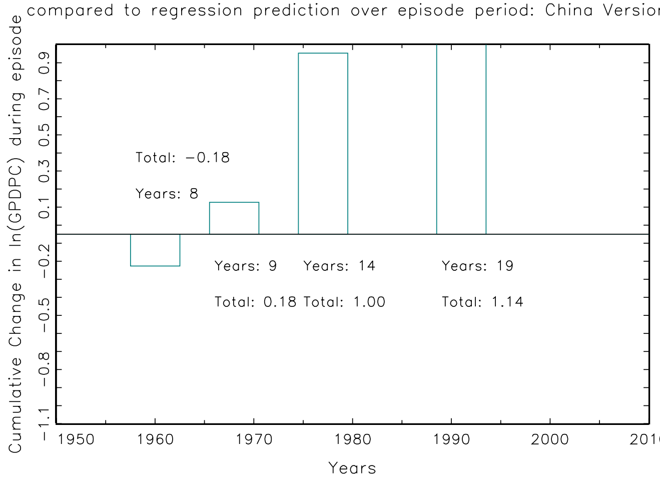


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: China Version 1



Colombia

Figure 5: Single trend for Colombia

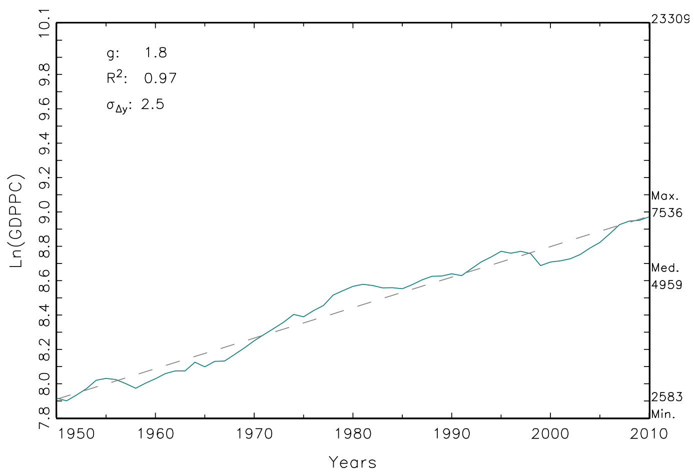


Figure 6: Breaks filtered from four possible B–P breaks: Colombia

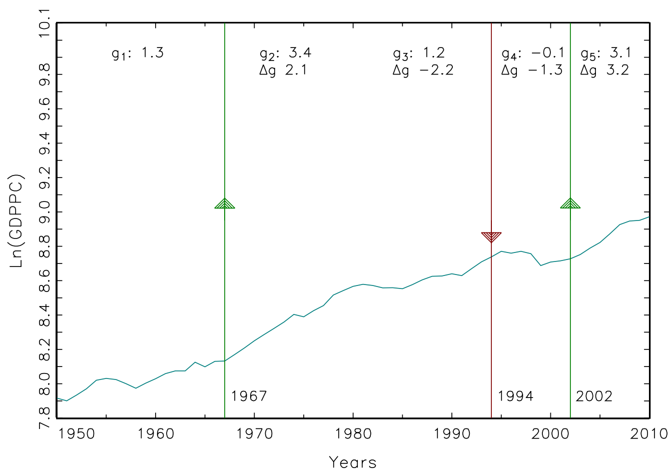


Figure 7: Bai–Perron Identified Break(s) for Colombia

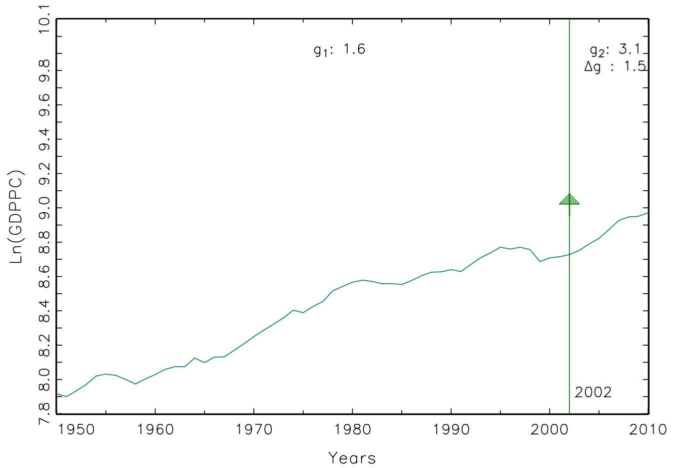
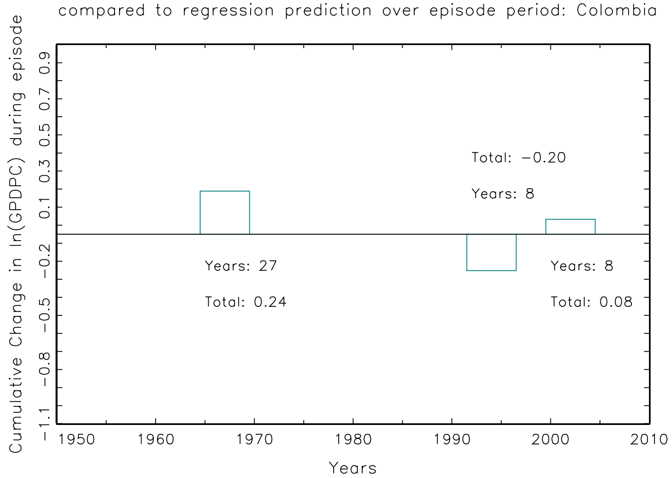


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Colombia



Congo, Rep.

Figure 5: Single trend for Congo, Republic of

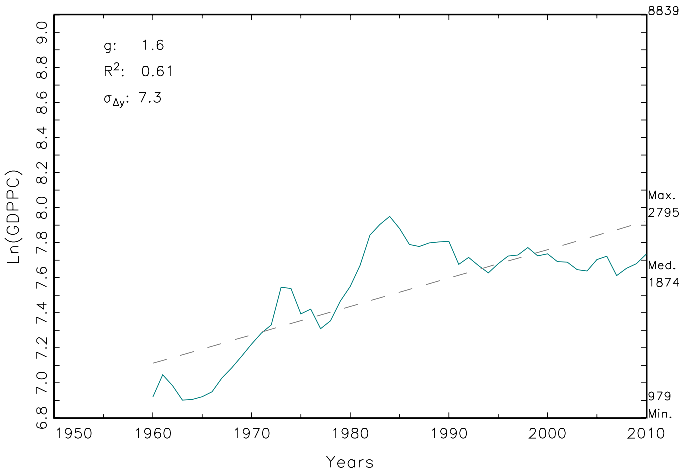


Figure 6: Breaks filtered from three possible B–P breaks: Congo, Republic

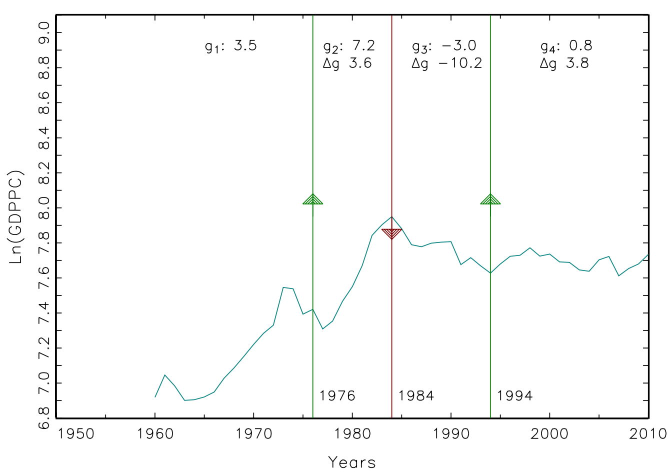


Figure 7: Bai–Perron Identified Break(s) for Congo, Republic of

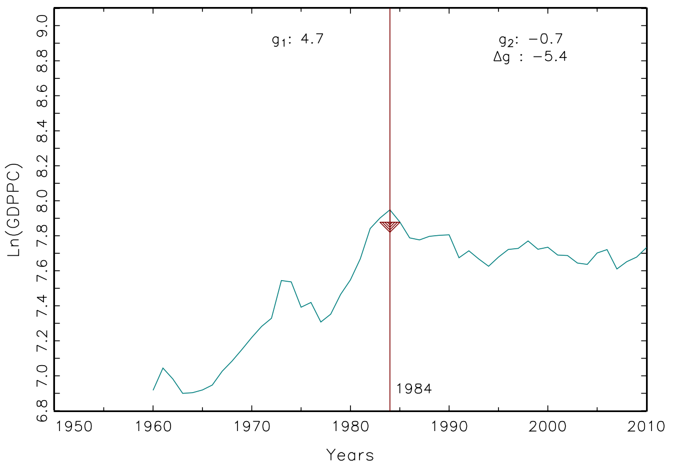
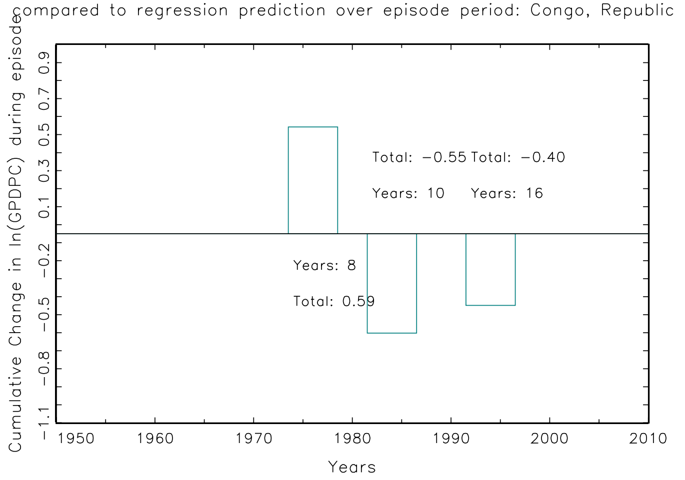


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Congo, Republic o



Congo, Dem Rep

Figure 5: Single trend for Congo, Dem. Rep.

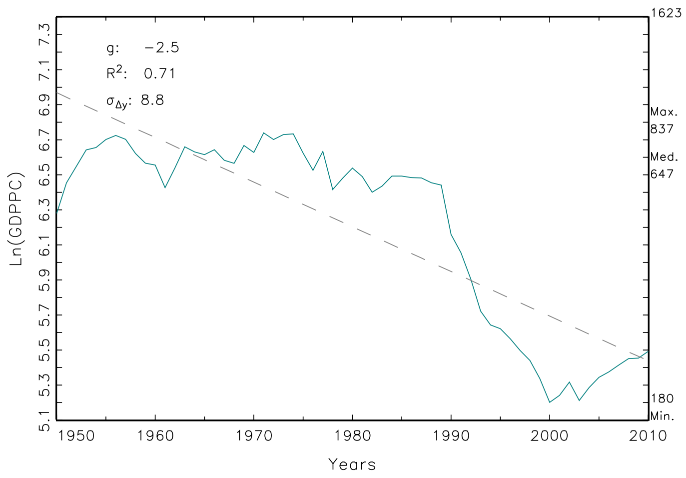


Figure 6: Breaks filtered from four possible B−P breaks: Congo, Dem. Rep

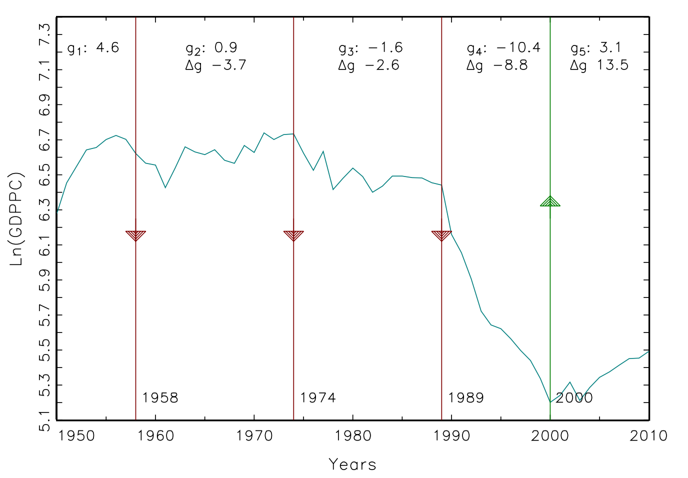


Figure 7: Bai−Perron Identified Break(s) for Congo, Dem. Rep.

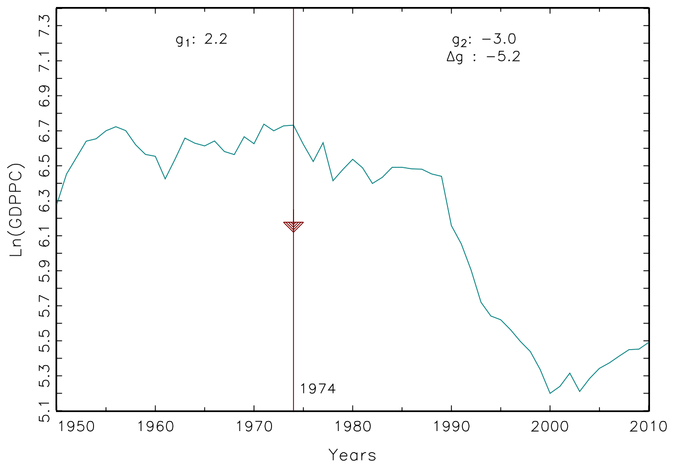
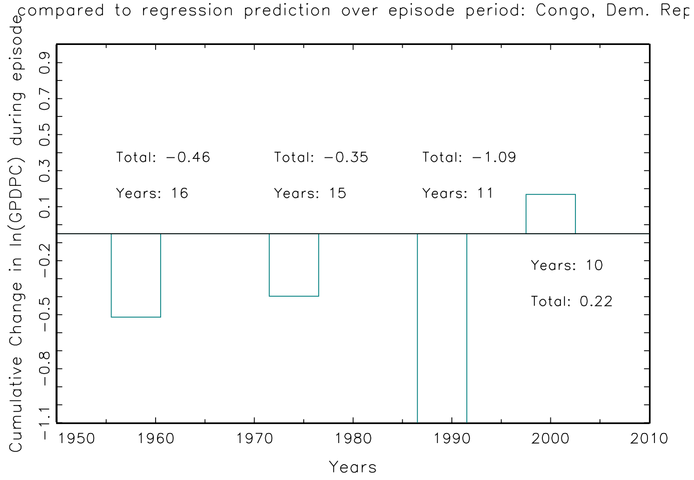


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Congo, Dem. Rep



Costa Rica

Figure 5: Single trend for Costa Rica

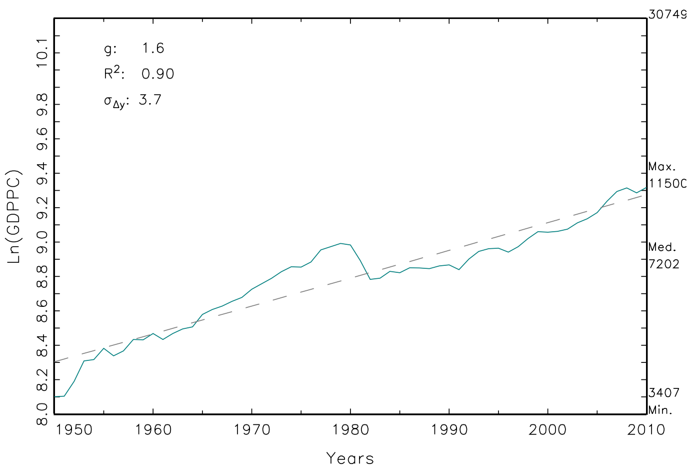


Figure 6: Breaks filtered from four possible B–P breaks: Costa Rica

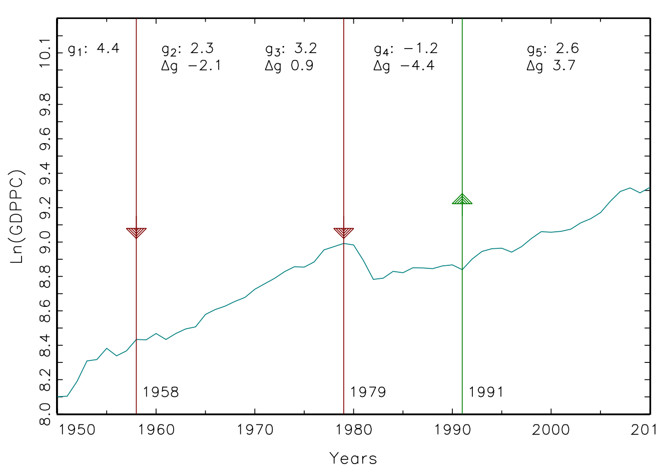


Figure 7: Bai–Perron Identified Break(s) for Costa Rica

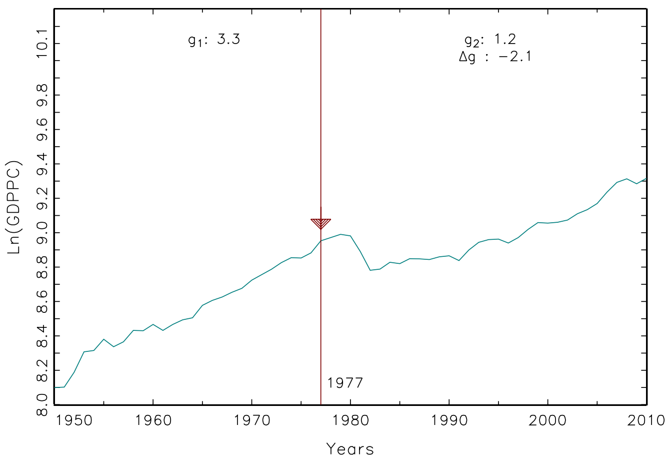
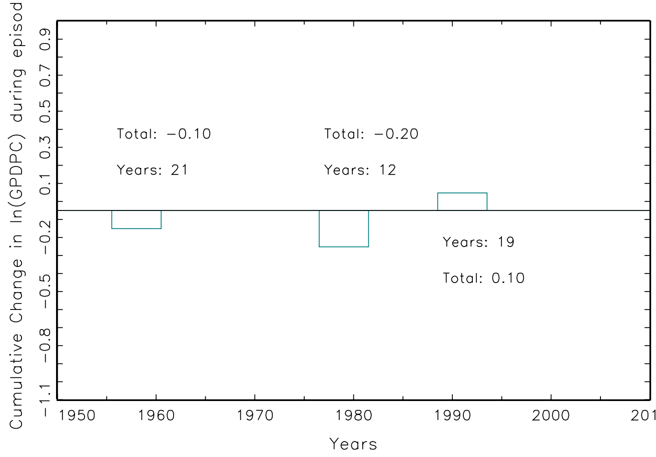


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Costa Rica



Côte d'Ivoire

Figure 5: Single trend for Cote d'Ivoire

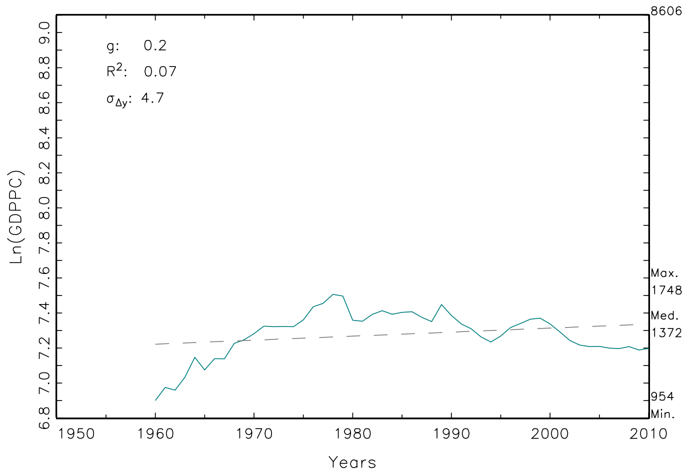


Figure 6: Breaks filtered from three possible B–P breaks: Cote d'Ivoire

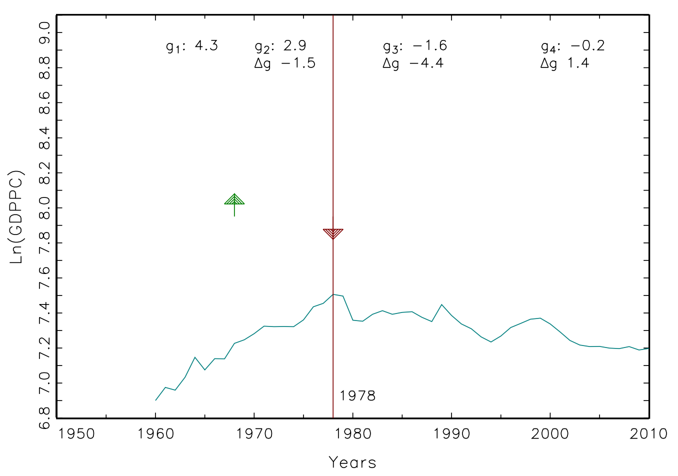


Figure 7: Bai–Perron Identified Break(s) for Cote d'Ivoire

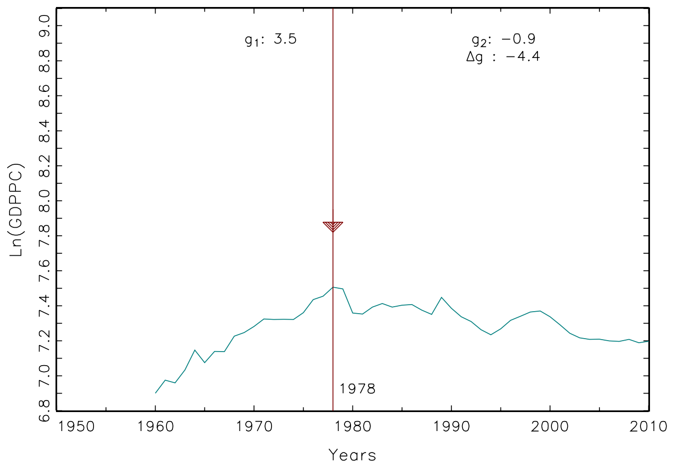
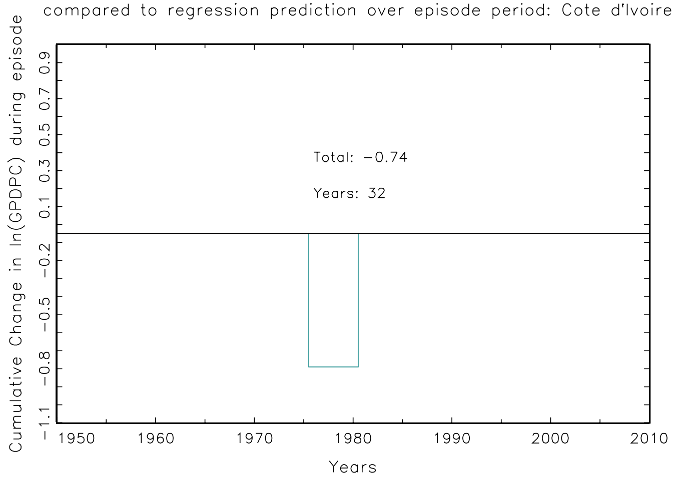


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Cote d'Ivoire



Cuba

Figure 5: Single trend for Cuba

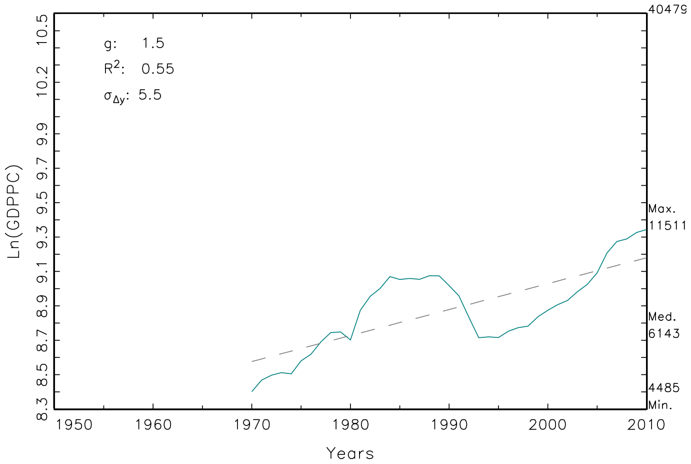


Figure 6: Breaks filtered from two possible B−P breaks: Cuba

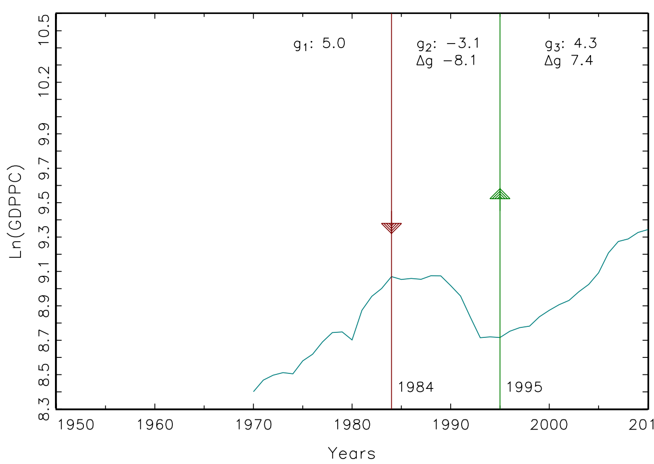


Figure 7: Bai−Perron Identified Break(s) for Cuba

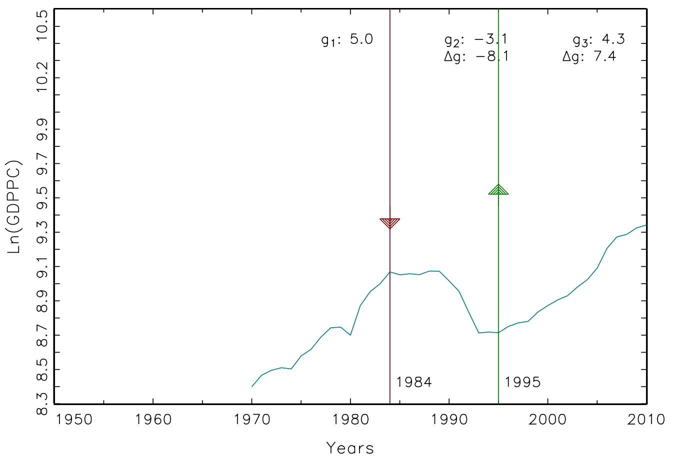
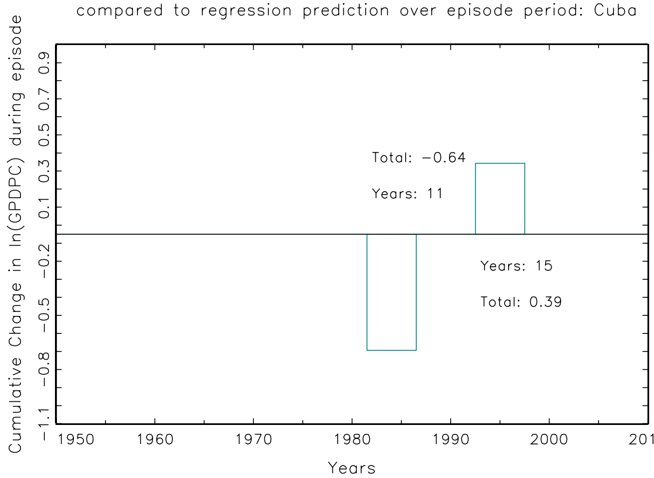


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Cuba



Cyprus

Figure 5: Single trend for Cyprus

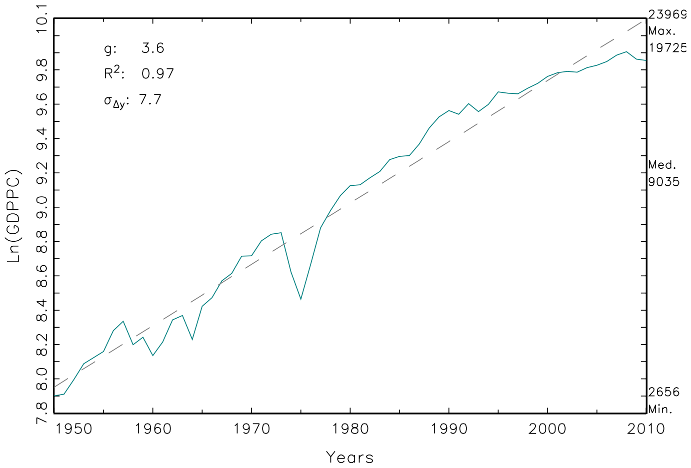


Figure 6: Breaks filtered from four possible B–P breaks: Cyprus

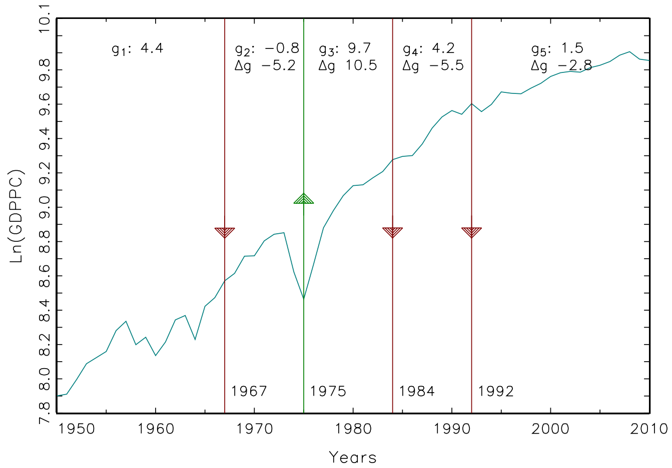


Figure 7: Bai–Perron Identified Break(s) for Cyprus

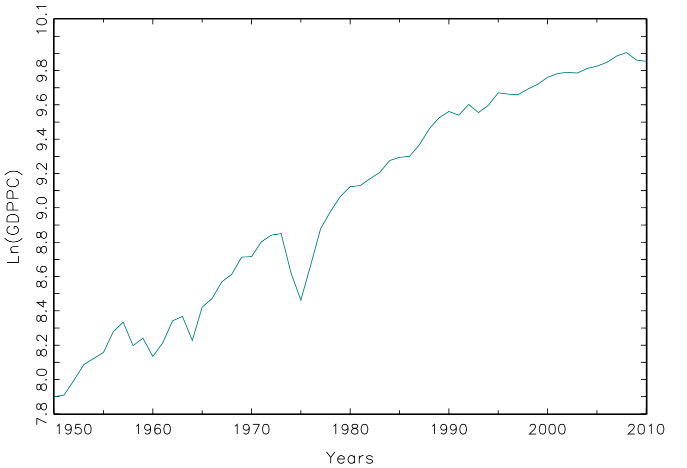
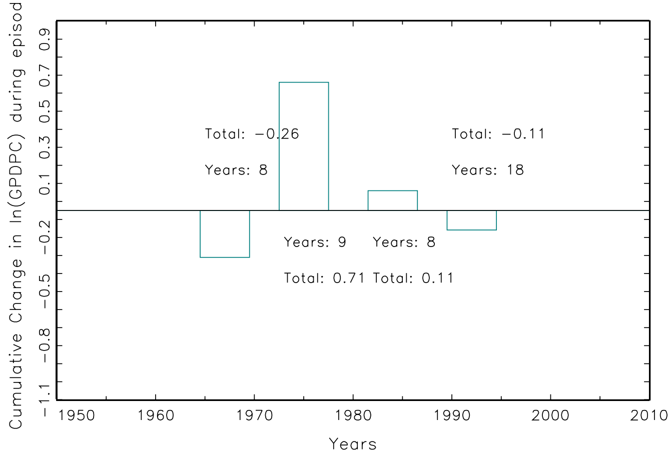


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Cyprus



Denmark

Figure 5: Single trend for Denmark

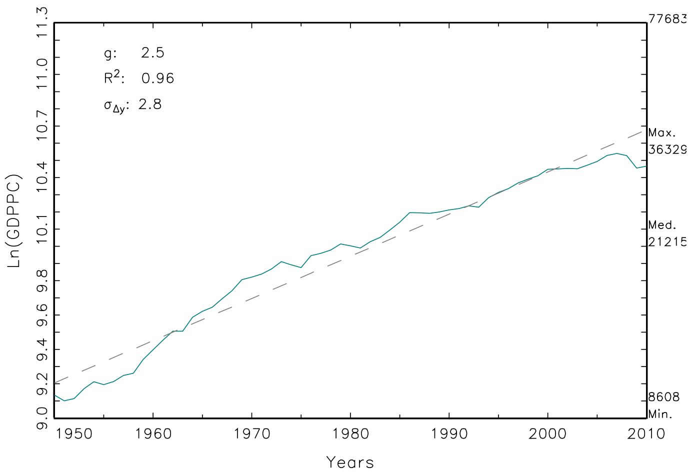


Figure 6: Breaks filtered from four possible B–P breaks: Denmark

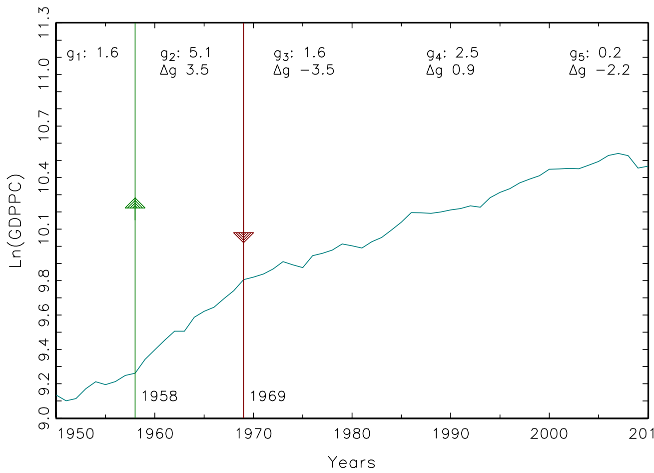


Figure 7: Bai–Perron Identified Break(s) for Denmark

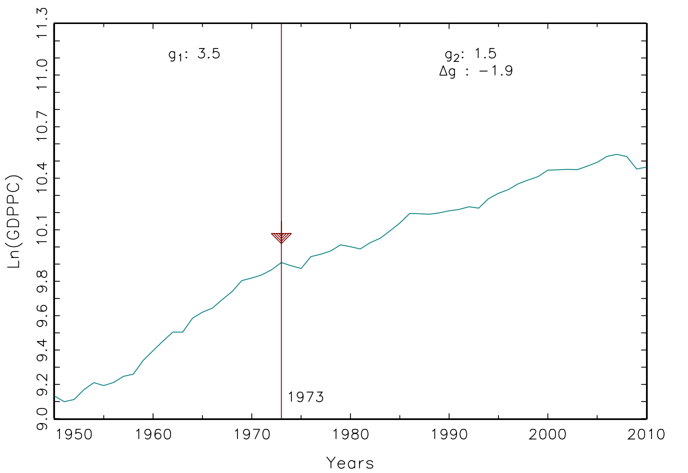
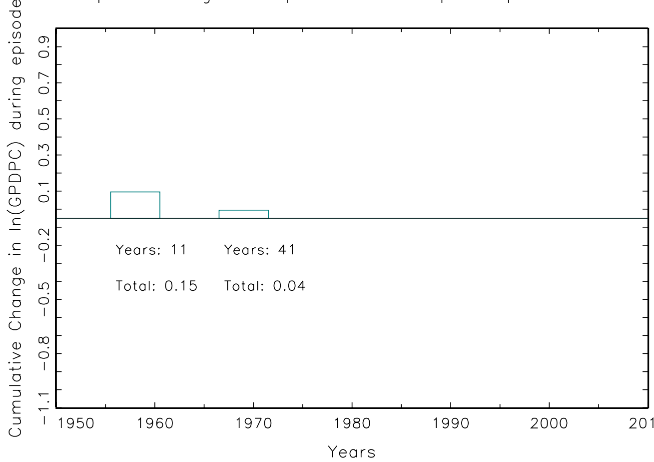


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Denmark



Dominican Republic

Figure 5: Single trend for Dominican Republic

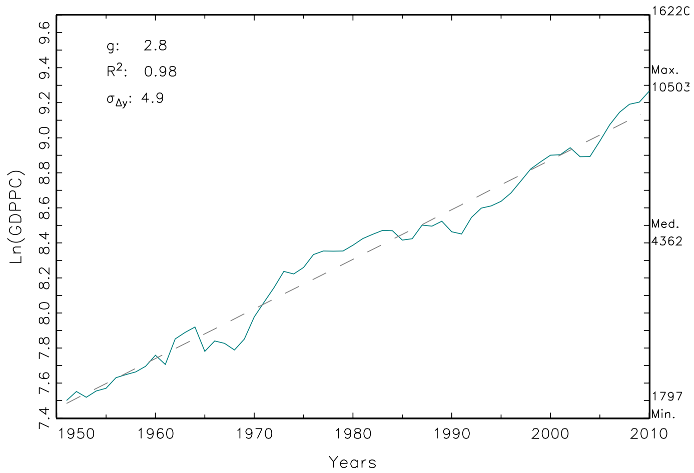


Figure 6: Breaks filtered from four possible B−P breaks: Dominican Republ

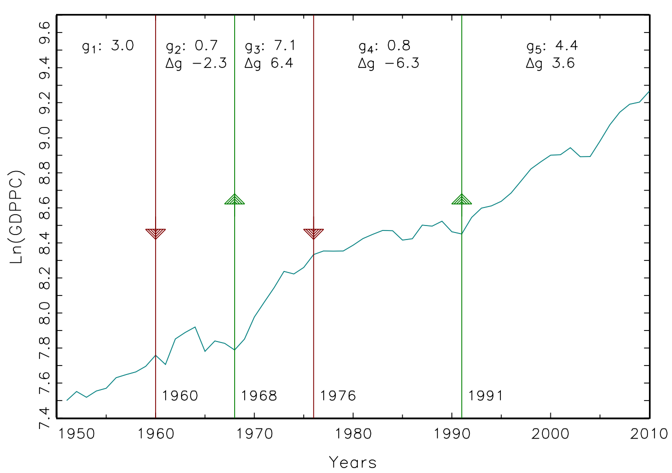


Figure 7: Bai−Perron Identified Break(s) for Dominican Republic

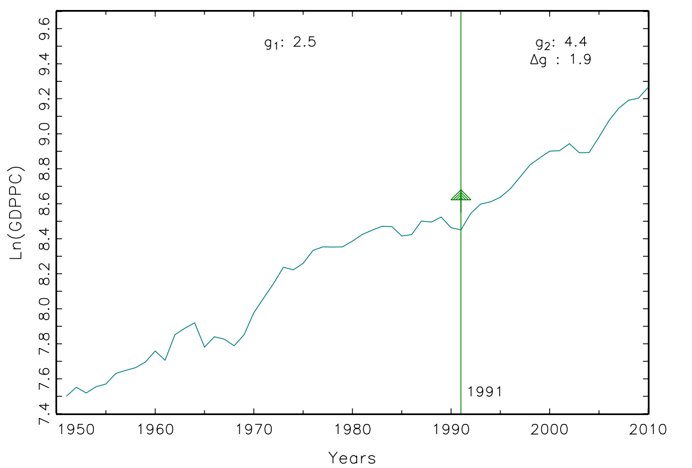
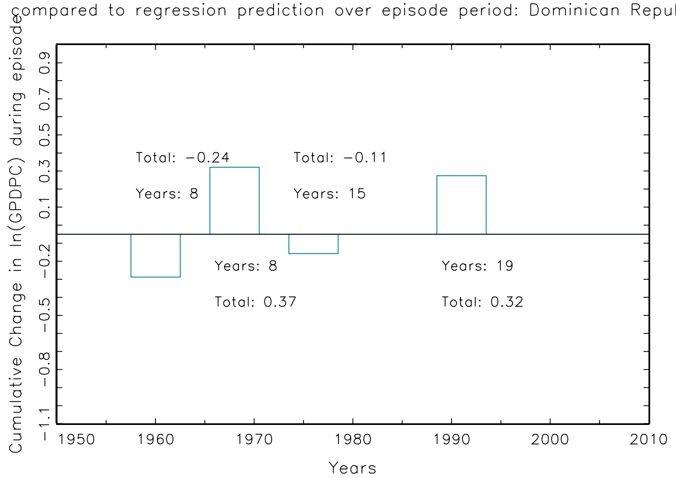


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Dominican Republ



Ecuador

Figure 5: Single trend for Ecuador

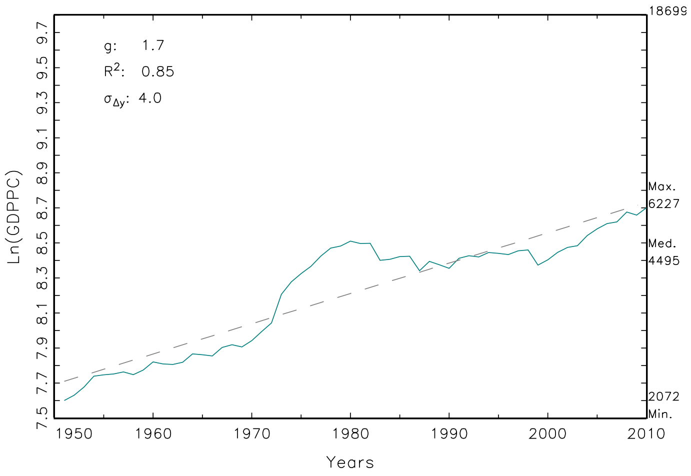


Figure 6: Breaks filtered from four possible B–P breaks: Ecuador

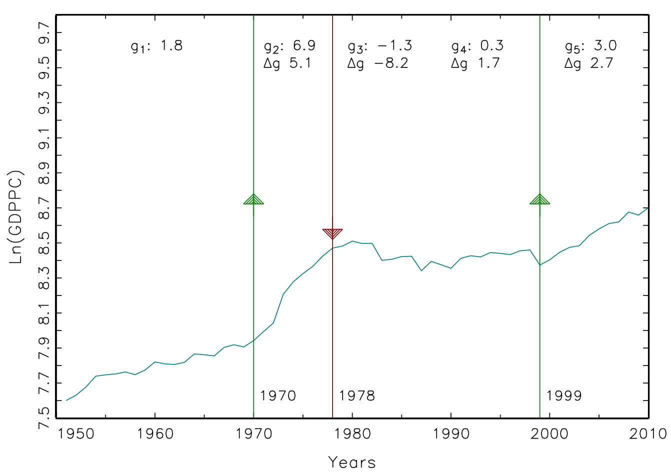


Figure 7: Bai–Perron Identified Break(s) for Ecuador

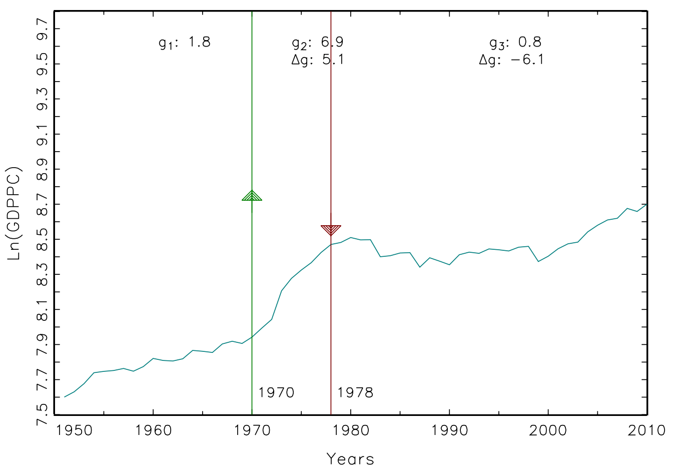
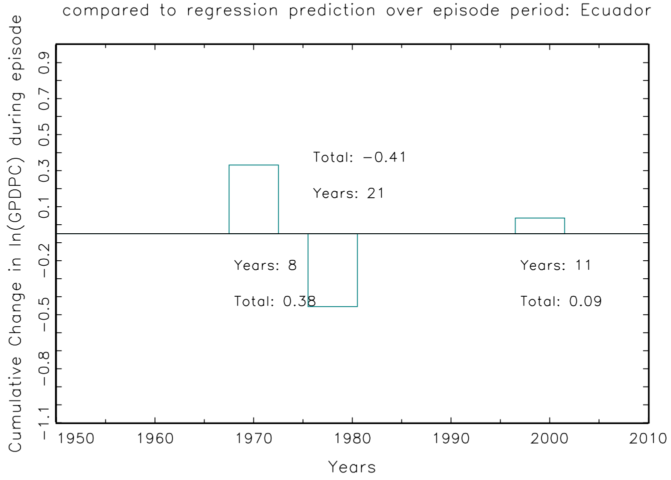


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Ecuador



Egypt, Arab Rep

Figure 5: Single trend for Egypt

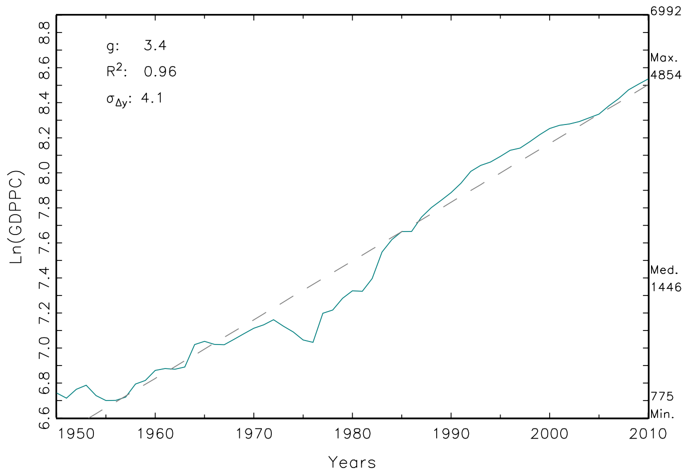


Figure 6: Breaks filtered from four possible B–P breaks: Egypt

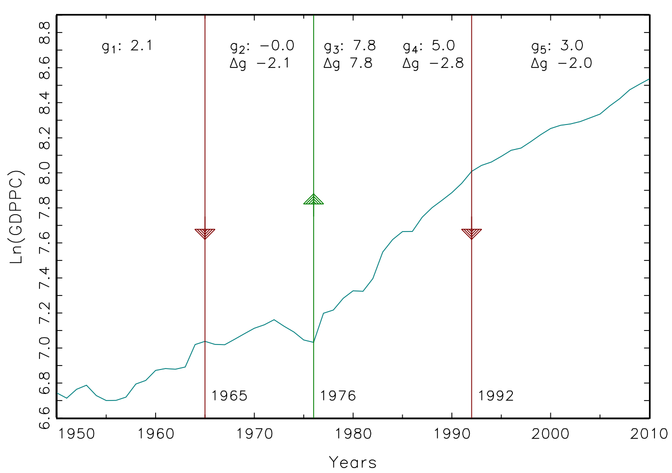


Figure 7: Bai–Perron Identified Break(s) for Egypt

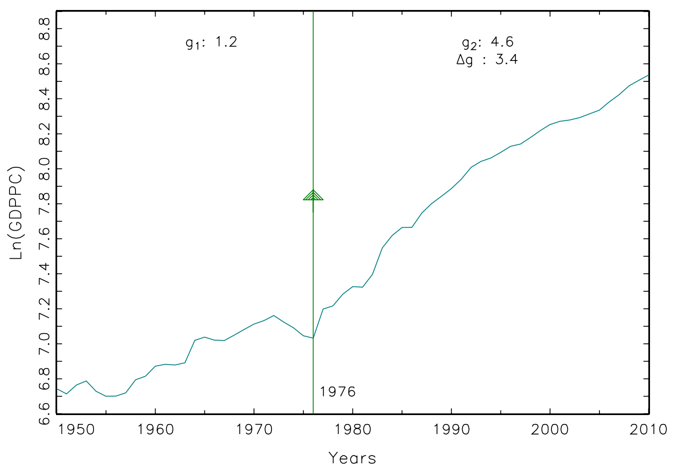
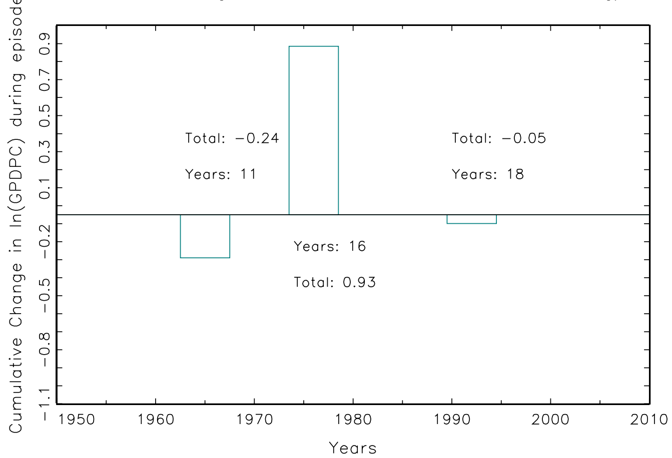


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Egypt



El Salvador

Figure 5: Single trend for El Salvador

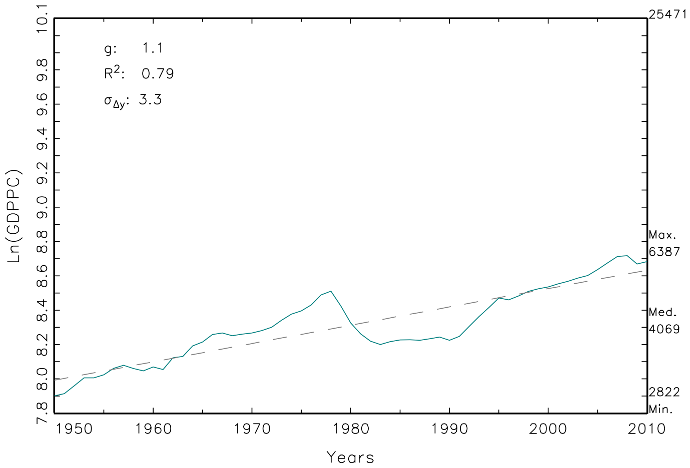


Figure 6: Breaks filtered from four possible B–P breaks: El Salvador

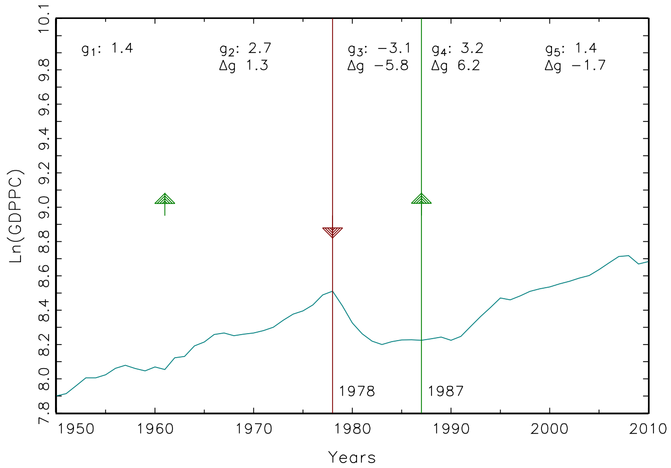


Figure 7: Bai–Perron Identified Break(s) for El Salvador

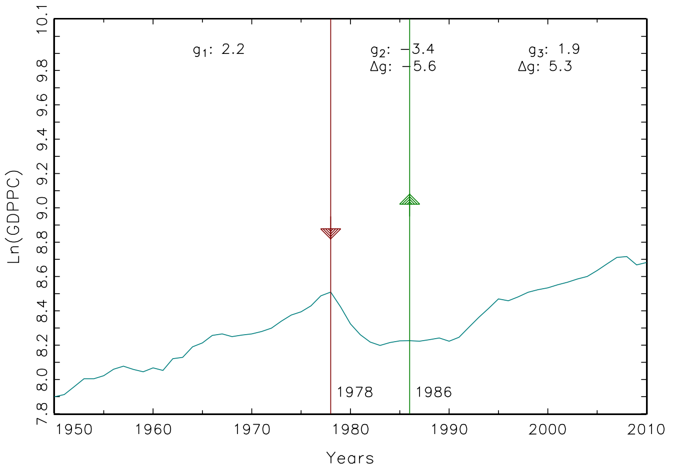
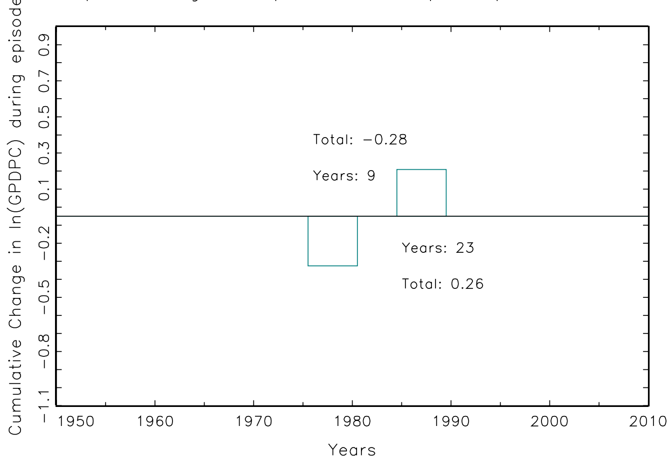


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: El Salvador



Ethiopia

Figure 5: Single trend for Ethiopia

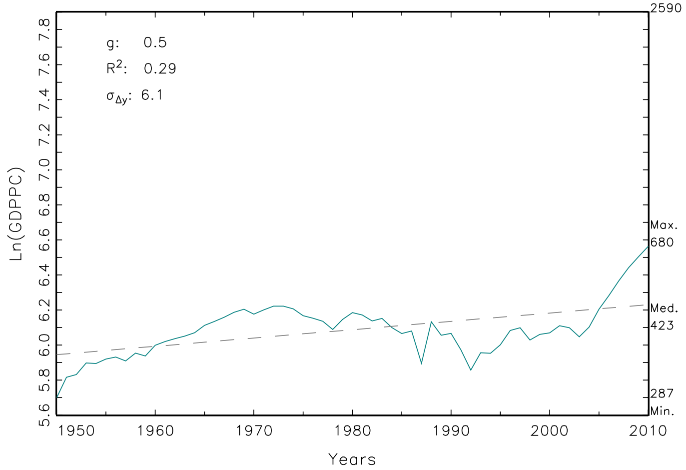


Figure 6: Breaks filtered from four possible B–P breaks: Ethiopia

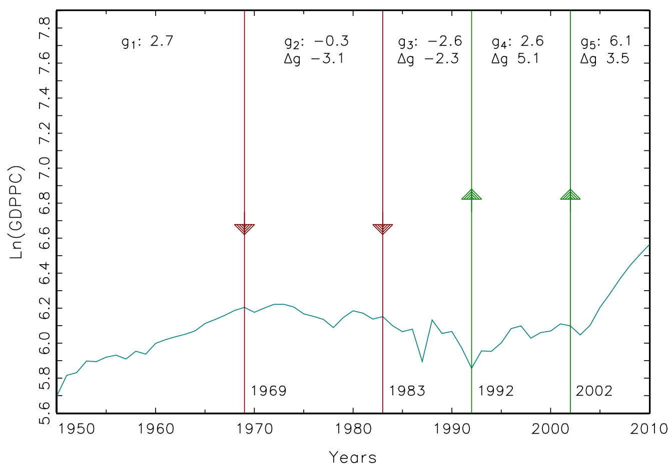


Figure 7: Bai–Perron Identified Break(s) for Ethiopia

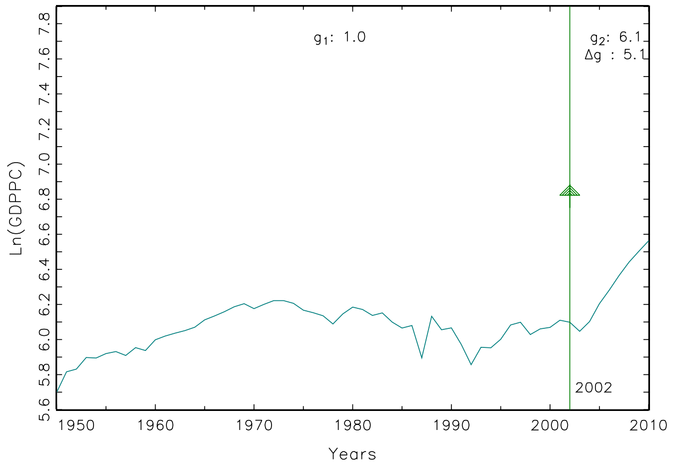
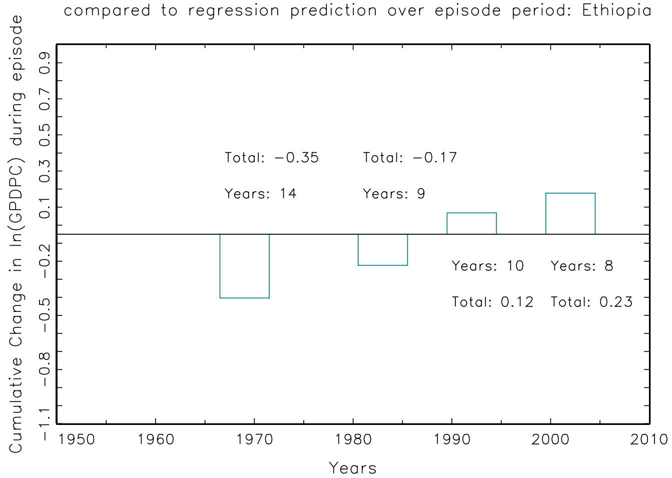


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Ethiopia



Fiji

Figure 5: Single trend for Fiji

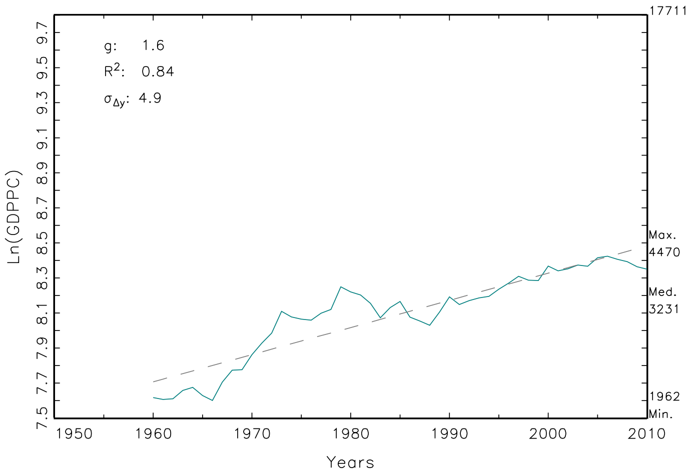


Figure 6: Breaks filtered from three possible B–P breaks: Fiji

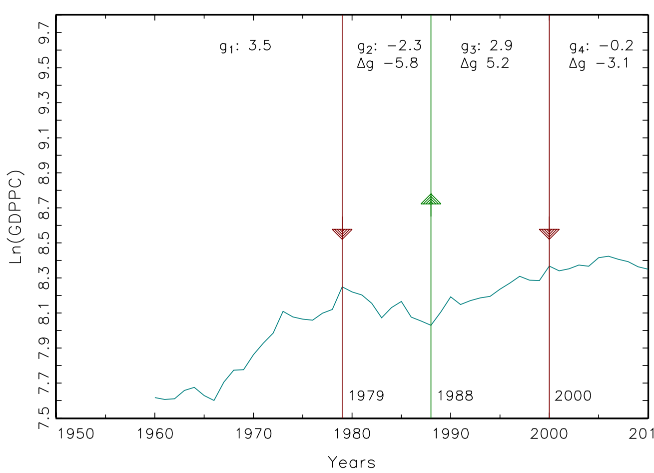


Figure 7: Bai–Perron Identified Break(s) for Fiji

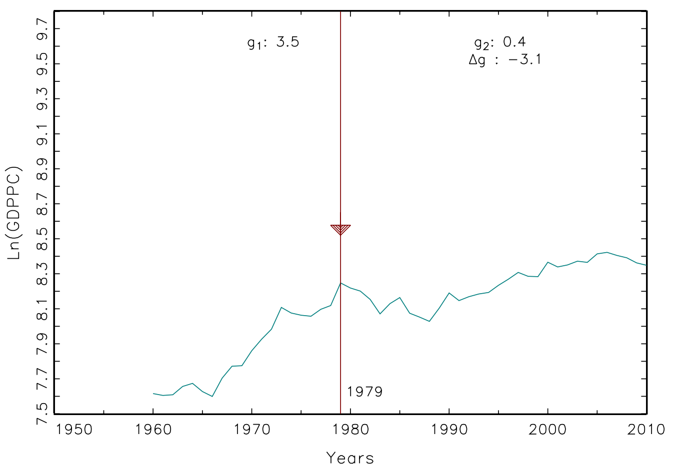
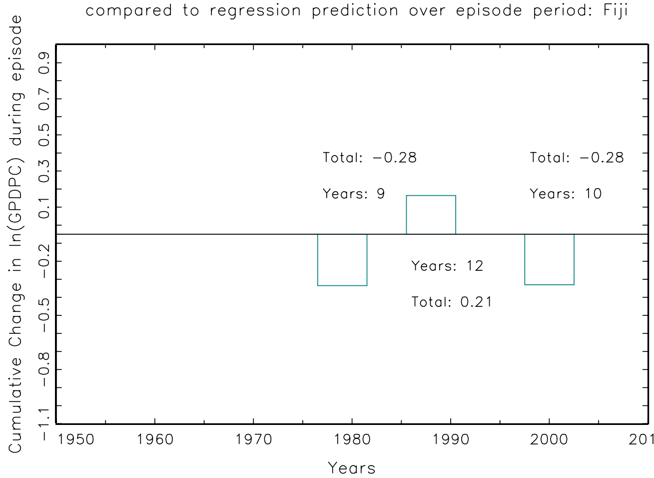


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Fiji



Finland

Figure 5: Single trend for Finland

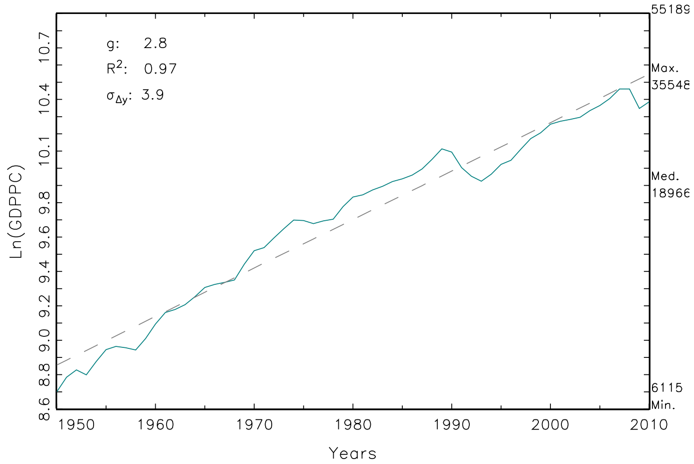


Figure 6: Breaks filtered from four possible B−P breaks: Finland

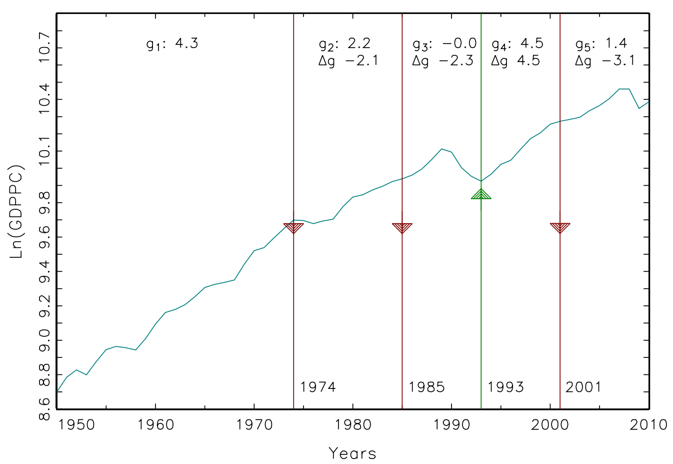


Figure 7: Bai−Perron Identified Break(s) for Finland

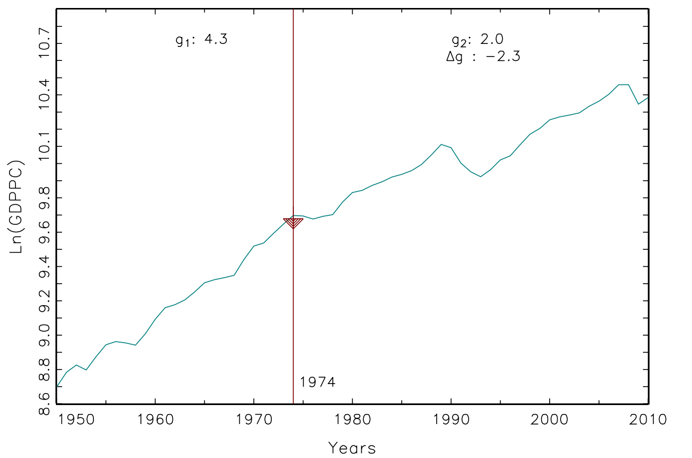
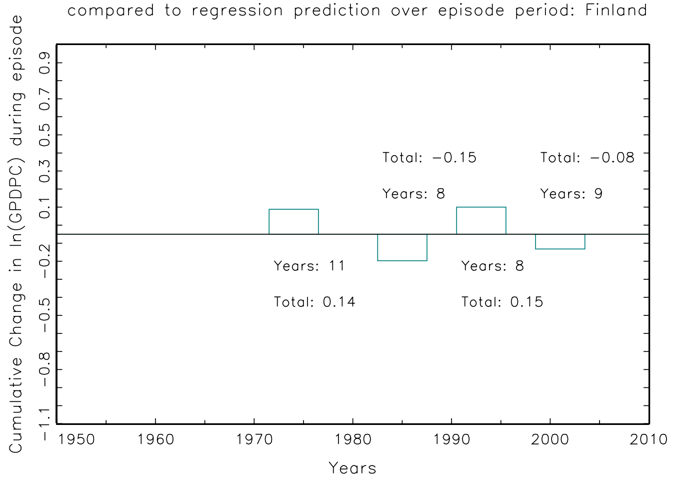


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Finland



France

Figure 5: Single trend for France

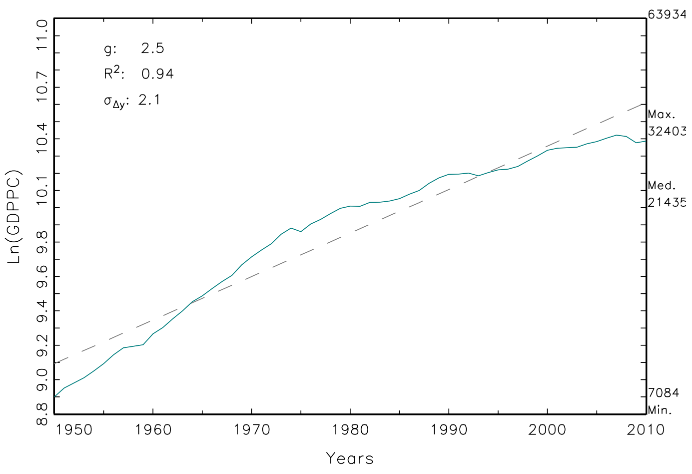


Figure 6: Breaks filtered from four possible B–P breaks: France

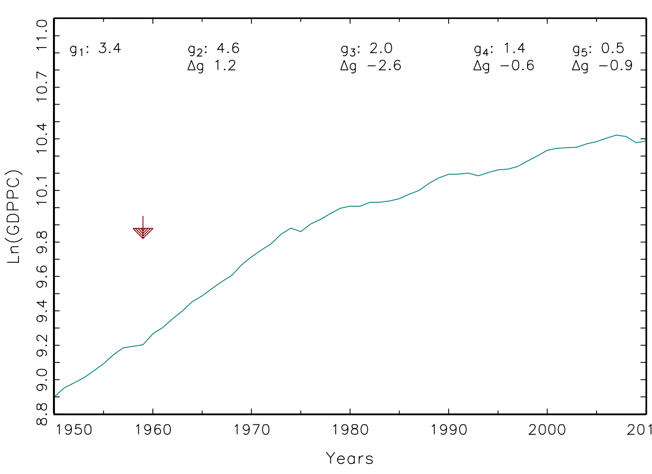


Figure 7: Bai–Perron Identified Break(s) for France

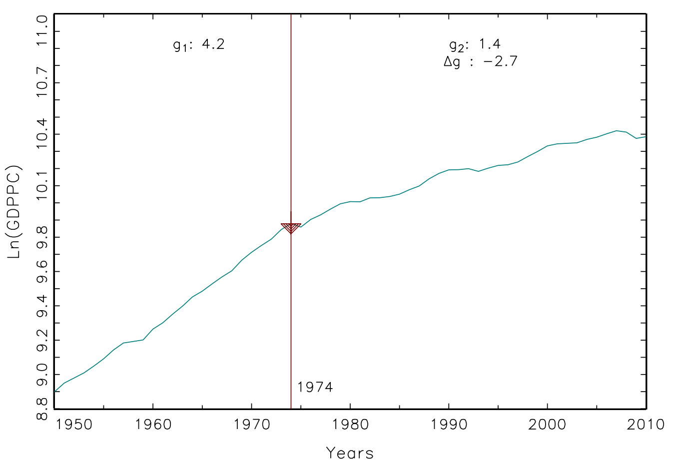
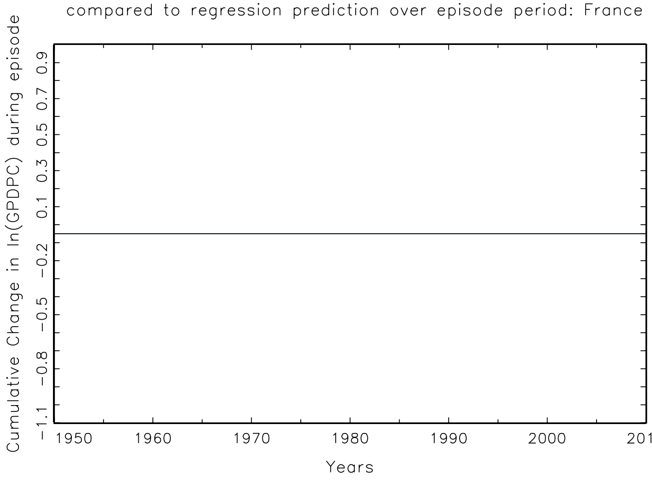


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: France



Gabon

Figure 5: Single trend for Gabon

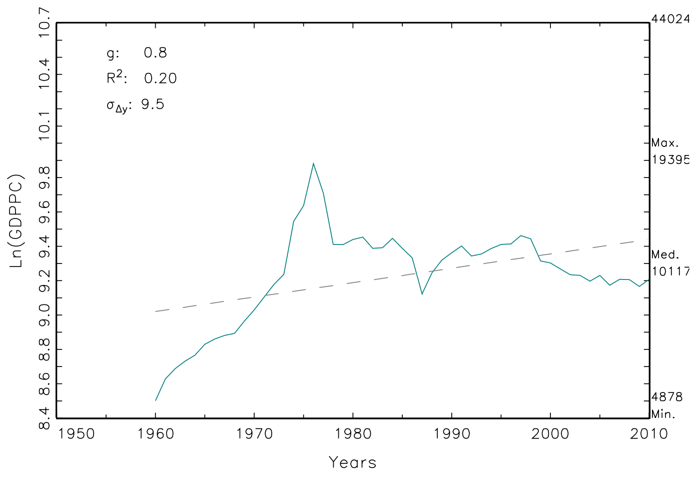


Figure 6: Breaks filtered from three possible B–P breaks: Gabon

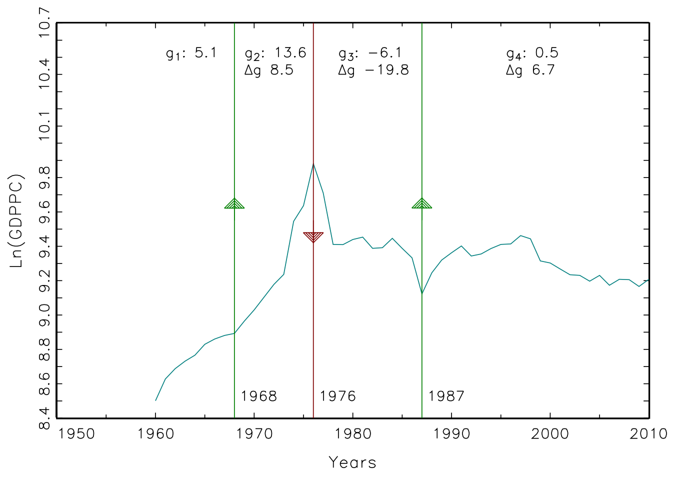


Figure 7: Bai–Perron Identified Break(s) for Gabon

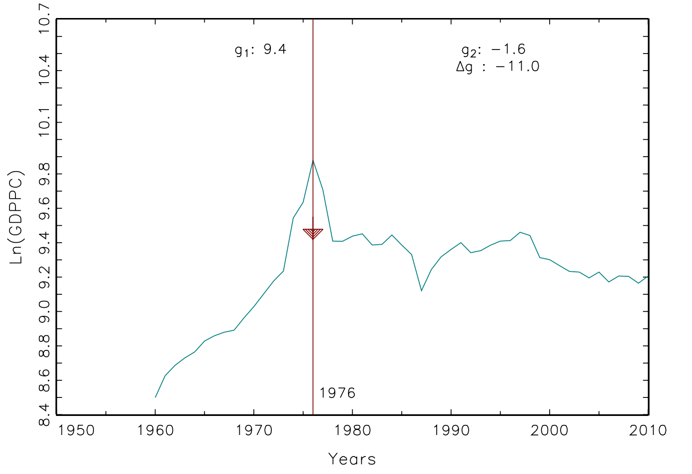
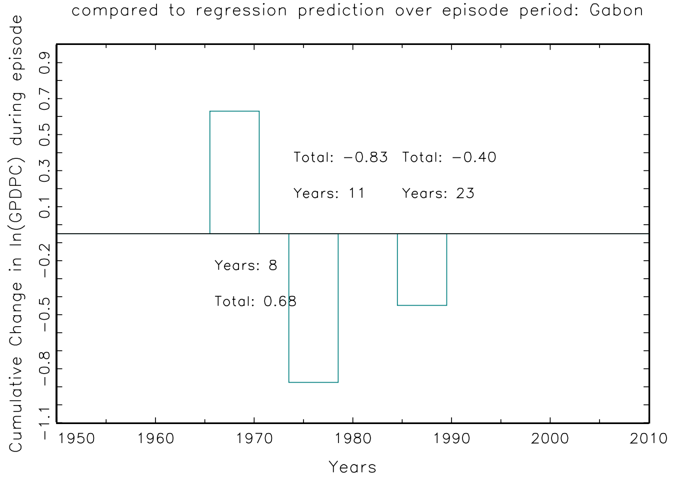


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Gabon



Gambia, The

Figure 5: Single trend for Gambia, The

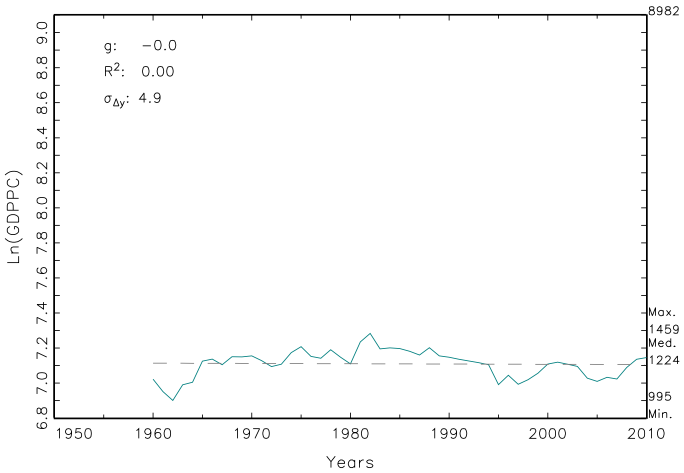


Figure 6: Breaks filtered from three possible B−P breaks: Gambia, The

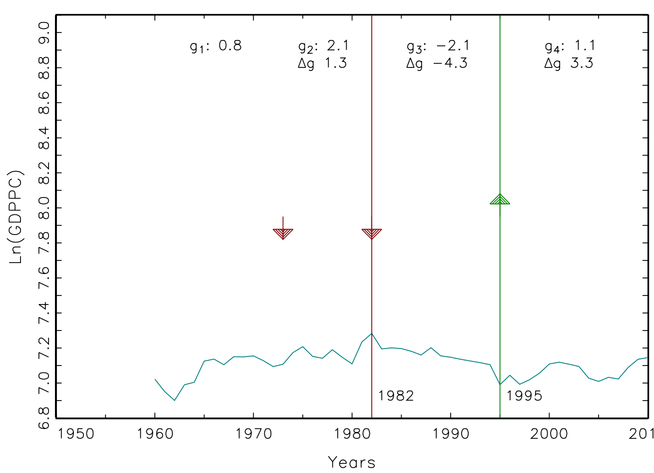


Figure 7: Bai−Perron Identified Break(s) for Gambia, The

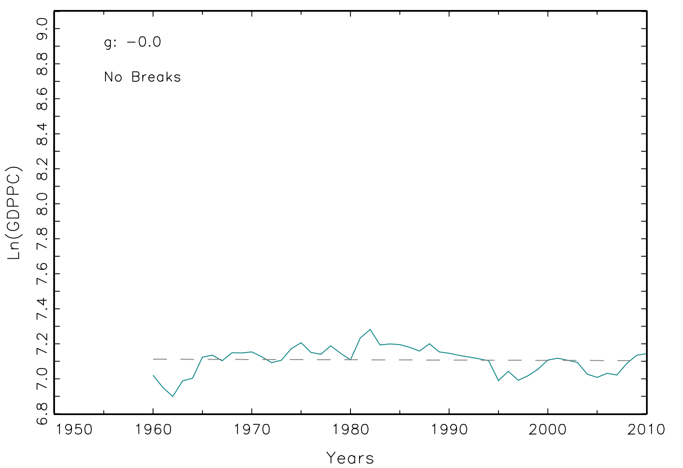
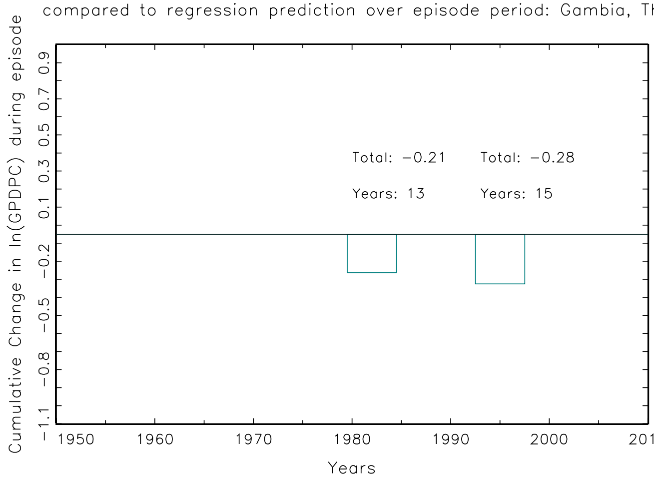


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Gambia, The



Germany

Figure 5: Single trend for Germany

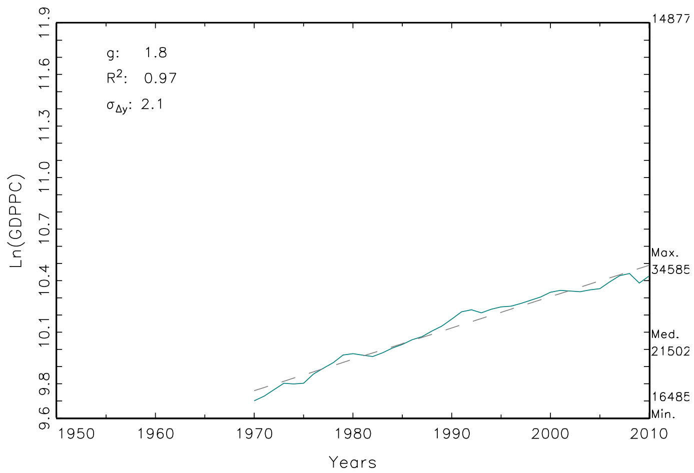


Figure 6: Breaks filtered from two possible B–P breaks: Germany

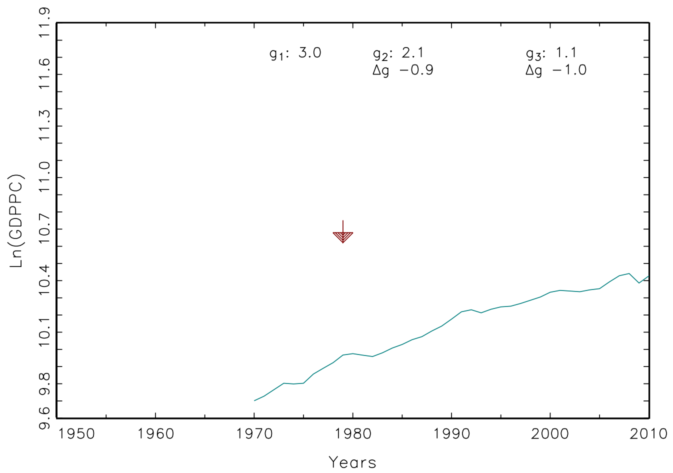


Figure 7: Bai–Perron Identified Break(s) for Germany

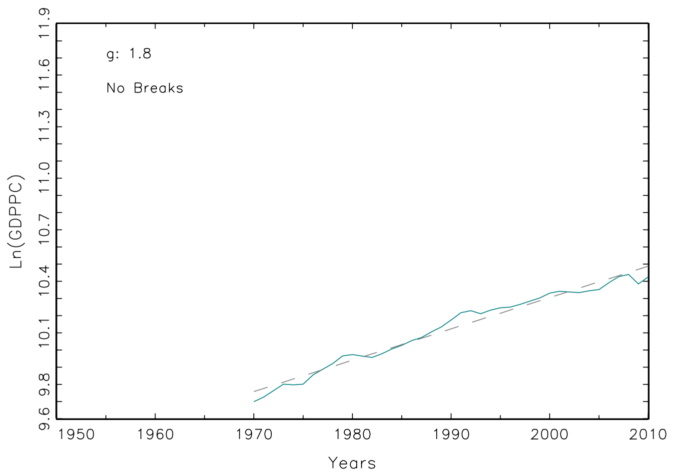
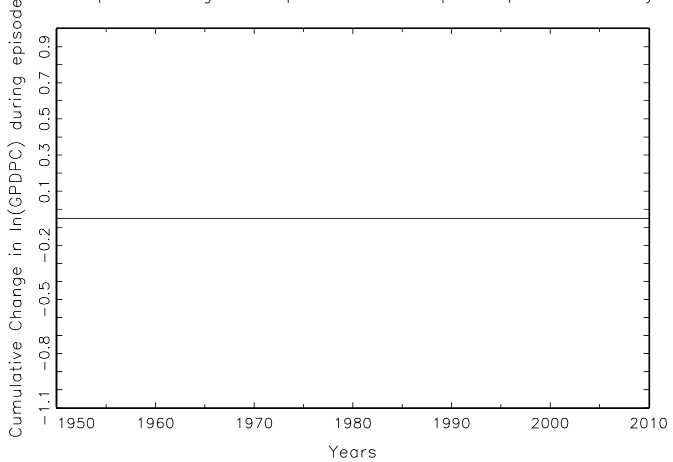


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Germany



Ghana

Figure 5: Single trend for Ghana

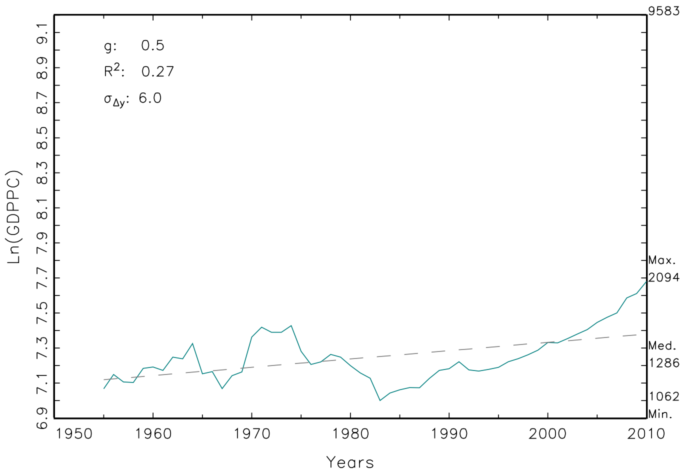


Figure 6: Breaks filtered from three possible B–P breaks: Ghana

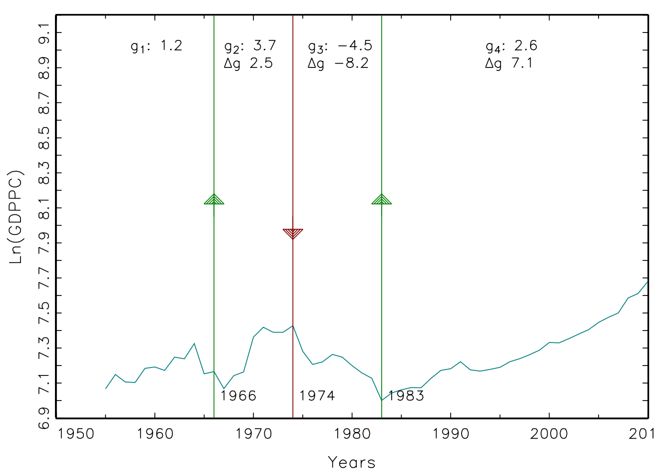


Figure 7: Bai–Perron Identified Break(s) for Ghana

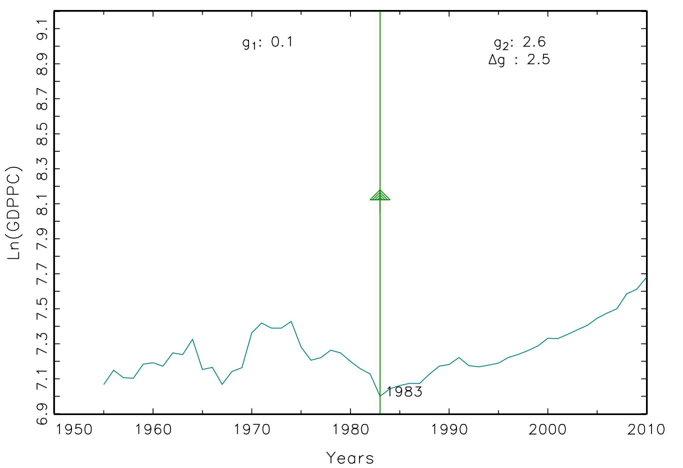
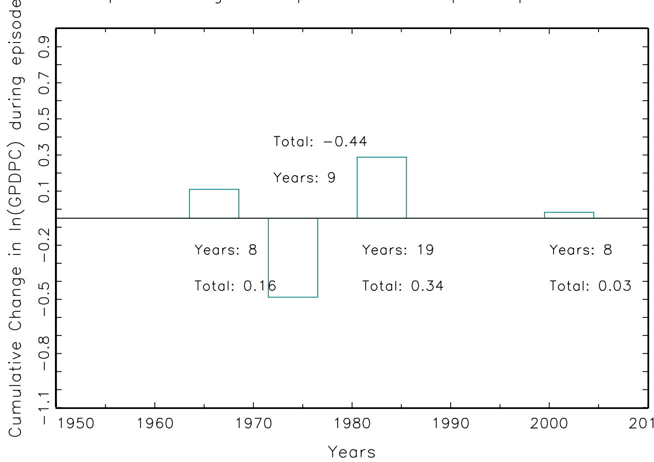


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Ghana



Greece

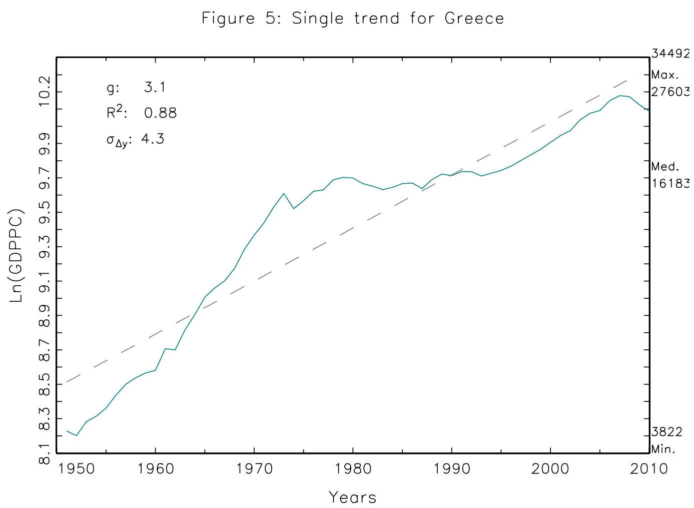


Figure 5: Single trend for Greece
g: 3.1
R²: 0.88
σΔy: 4.3
34492
Max.
27603
Med.
16183
3822
Min.
Ln(GDPPC)
Years

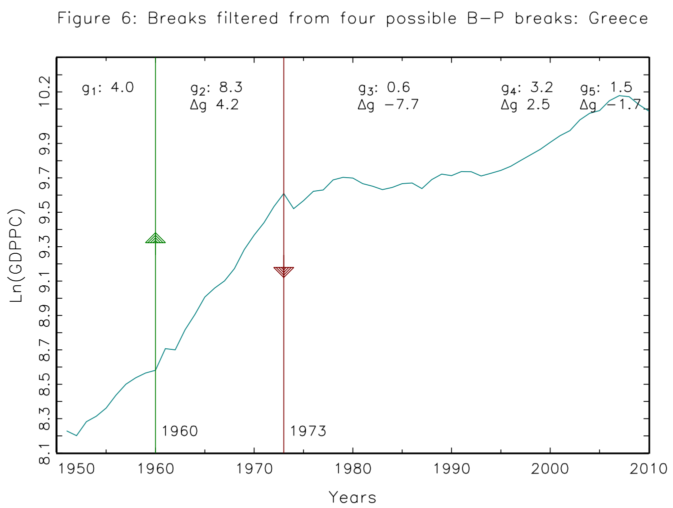


Figure 6: Breaks filtered from four possible B−P breaks: Greece
g1: 4.0
g2: 8.3
Δg 4.2
g3: 0.6
Δg −7.7
g4: 3.2
Δg 2.5
g5: 1.5
Δg −1.7
1960
1973
Ln(GDPPC)
Years

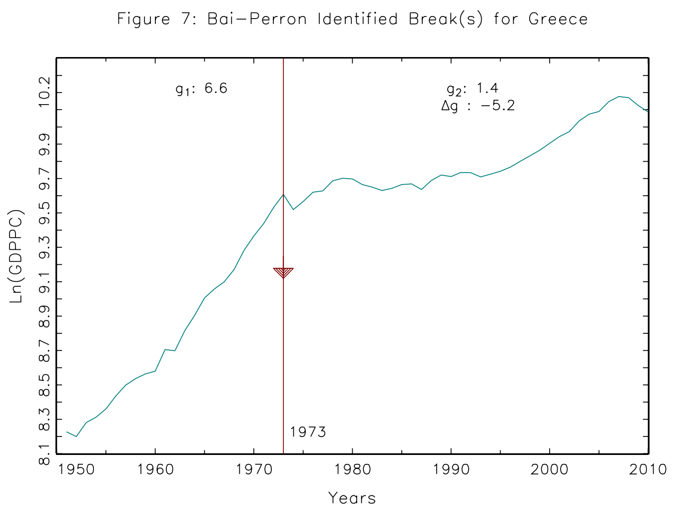


Figure 7: Bai−Perron Identified Break(s) for Greece
g1: 6.6
g2: 1.4
Δg : −5.2
1973
Ln(GDPPC)
Years

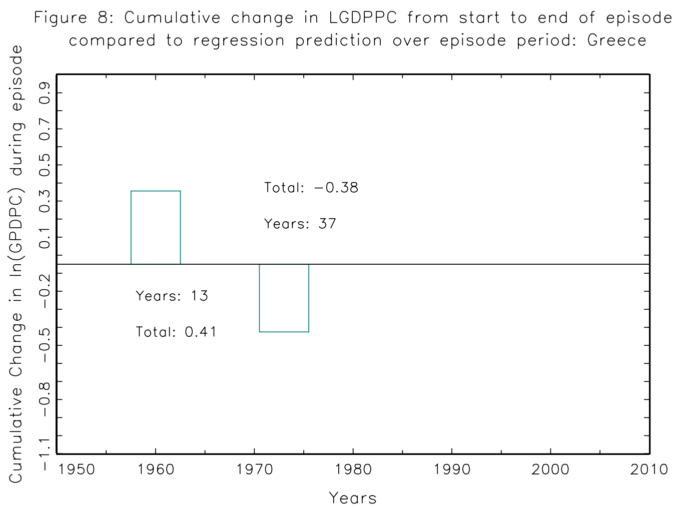


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Greece
Total: −0.38
Years: 37
Years: 13
Total: 0.41
Cumulative Change in ln(GPDPC) during episode
Years

Guatemala

Figure 5: Single trend for Guatemala

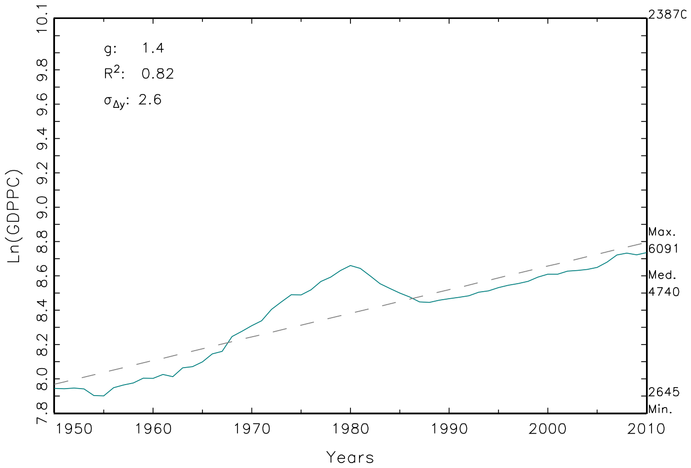


Figure 6: Breaks filtered from four possible B–P breaks: Guatemala

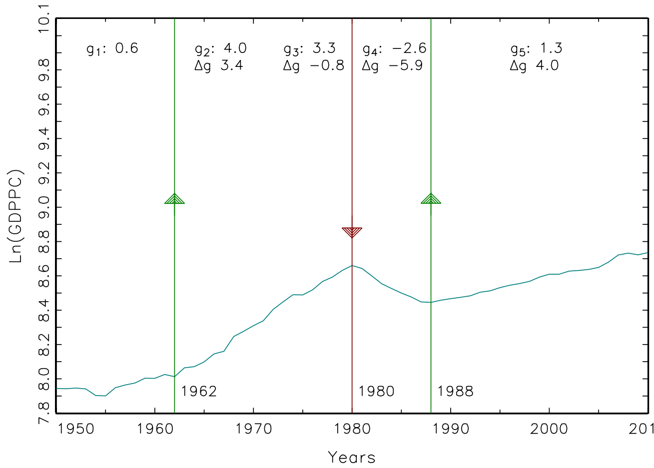


Figure 7: Bai–Perron Identified Break(s) for Guatemala

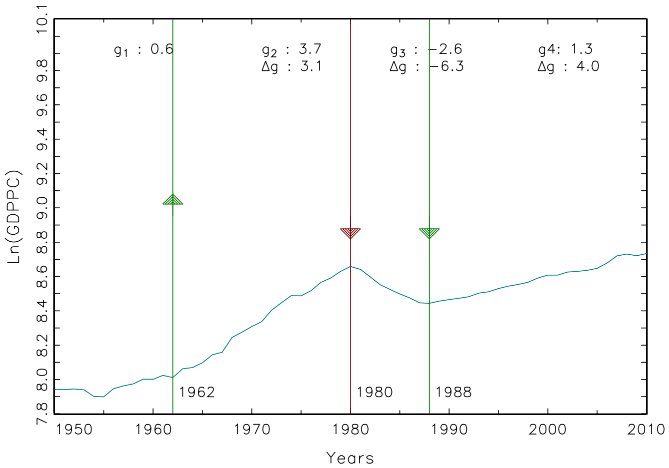
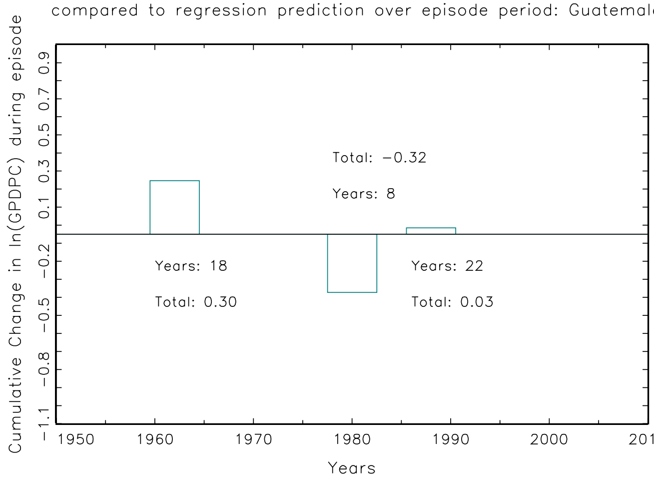


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Guatemala



Guinea

Figure 5: Single trend for Guinea

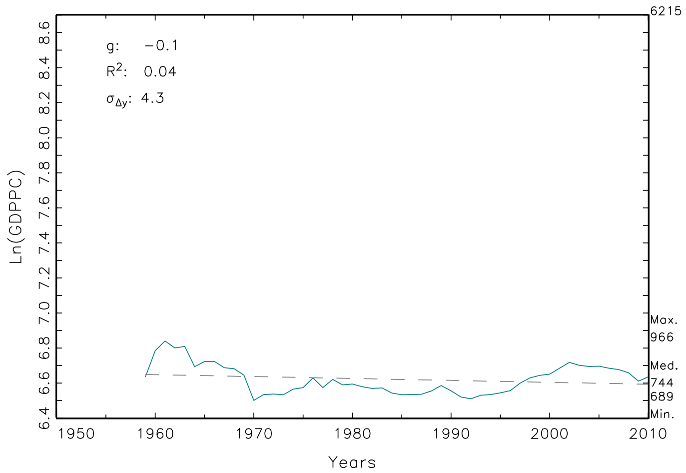


Figure 6: Breaks filtered from three possible B−P breaks: Guinea

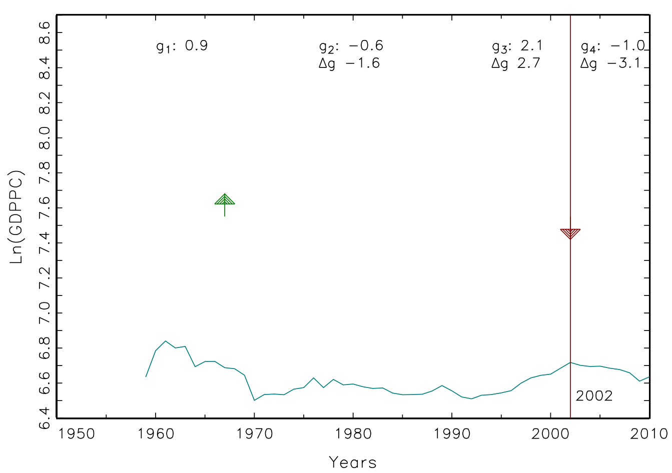


Figure 7: Bai−Perron Identified Break(s) for Guinea

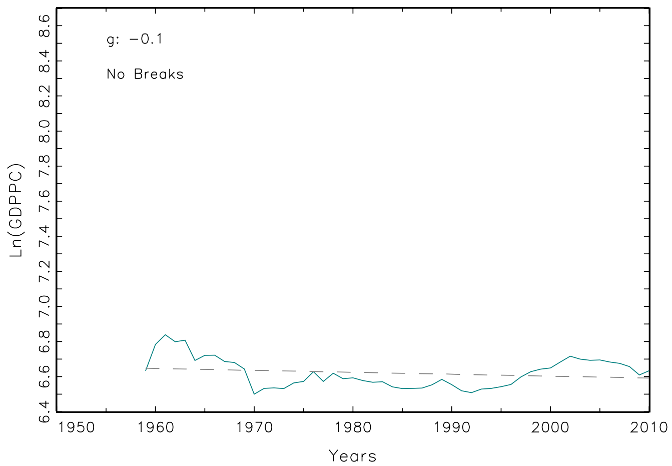
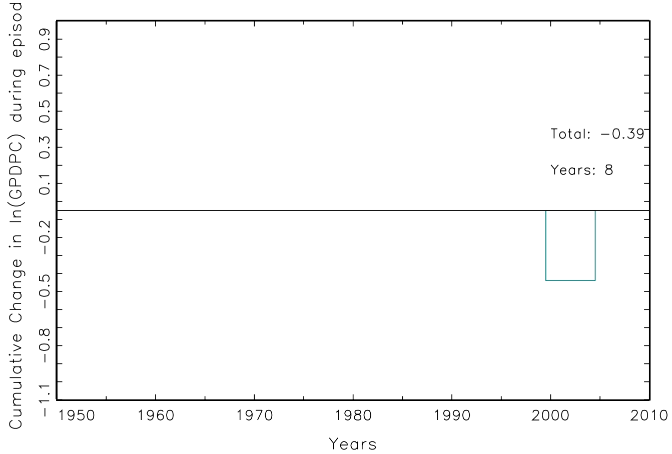


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Guinea



Guinea-Bissau

Figure 5: Single trend for Guinea–Bissau

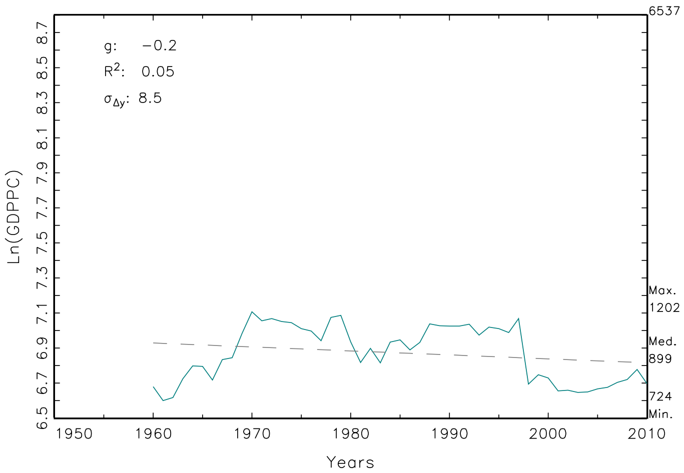


Figure 6: Breaks filtered from three possible B–P breaks: Guinea–Bissau

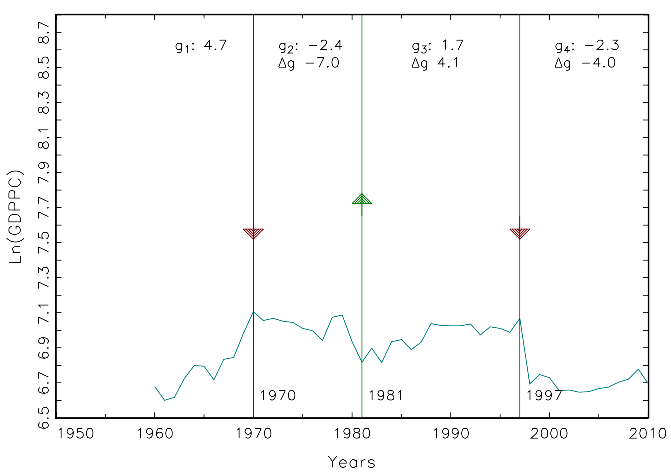


Figure 7: Bai–Perron Identified Break(s) for Guinea–Bissau

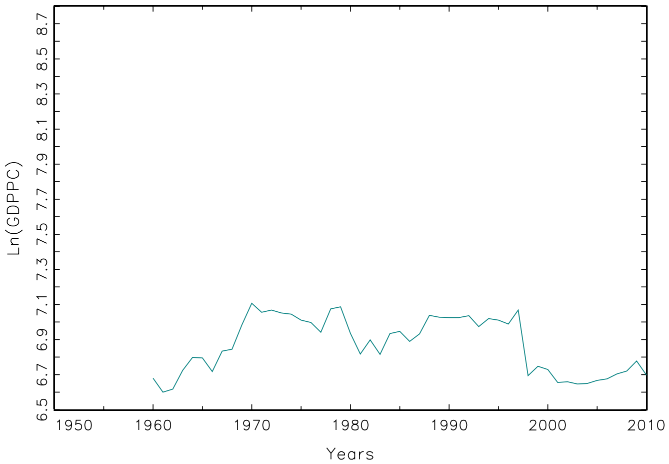
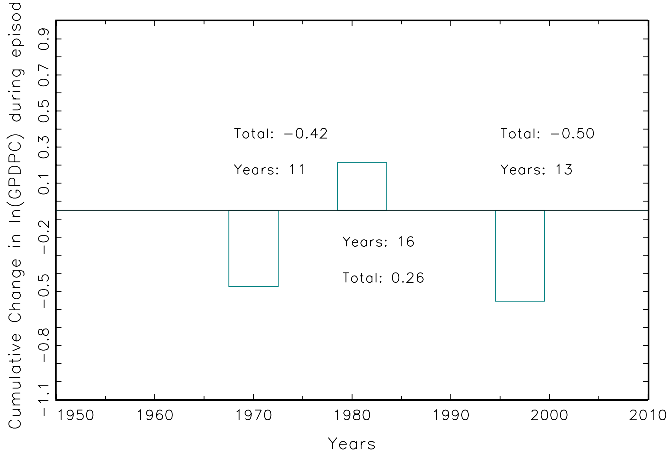


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Guinea–Bissau



Guyana

Figure 5: Single trend for Guyana

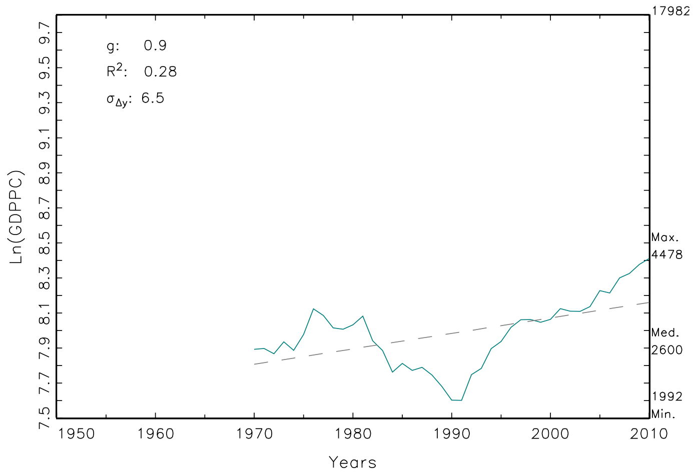


Figure 6: Breaks filtered from two possible B–P breaks: Guyana

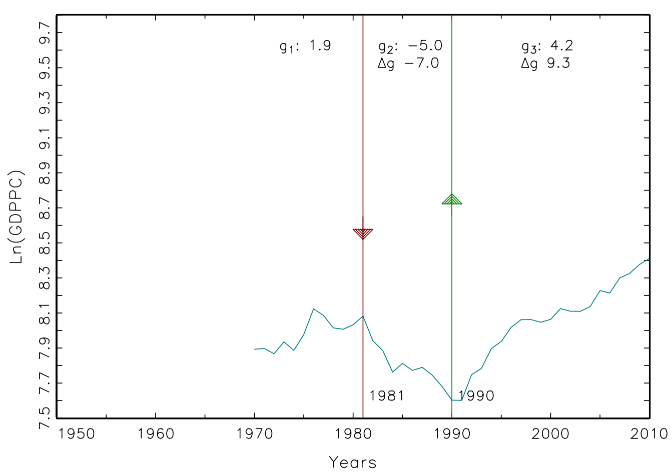


Figure 7: Bai–Perron Identified Break(s) for Guyana

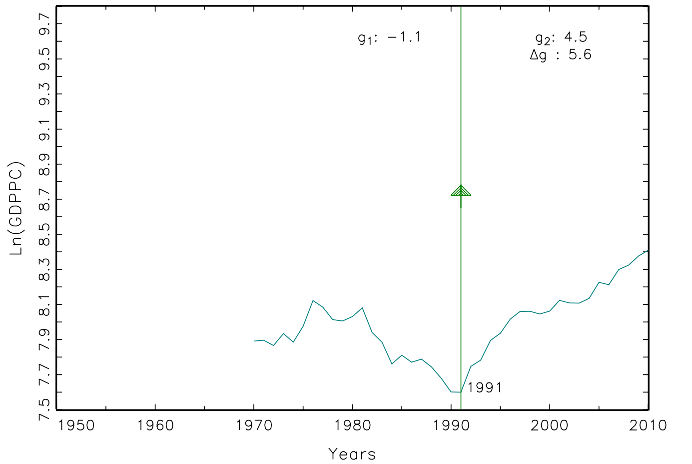
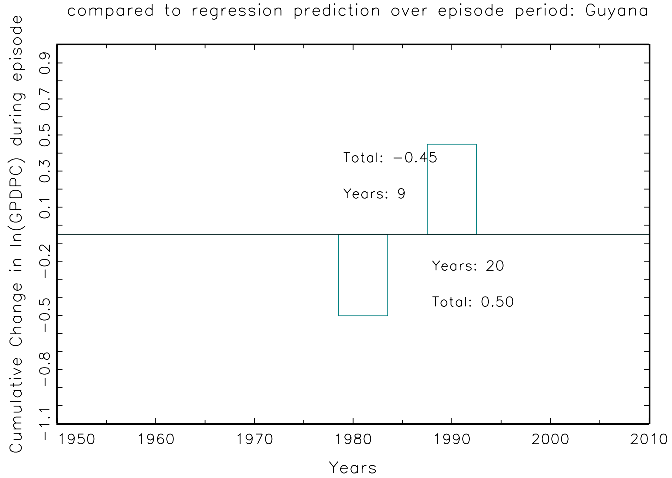


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Guyana



Haiti

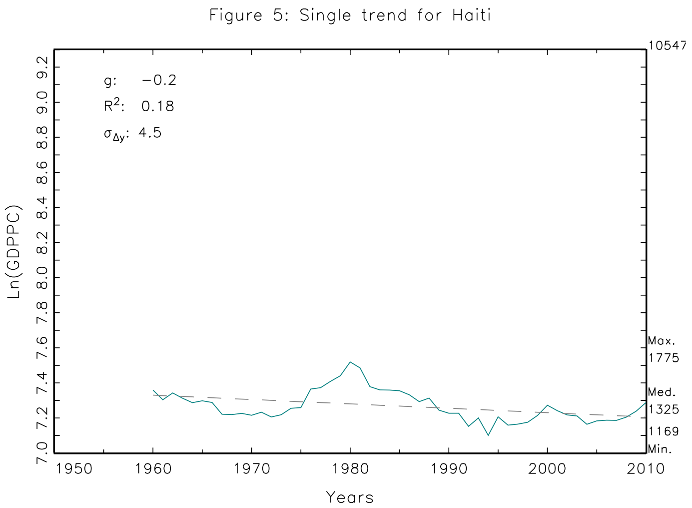


Figure 5: Single trend for Haiti
g: −0.2
R²: 0.18
σΔy: 4.5
10547
Max.
1775
Med.
1325
1169
Min.
Ln(GDPPC)
Years

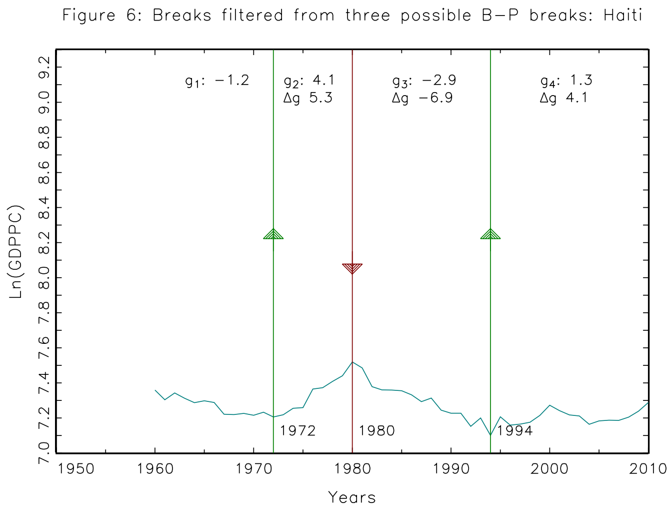


Figure 6: Breaks filtered from three possible B−P breaks: Haiti
g1: −1.2
g2: 4.1
Δg 5.3
g3: −2.9
Δg −6.9
g4: 1.3
Δg 4.1
1972
1980
1994
Ln(GDPPC)
Years

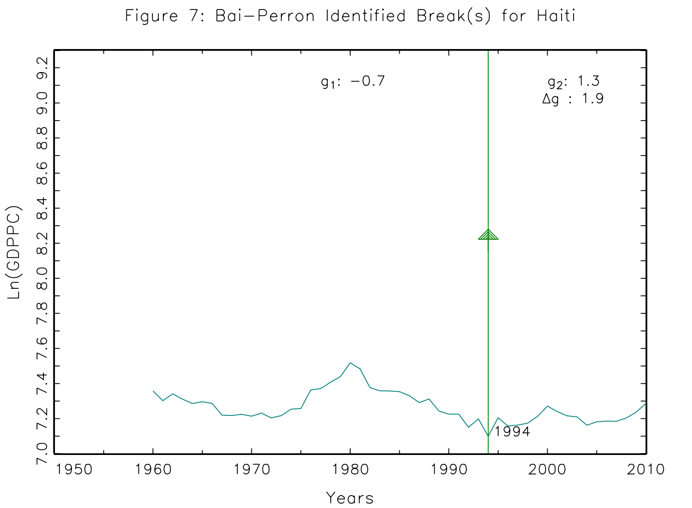


Figure 7: Bai−Perron Identified Break(s) for Haiti
g1: −0.7
g2: 1.3
Δg : 1.9
1994
Ln(GDPPC)
Years

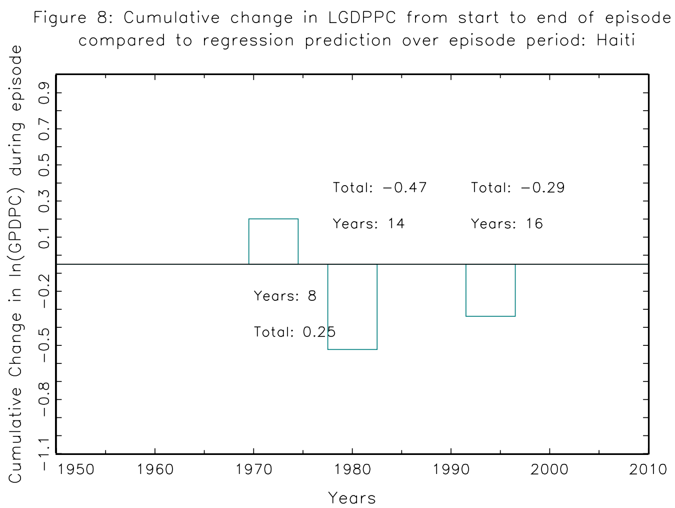


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Haiti
Total: −0.47
Years: 14
Total: −0.29
Years: 16
Years: 8
Total: 0.25
Cumulative Change in ln(GPDPC) during episode
Years

Honduras

Figure 5: Single trend for Honduras

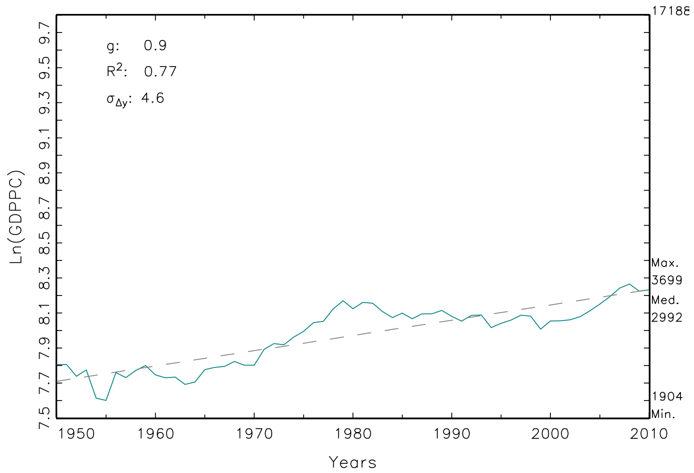


Figure 6: Breaks filtered from four possible B–P breaks: Honduras

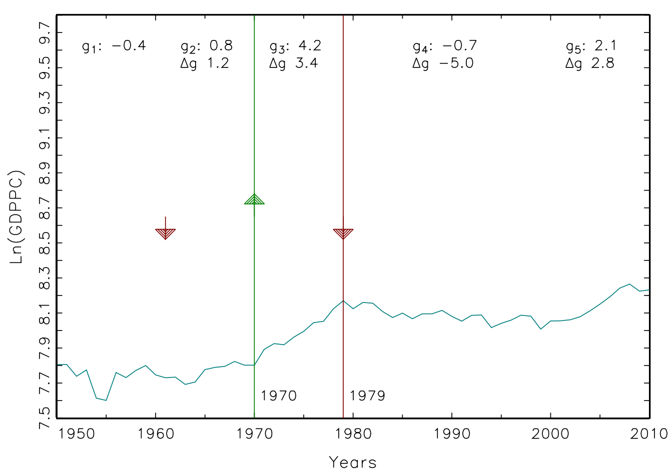


Figure 7: Bai–Perron Identified Break(s) for Honduras

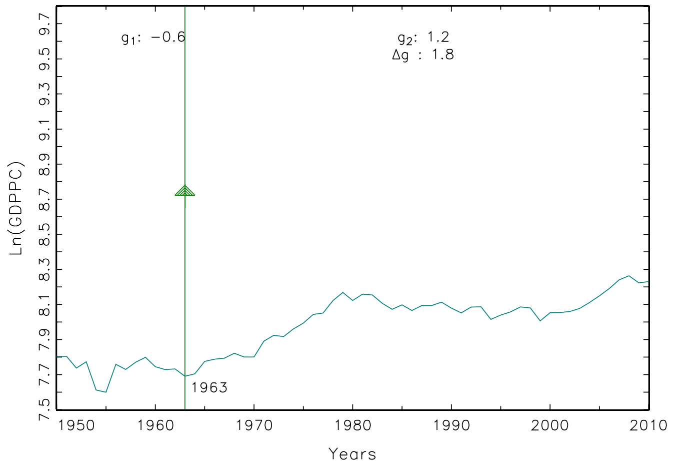
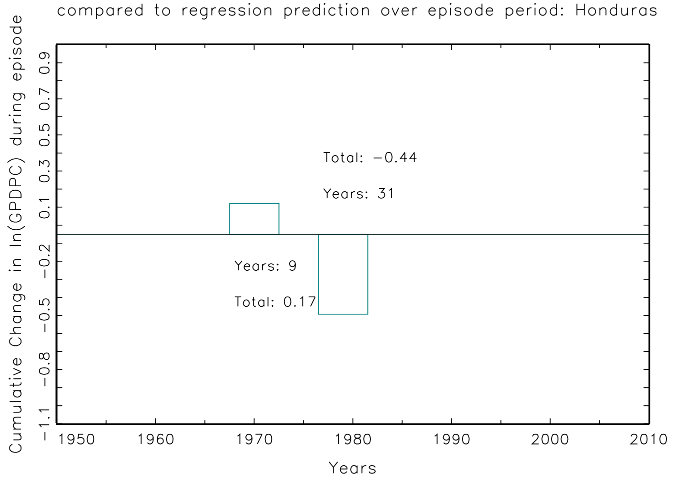


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Honduras



Hong Kong SAR, China

Figure 5: Single trend for Hong Kong

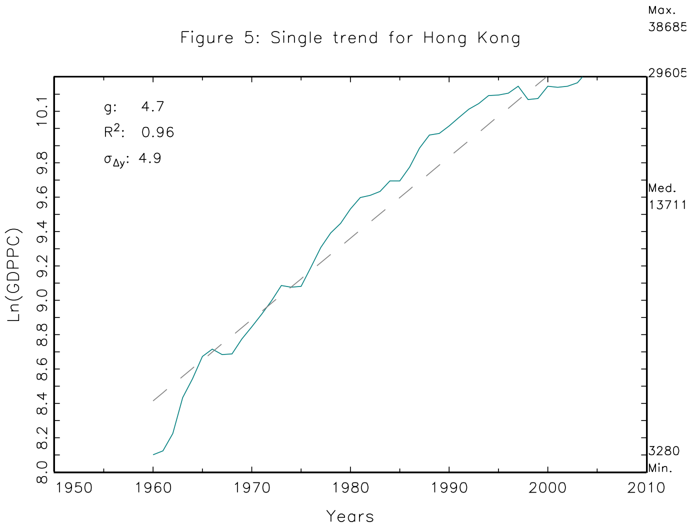


Figure 6: Breaks filtered from three possible B−P breaks: Hong Kong

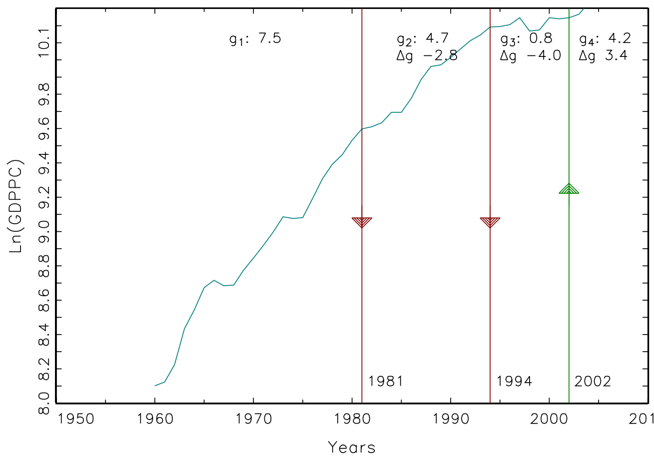


Figure 7: Bai−Perron Identified Break(s) for Hong Kong

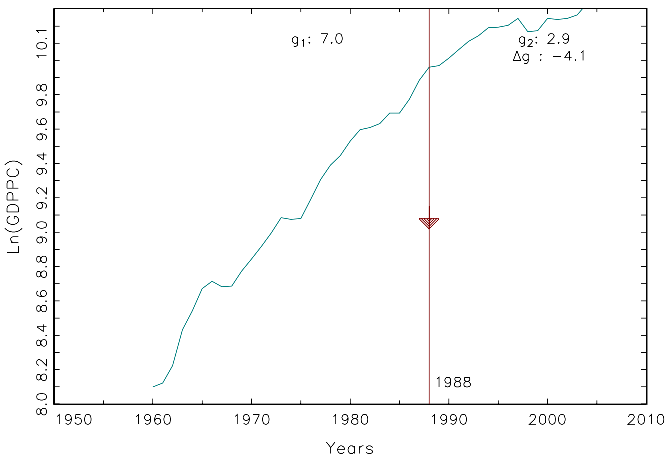
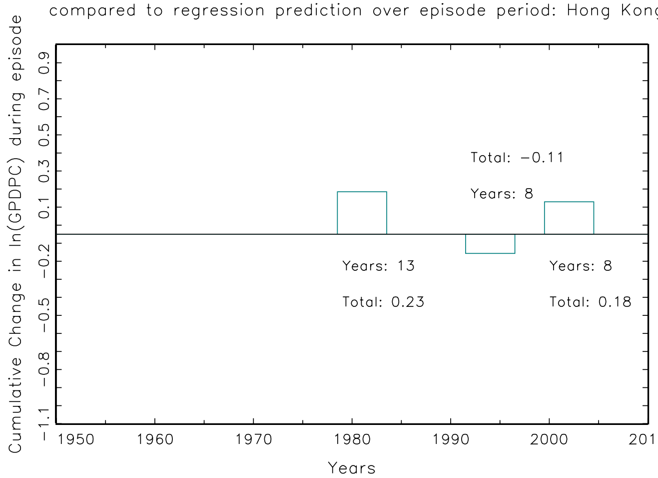


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Hong Kong



Hungary

Figure 5: Single trend for Hungary

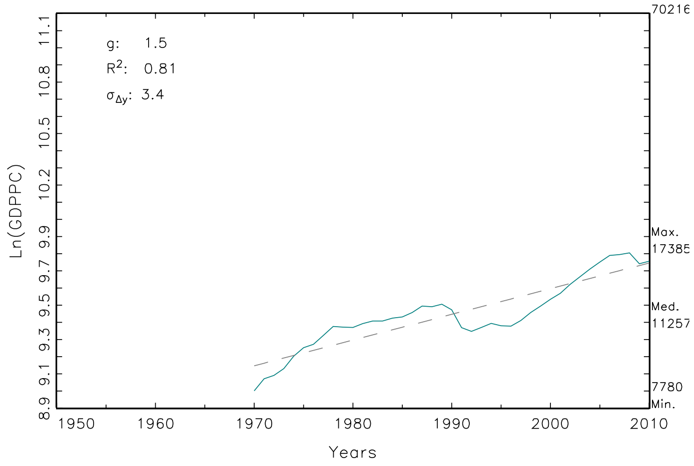


Figure 6: Breaks filtered from two possible B–P breaks: Hungary

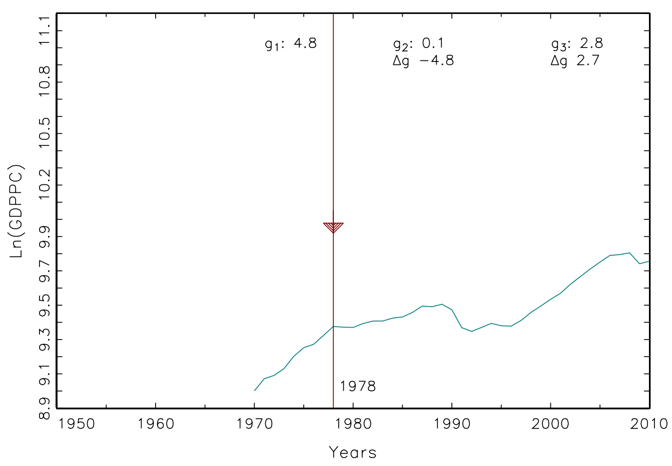


Figure 7: Bai–Perron Identified Break(s) for Hungary

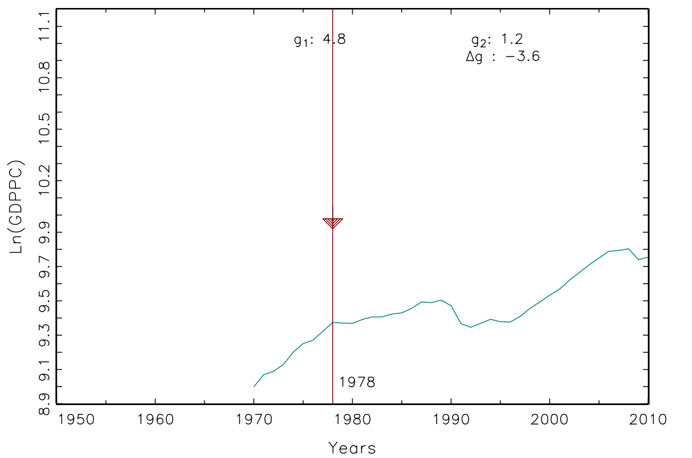
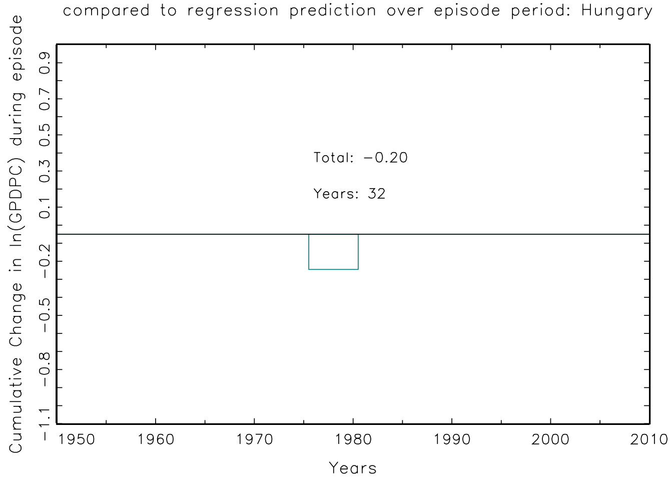


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Hungary



India

Figure 5: Single trend for India

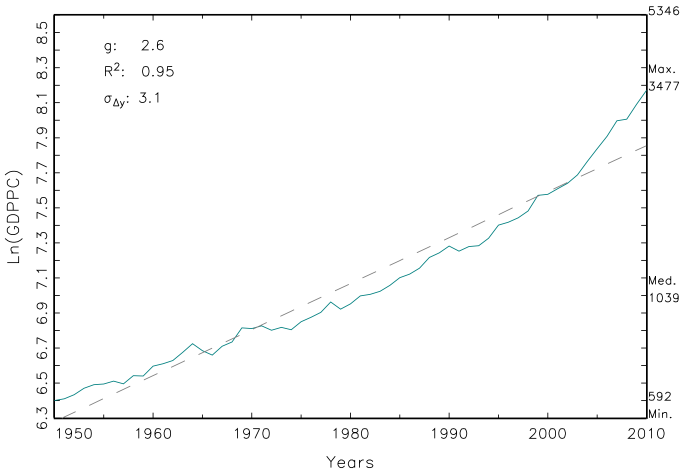


Figure 6: Breaks filtered from four possible B–P breaks: India

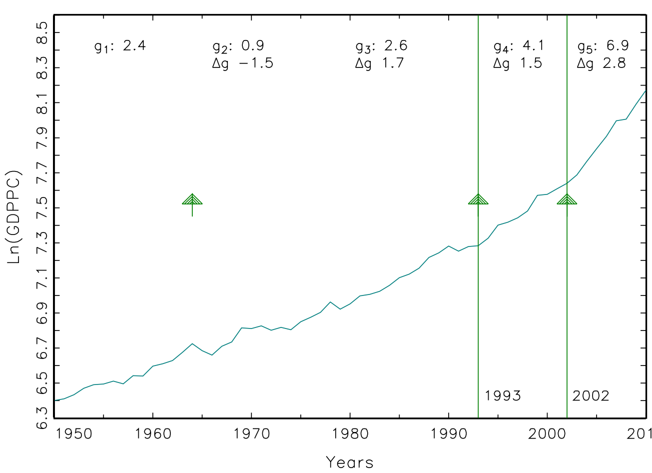


Figure 7: Bai–Perron Identified Break(s) for India

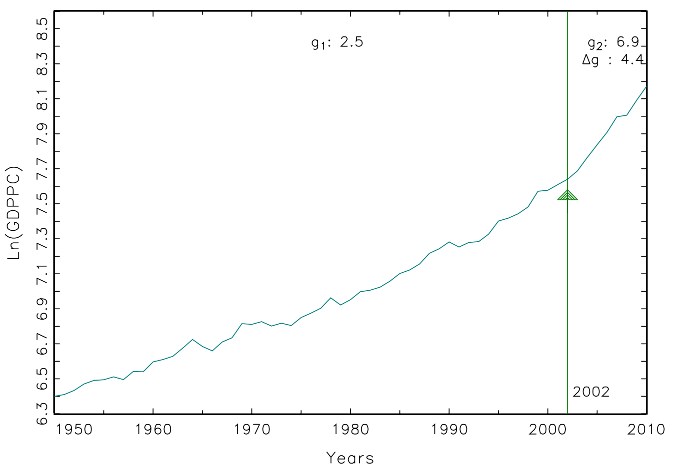
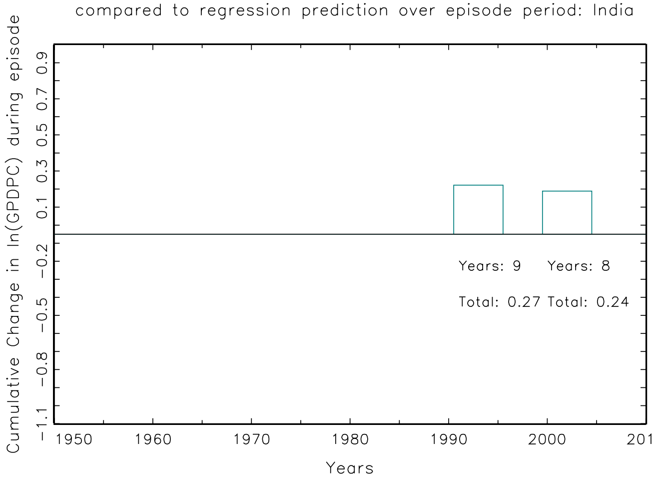


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: India



Indonesia

Figure 5: Single trend for Indonesia

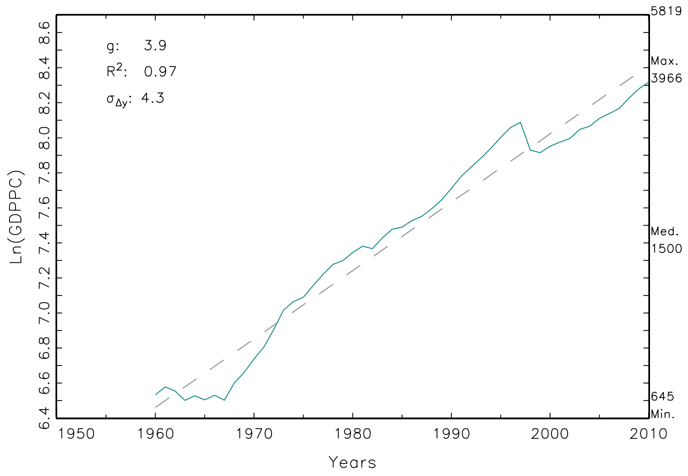


Figure 6: Breaks filtered from three possible B–P breaks: Indonesia

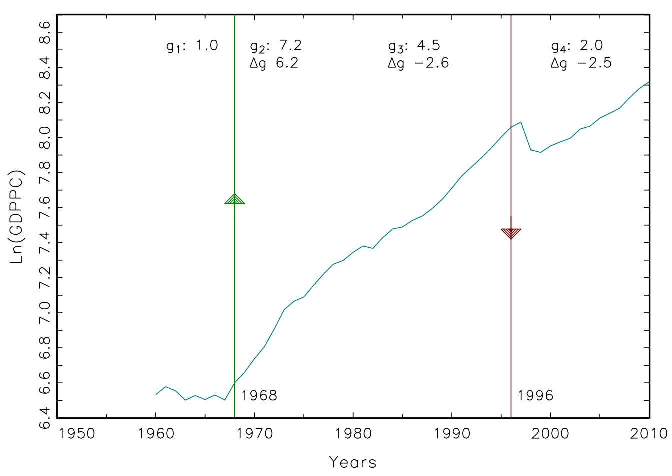


Figure 7: Bai–Perron Identified Break(s) for Indonesia

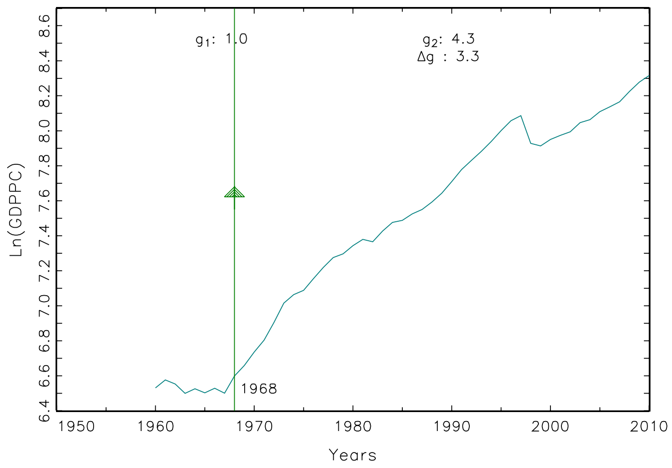
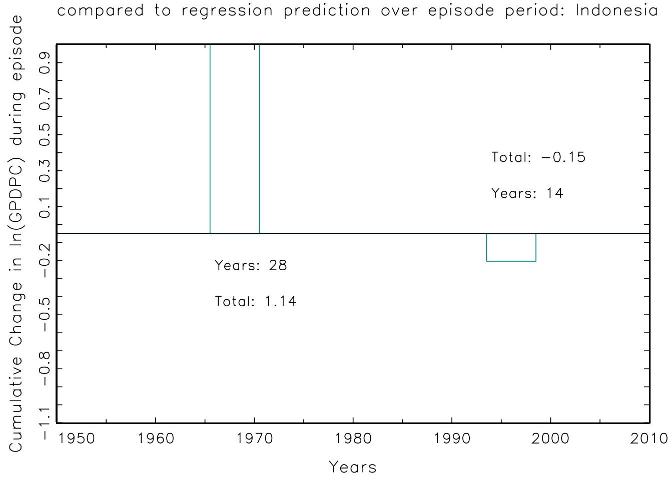


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Indonesia



Iran, Islamic Rep.

Figure 5: Single trend for Iran

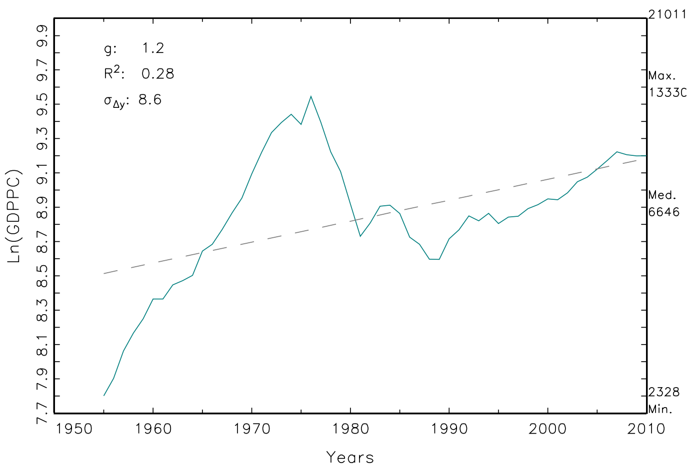


Figure 6: Breaks filtered from three possible B−P breaks: Iran

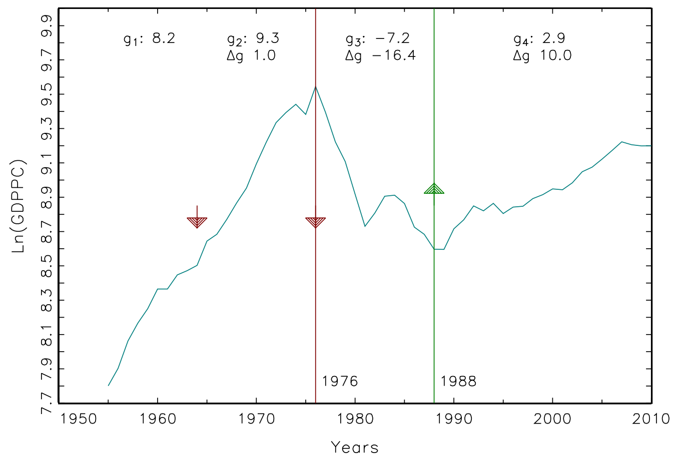


Figure 7: Bai−Perron Identified Break(s) for Iran

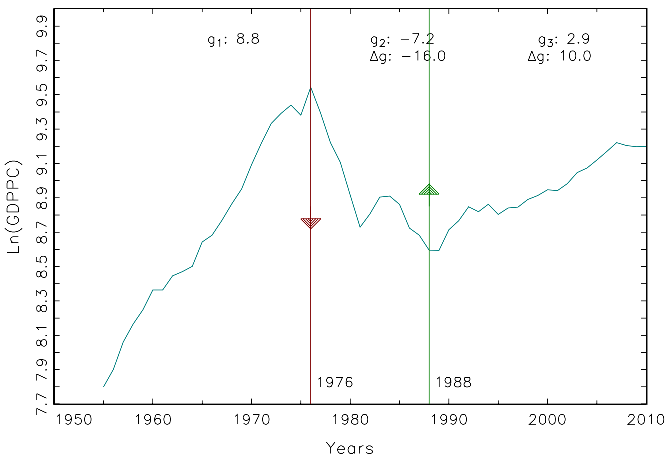
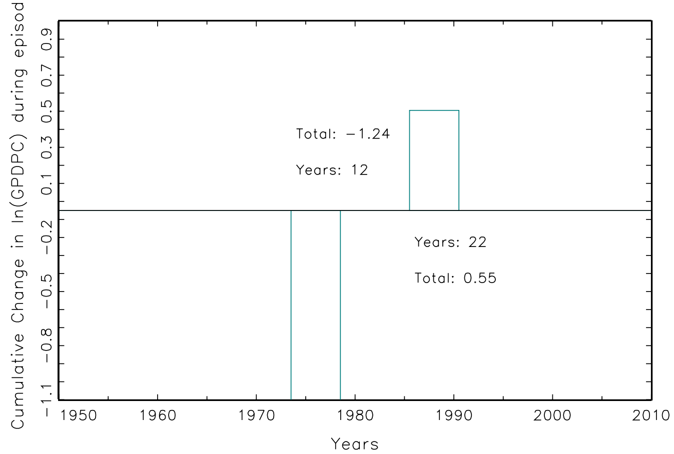


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Iran



Iraq

Figure 5: Single trend for Iraq

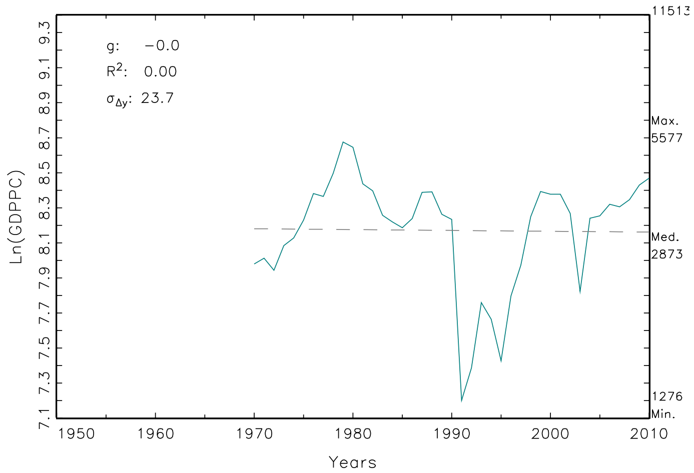


Figure 6: Breaks filtered from two possible B−P breaks: Iraq

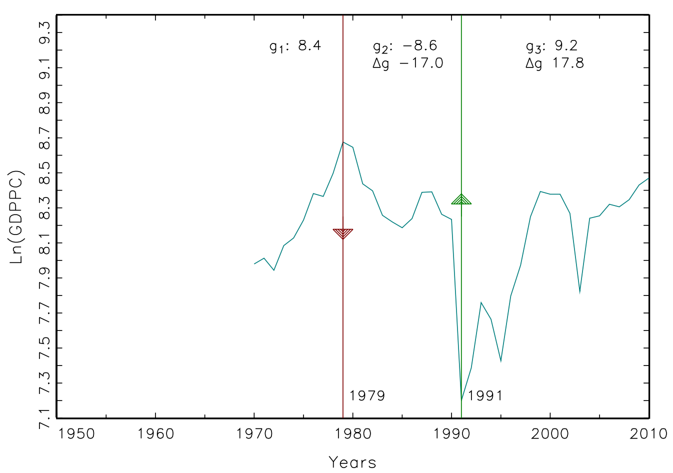


Figure 7: Bai−Perron Identified Break(s) for Iraq

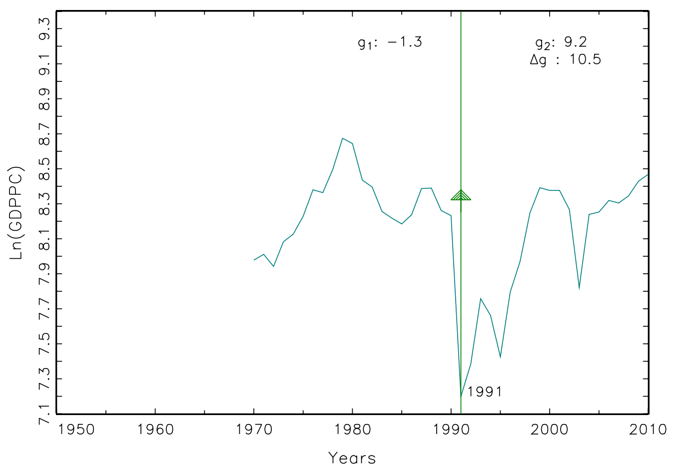
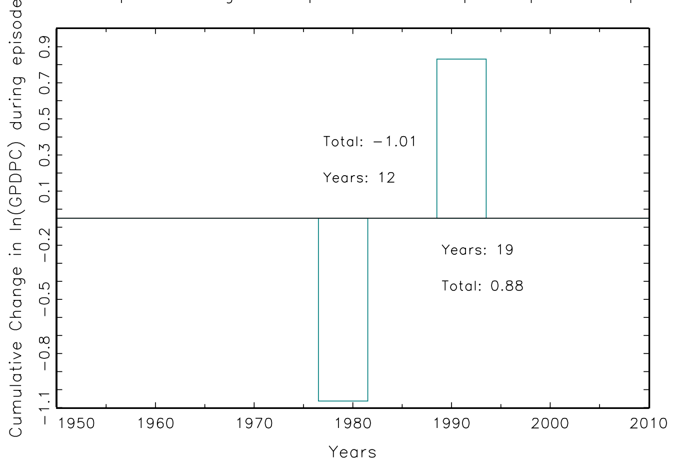


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Iraq



Ireland

Figure 5: Single trend for Ireland

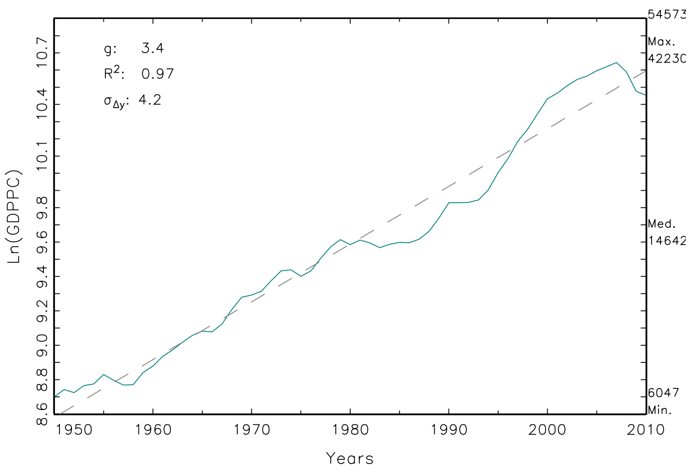


Figure 6: Breaks filtered from four possible B–P breaks: Ireland

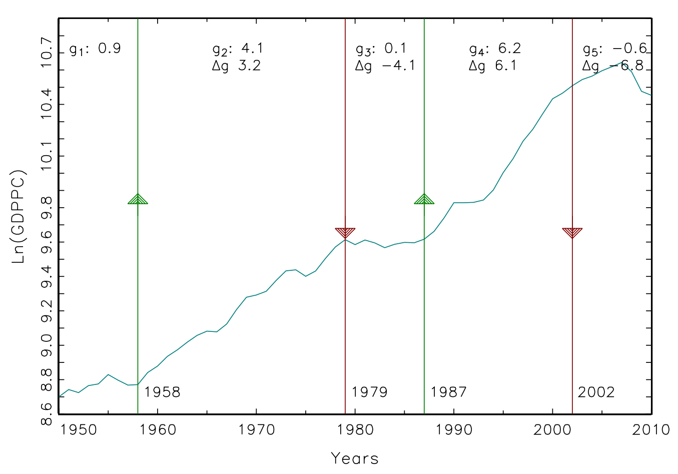


Figure 7: Bai–Perron Identified Break(s) for Ireland

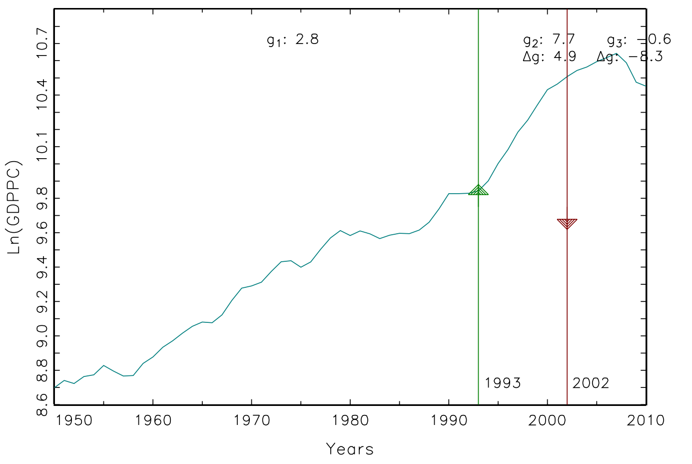
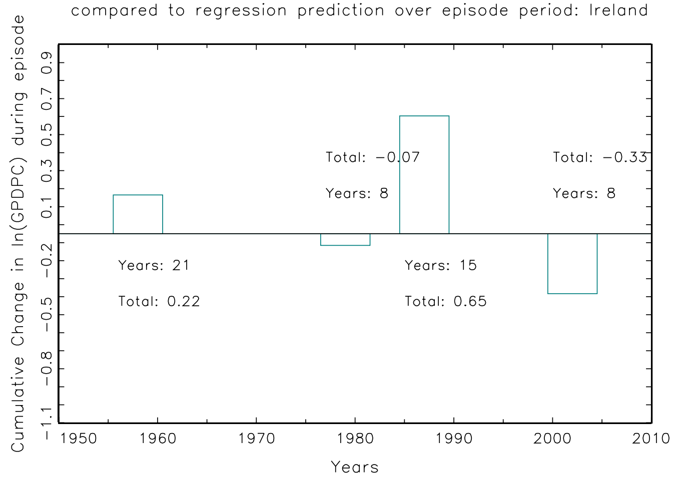


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Ireland



Israel

Figure 5: Single trend for Israel

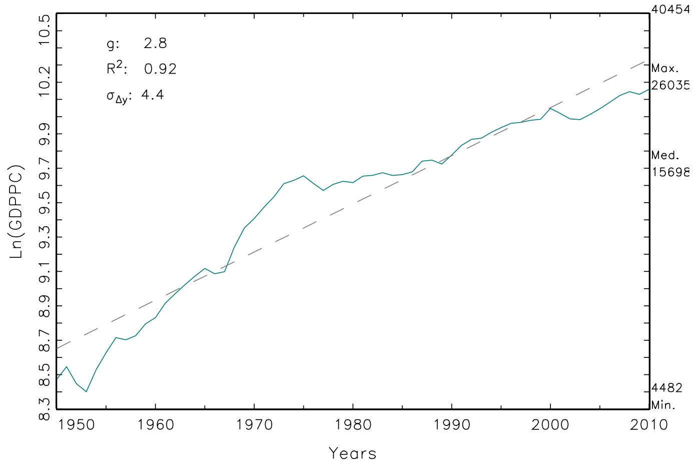


Figure 6: Breaks filtered from four possible B–P breaks: Israel

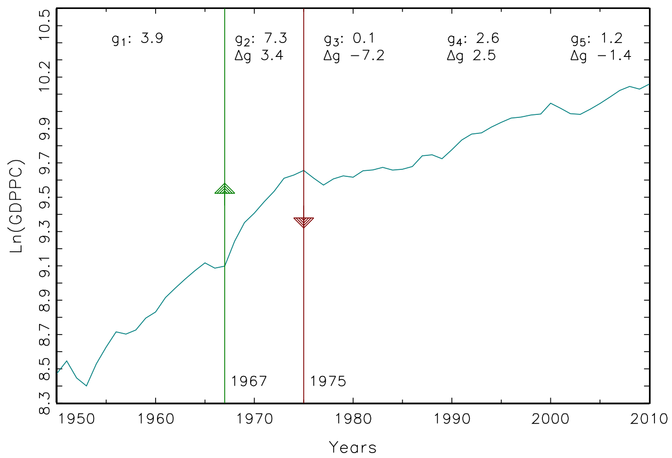


Figure 7: Bai–Perron Identified Break(s) for Israel

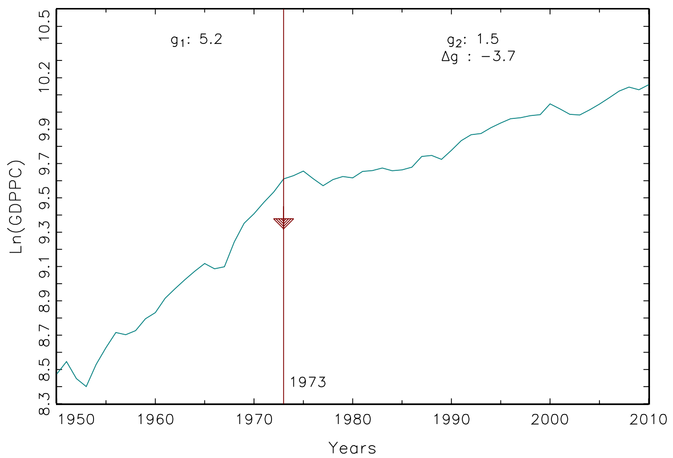
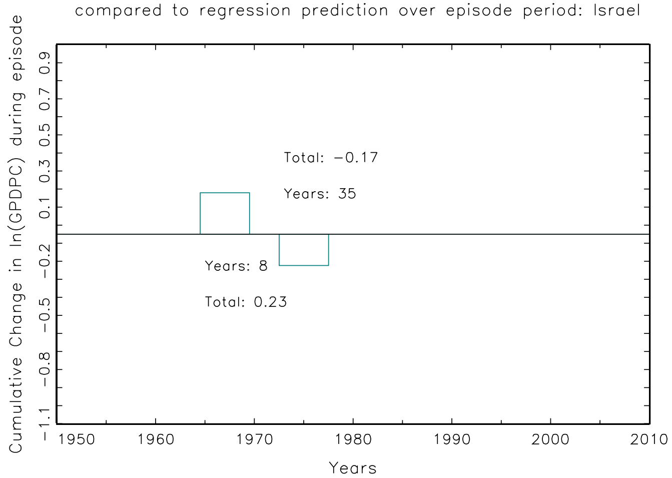


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Israel



Italy

Figure 5: Single trend for Italy

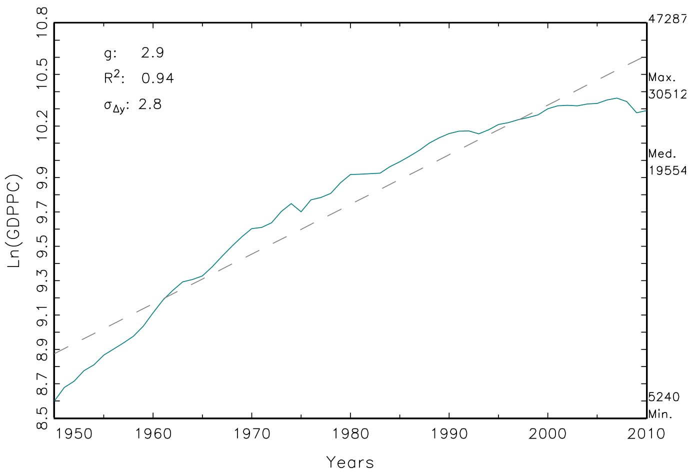


Figure 6: Breaks filtered from four possible B–P breaks: Italy

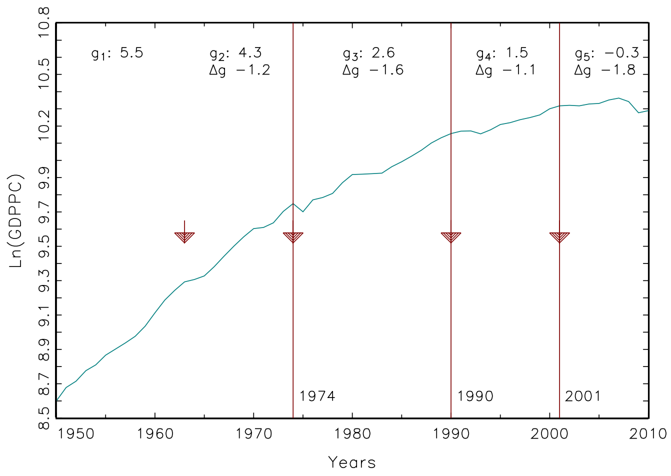


Figure 7: Bai–Perron Identified Break(s) for Italy

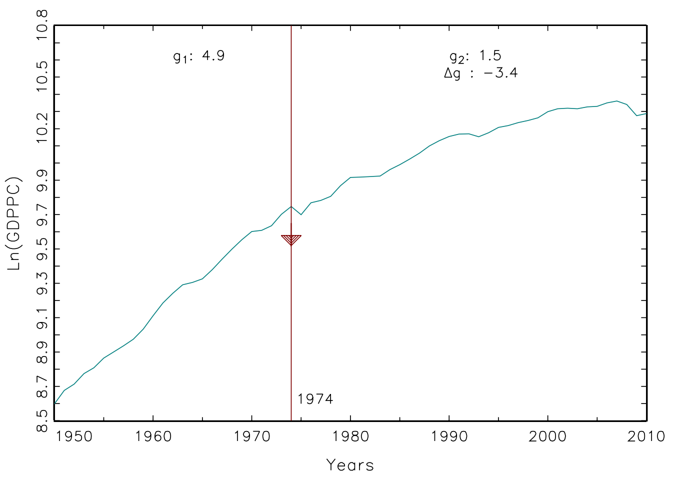
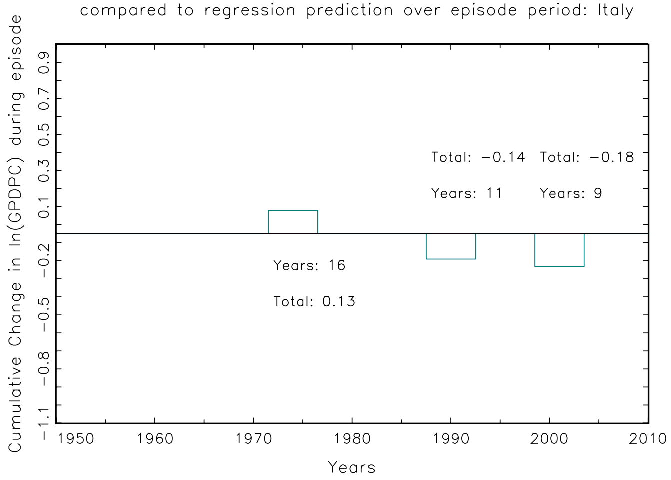


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Italy



Jamaica

Figure 5: Single trend for Jamaica

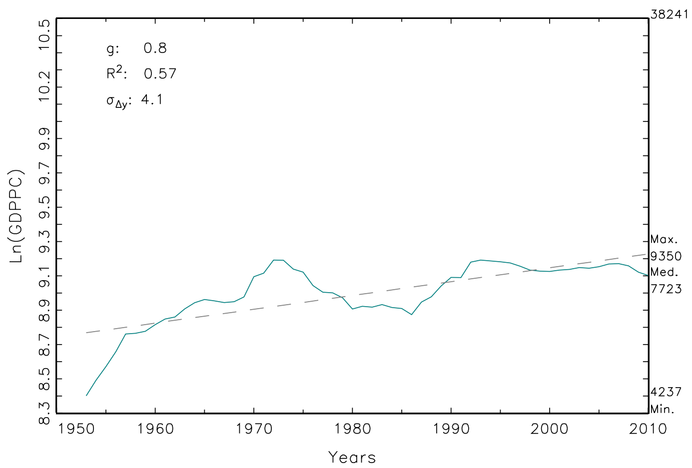


Figure 6: Breaks filtered from four possible B–P breaks: Jamaica

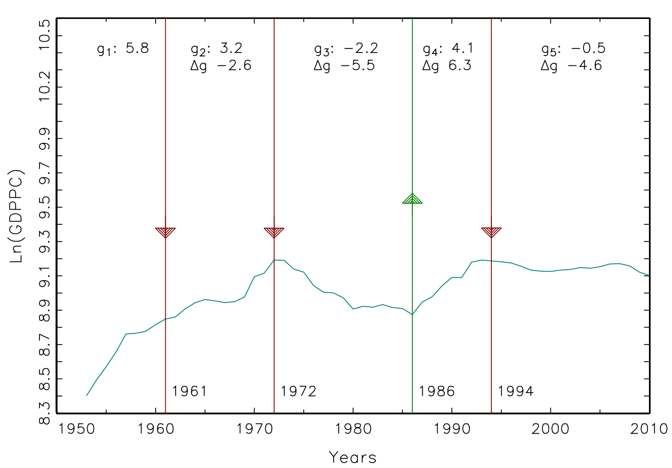


Figure 7: Bai–Perron Identified Break(s) for Jamaica

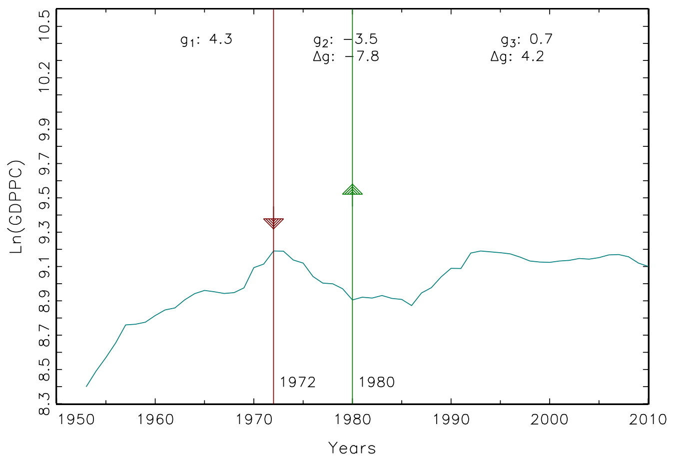
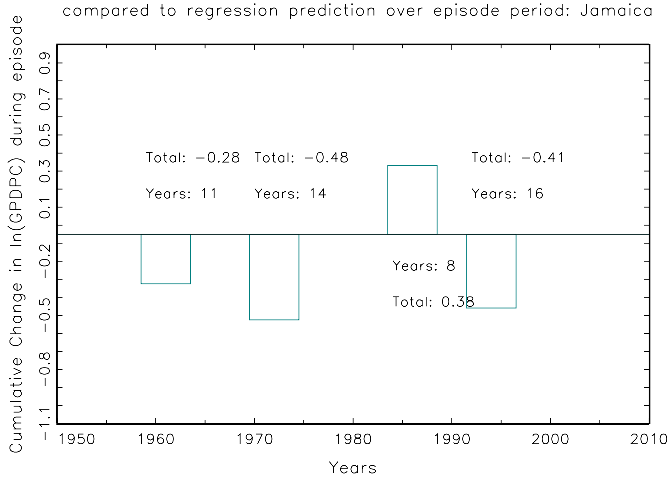


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Jamaica



Japan

Figure 5: Single trend for Japan

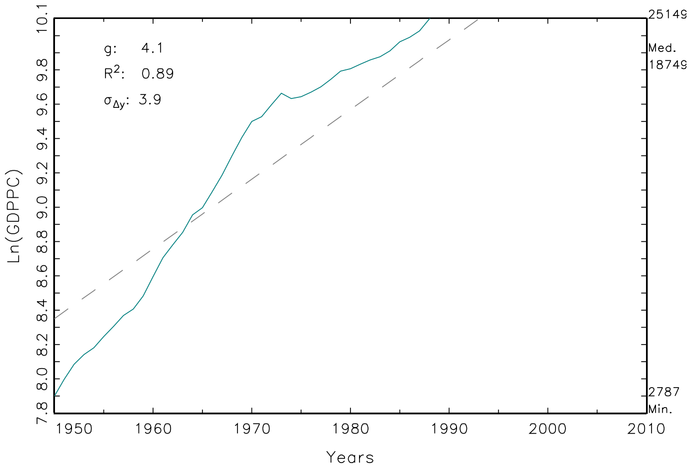


Figure 6: Breaks filtered from four possible B–P breaks: Japan

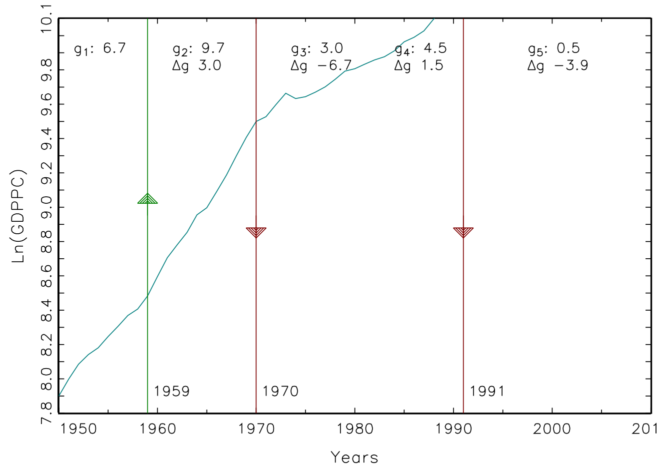


Figure 7: Bai–Perron Identified Break(s) for Japan

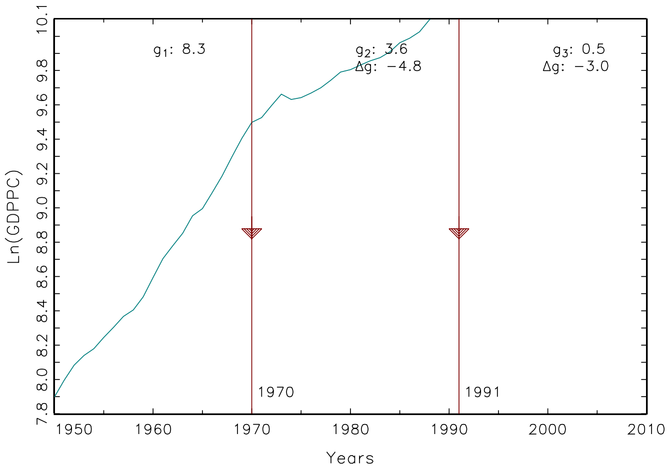
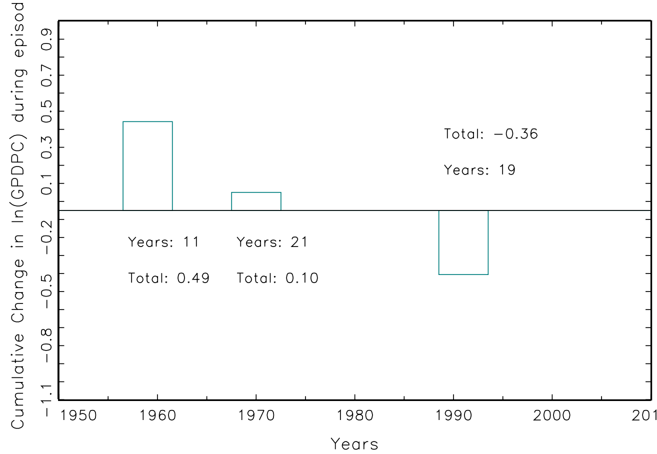


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Japan



Jordan

Figure 5: Single trend for Jordan

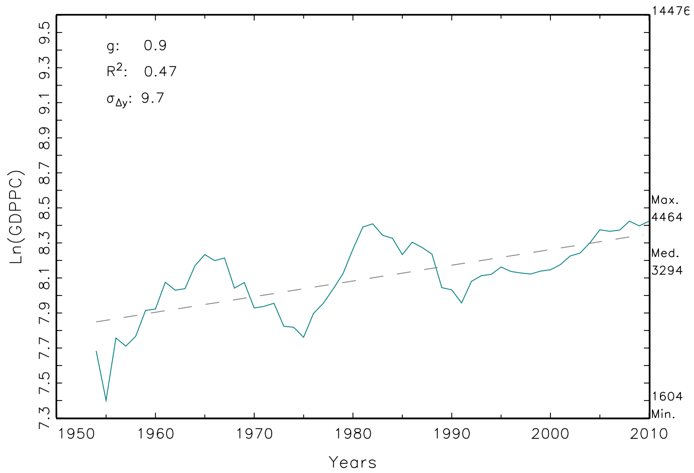


Figure 6: Breaks filtered from four possible B–P breaks: Jordan

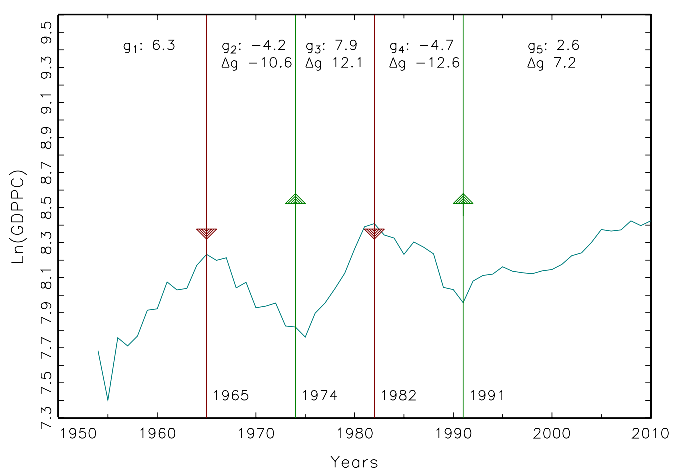


Figure 7: Bai–Perron Identified Break(s) for Jordan

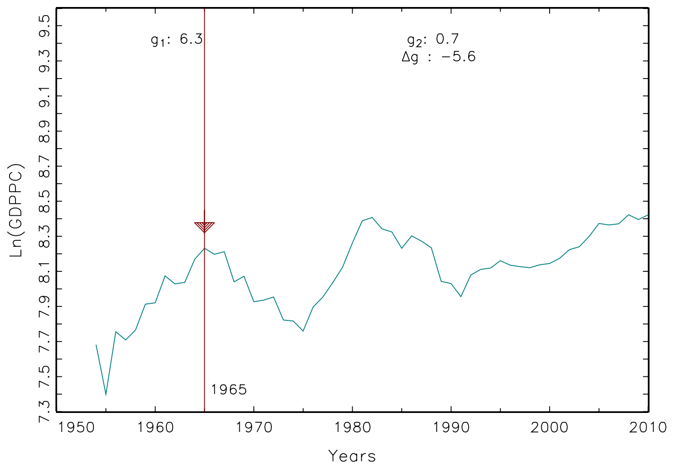
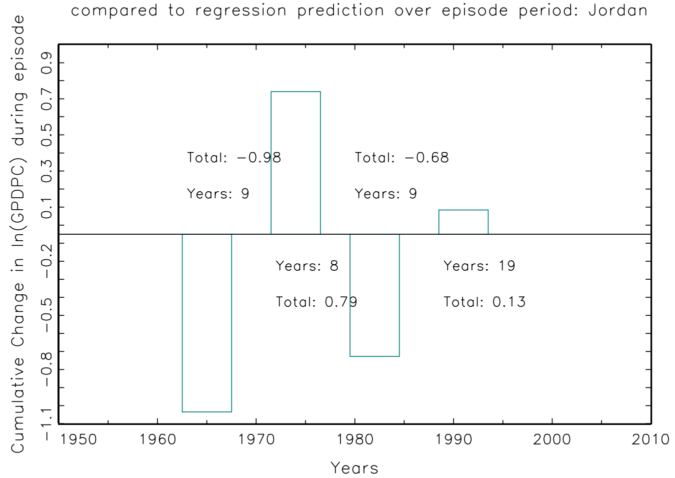


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Jordan



Kenya

Figure 5: Single trend for Kenya

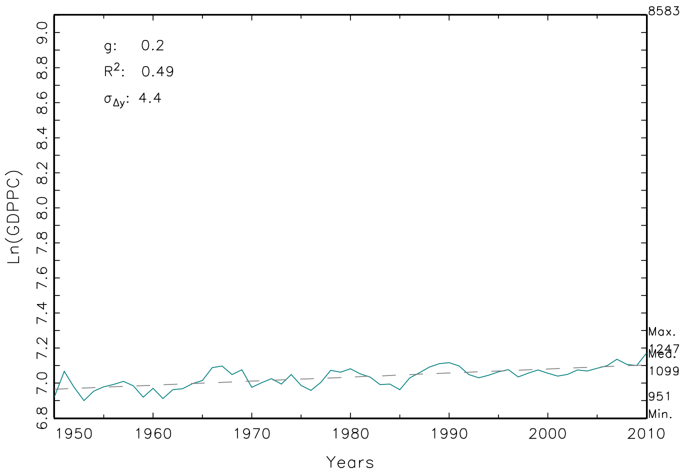


Figure 6: Breaks filtered from four possible B–P breaks: Kenya

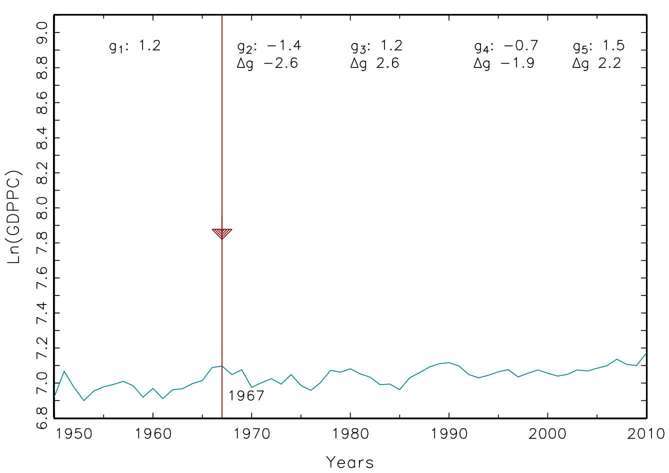


Figure 7: Bai–Perron Identified Break(s) for Kenya

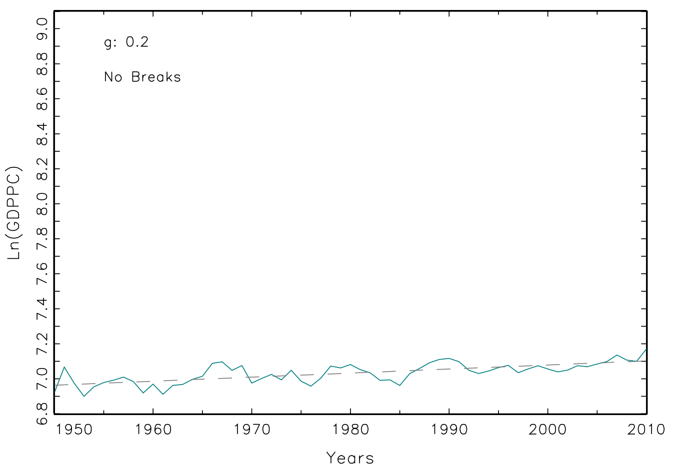
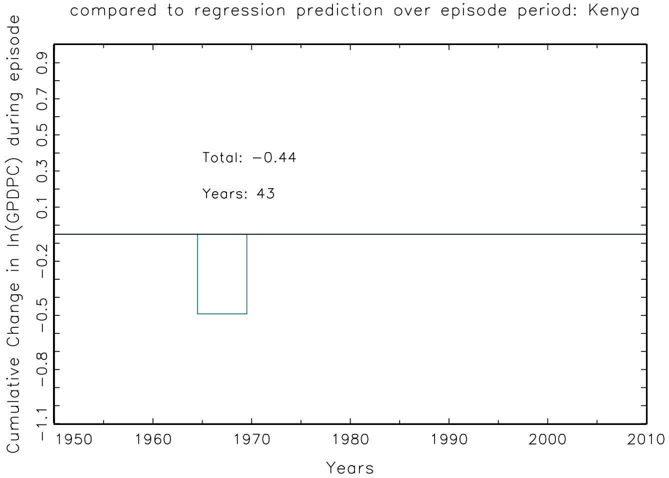


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Kenya



Korea, Rep.

Figure 5: Single trend for Korea, Republic of

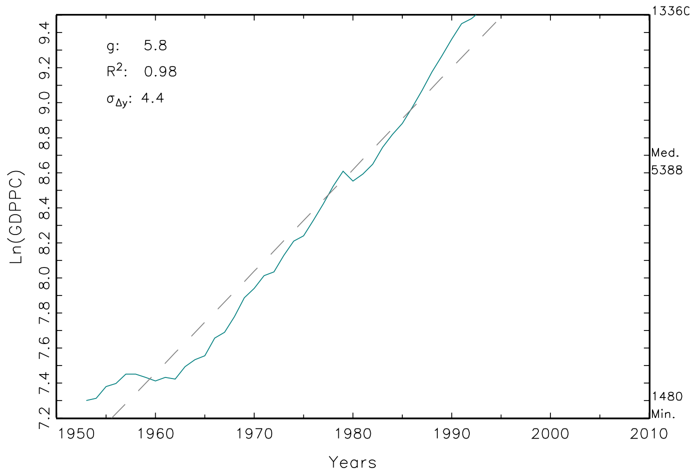


Figure 6: Breaks filtered from four possible B–P breaks: Korea, Republic of

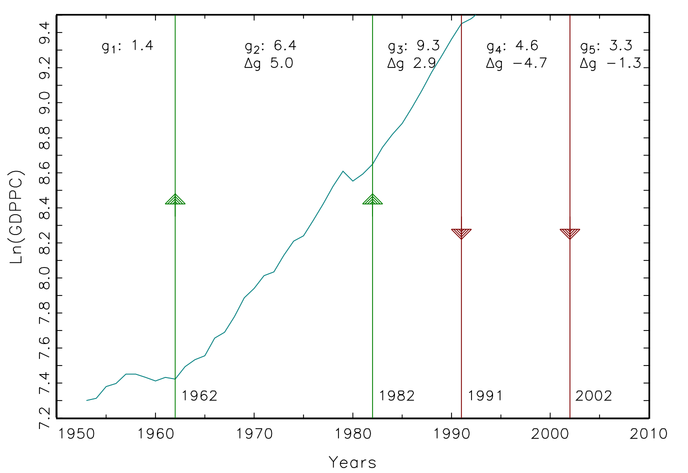


Figure 7: Bai–Perron Identified Break(s) for Korea, Republic of

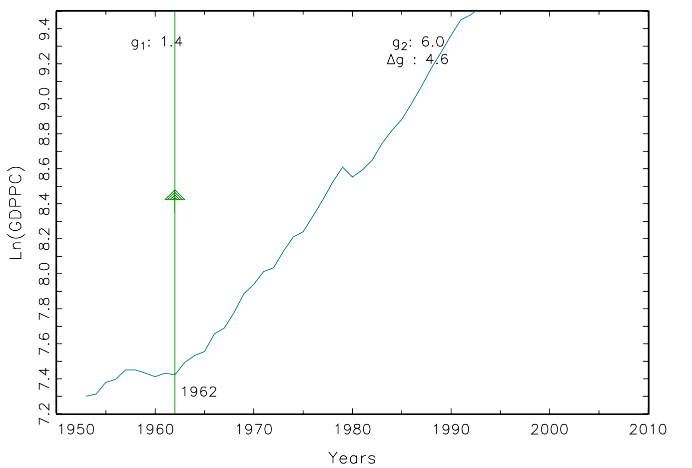
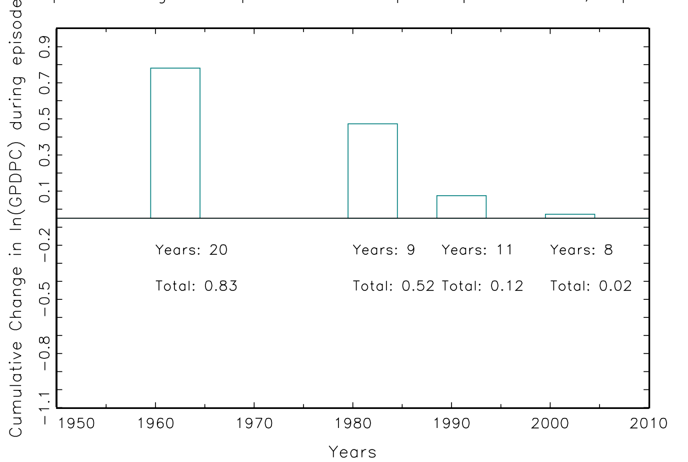


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Korea, Republic of



Lao PDR

Figure 5: Single trend for Laos

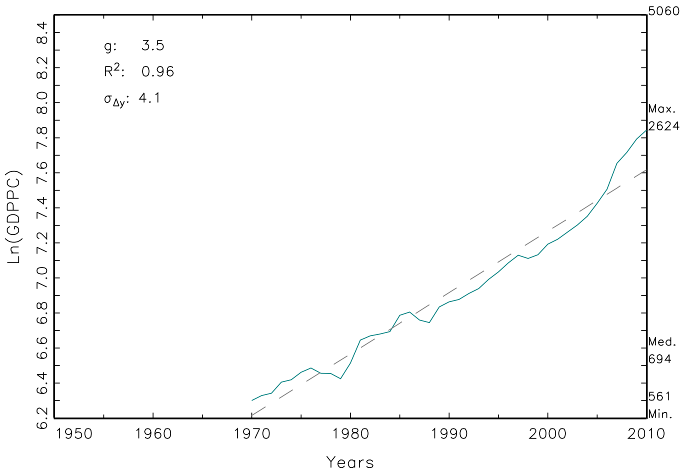


Figure 6: Breaks filtered from two possible B–P breaks: Laos

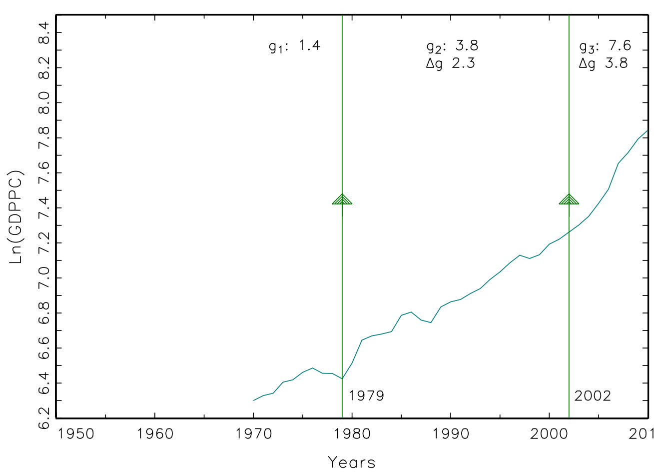


Figure 7: Bai–Perron Identified Break(s) for Laos

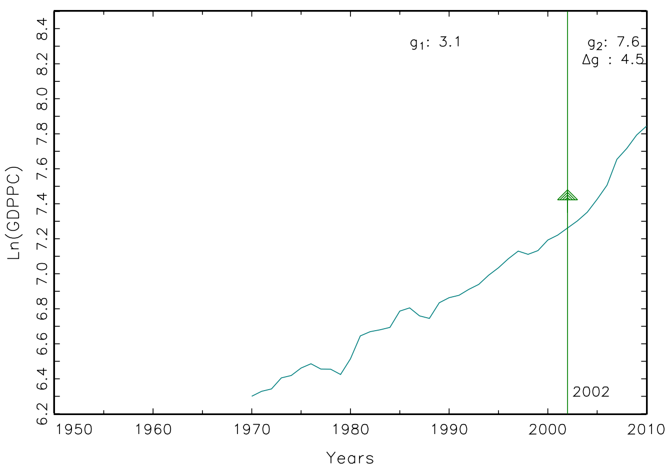
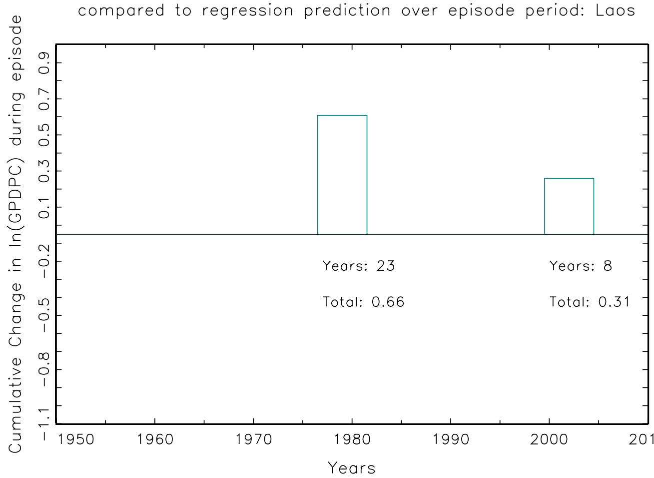


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Laos



Lebanon

Figure 5: Single trend for Lebanon

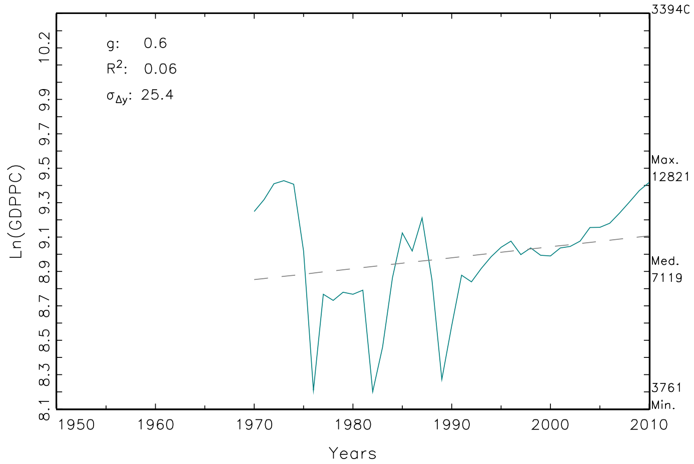


Figure 6: Breaks filtered from two possible B–P breaks: Lebanon

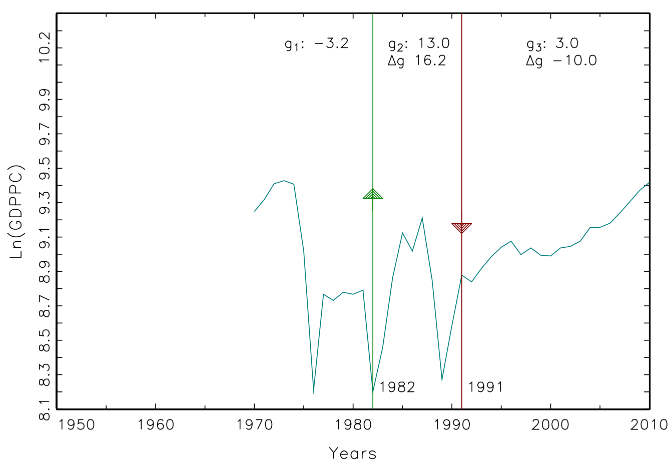


Figure 7: Bai–Perron Identified Break(s) for Lebanon

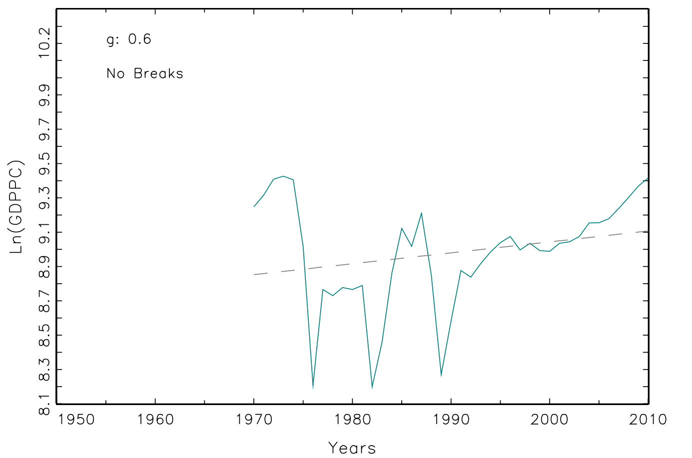
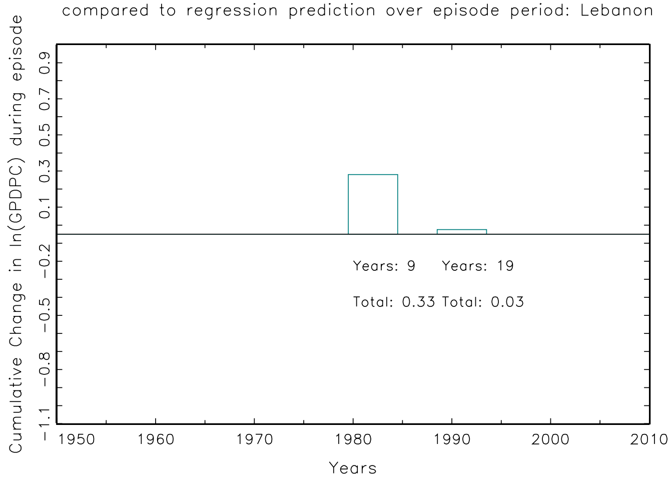


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Lebanon



Lesotho

Figure 5: Single trend for Lesotho

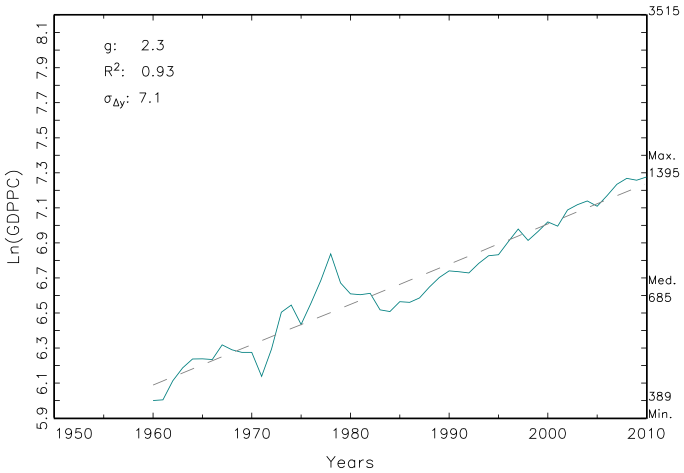


Figure 6: Breaks filtered from three possible B–P breaks: Lesotho

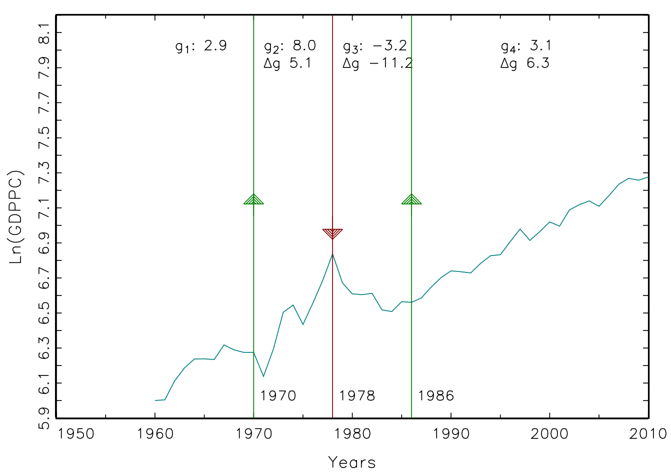


Figure 7: Bai–Perron Identified Break(s) for Lesotho

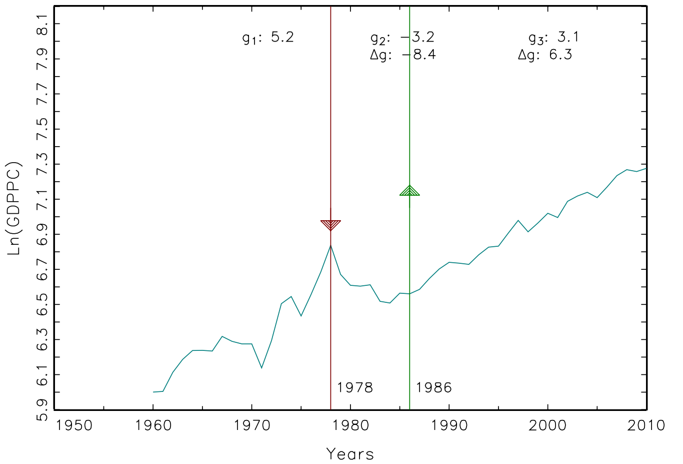
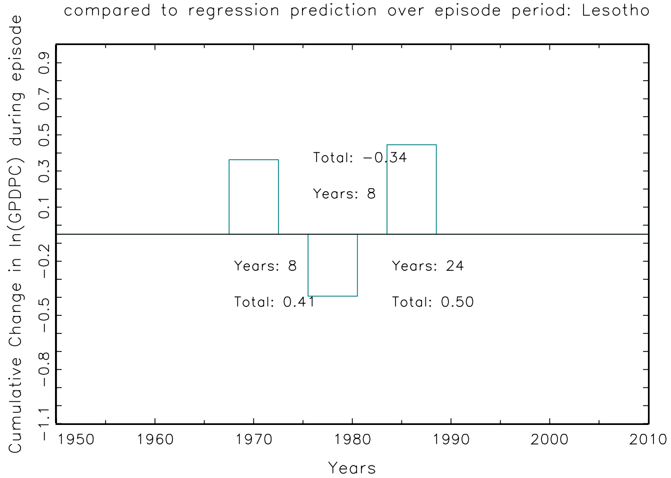


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Lesotho



Liberia

Figure 5: Single trend for Liberia

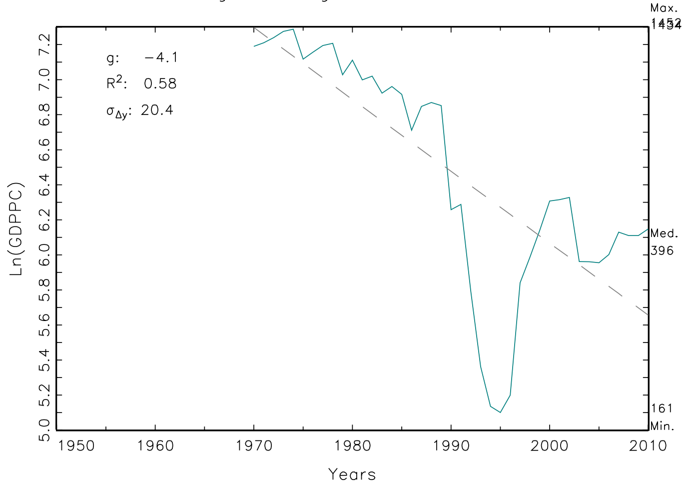


Figure 6: Breaks filtered from two possible B−P breaks: Liberia

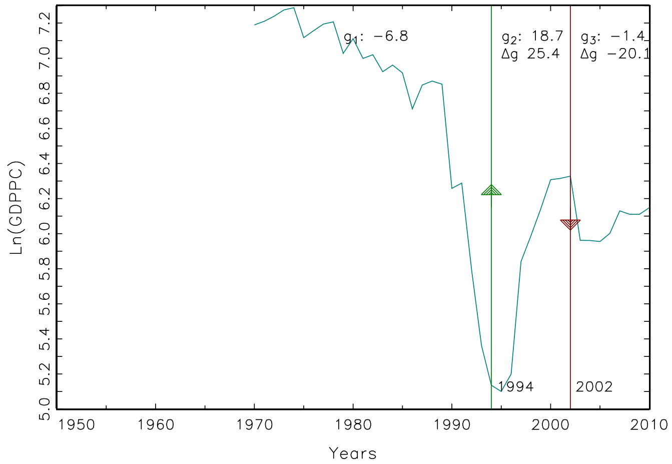


Figure 7: Bai−Perron Identified Break(s) for Liberia

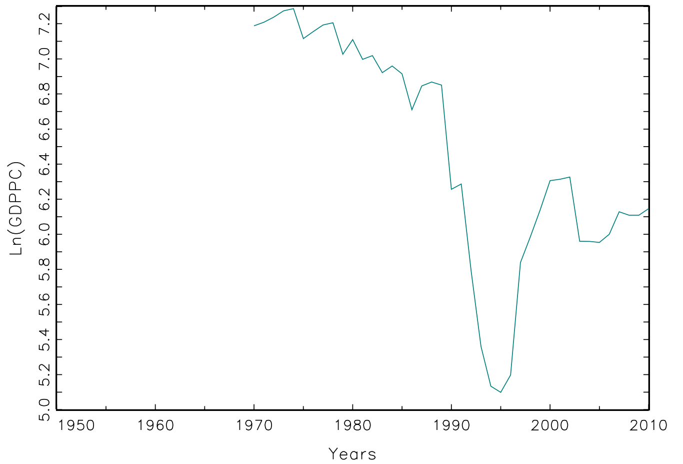
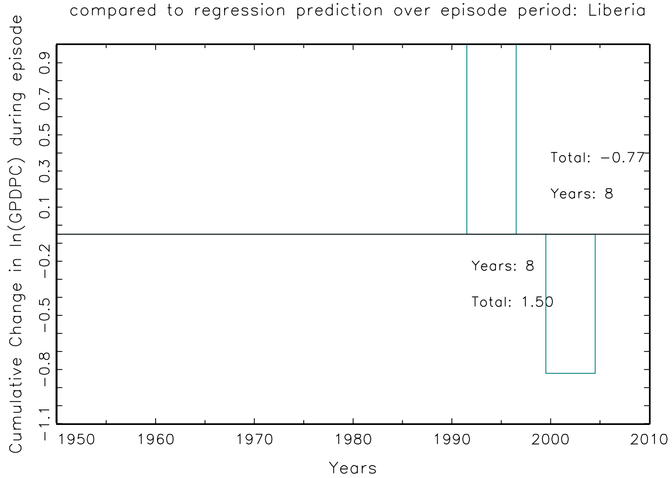


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Liberia



Madagascar

Figure 5: Single trend for Madagascar

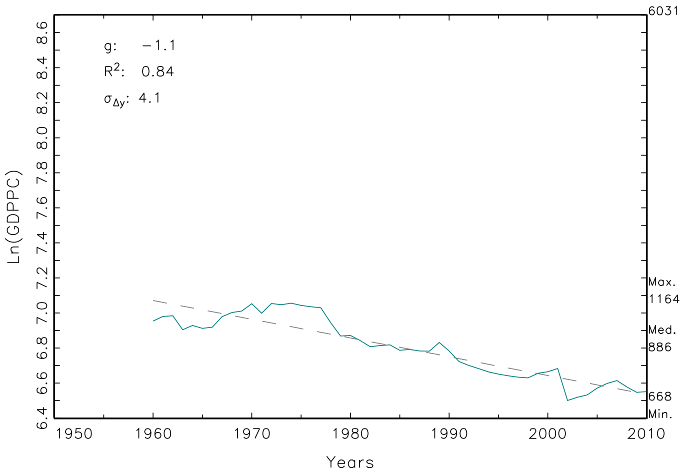


Figure 6: Breaks filtered from three possible B−P breaks: Madagascar

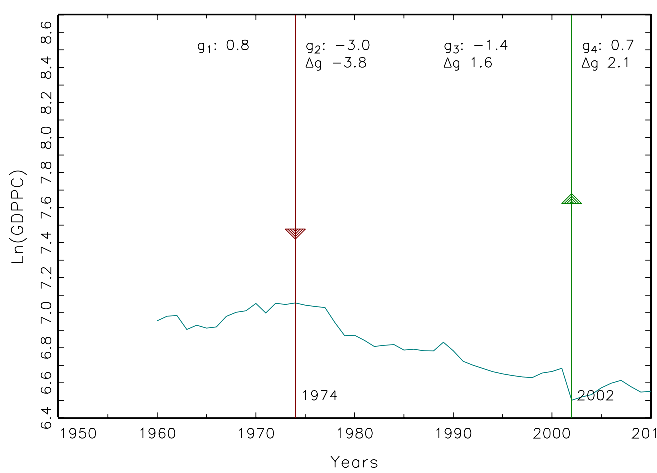


Figure 7: Bai−Perron Identified Break(s) for Madagascar

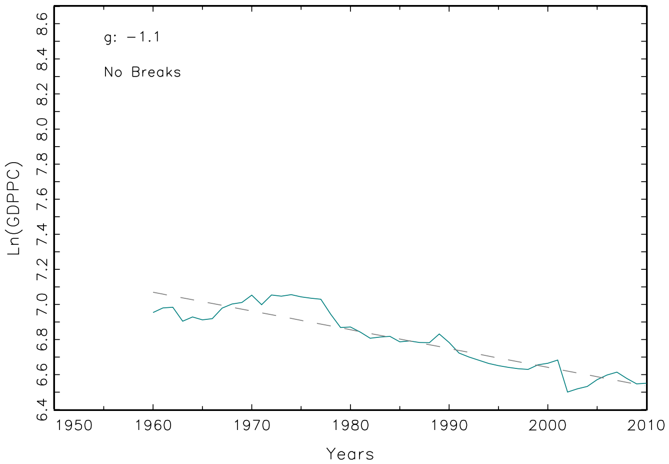
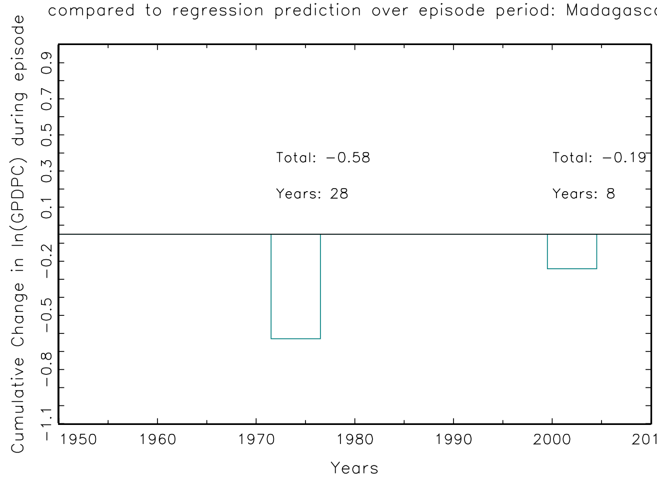


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Madagascar



Malawi

Figure 5: Single trend for Malawi

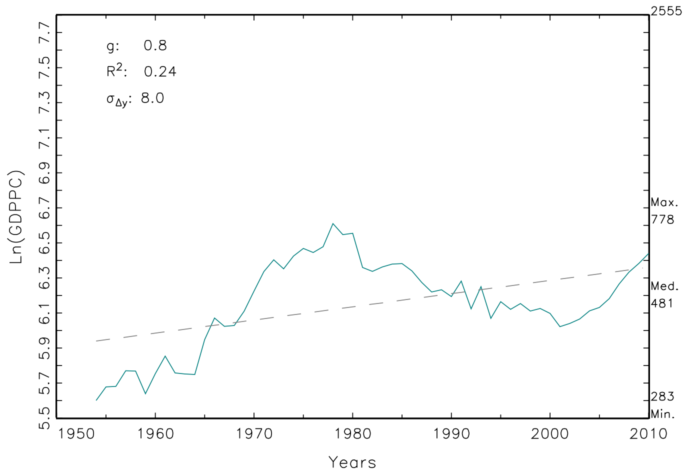


Figure 6: Breaks filtered from four possible B–P breaks: Malawi

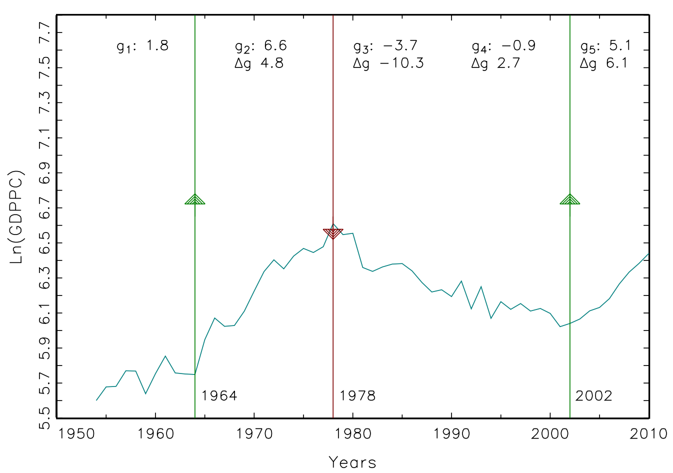


Figure 7: Bai–Perron Identified Break(s) for Malawi

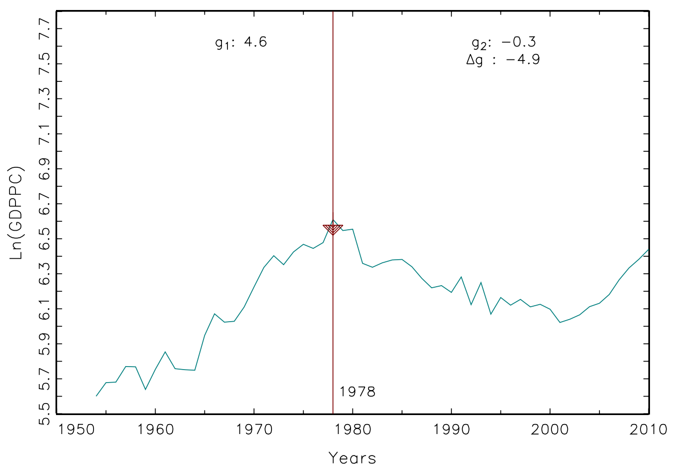
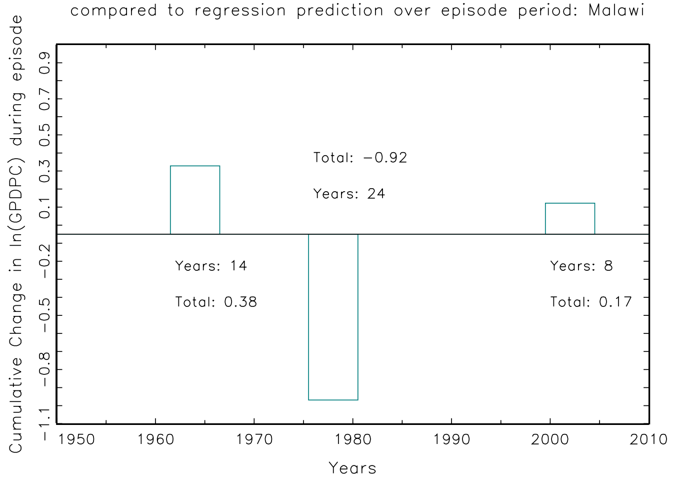


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Malawi



Malaysia

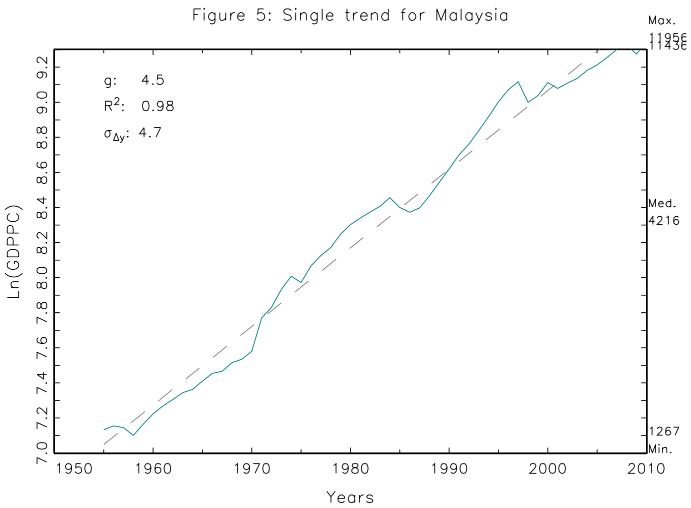


Figure 5: Single trend for Malaysia
g: 4.5
R²: 0.98
σΔy: 4.7
Max.
Med.
4216
1267
Min.
Ln(GDPPC)
Years

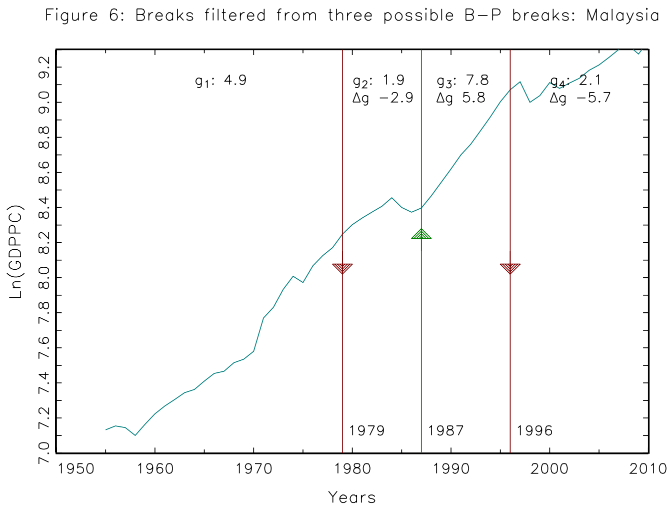


Figure 6: Breaks filtered from three possible B–P breaks: Malaysia
g1: 4.9
g2: 1.9
Δg −2.9
g3: 7.8
Δg 5.8
g4: 2.1
Δg −5.7
1979
1987
1996
Ln(GDPPC)
Years

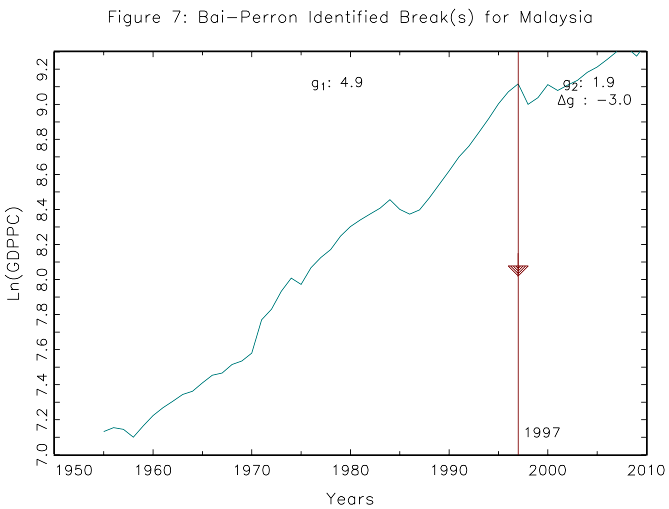


Figure 7: Bai–Perron Identified Break(s) for Malaysia
g1: 4.9
g2: 1.9
Δg : −3.0
1997
Ln(GDPPC)
Years

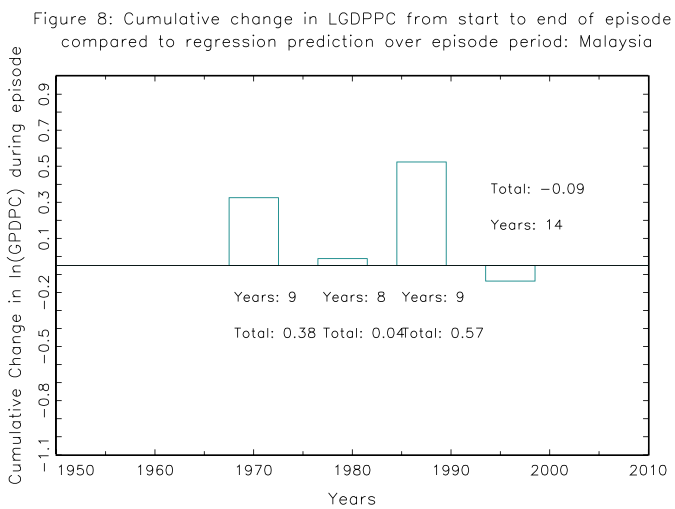


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Malaysia
Total: −0.09
Years: 14
Years: 9
Years: 8
Years: 9
Total: 0.38
Total: 0.04
Total: 0.57
Cumulative Change in ln(GPDPC) during episode
Years

Mali

Figure 5: Single trend for Mali

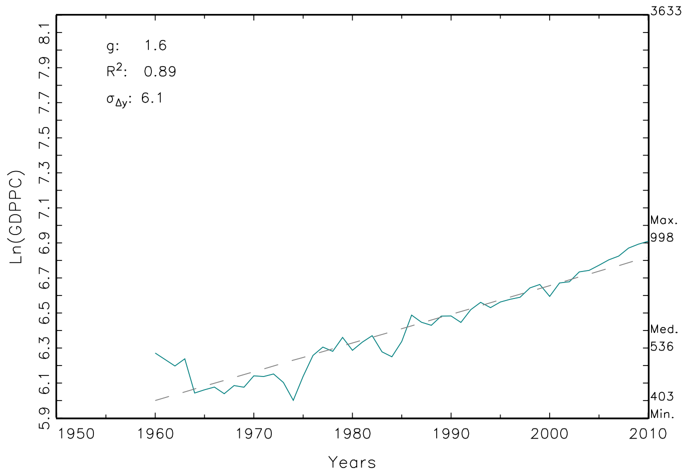


Figure 6: Breaks filtered from three possible B–P breaks: Mali

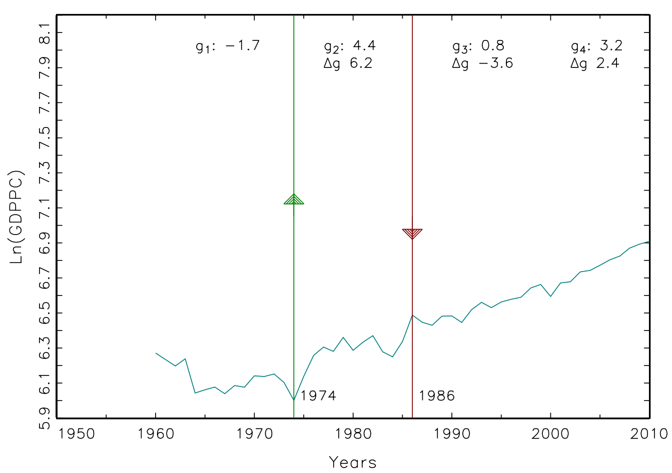


Figure 7: Bai–Perron Identified Break(s) for Mali

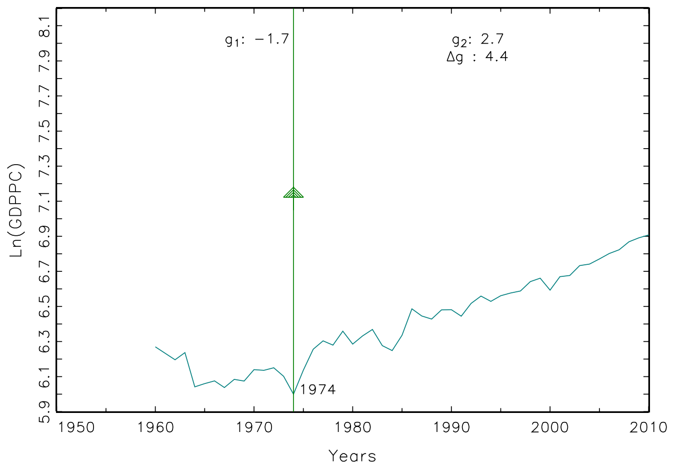
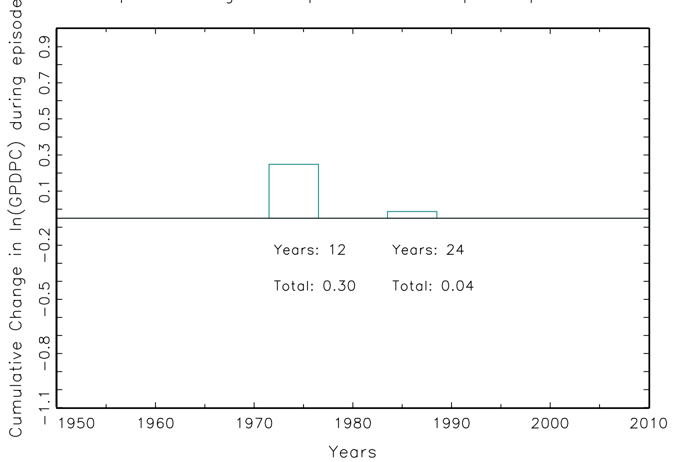


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Mali



Mauritania

Figure 5: Single trend for Mauritania

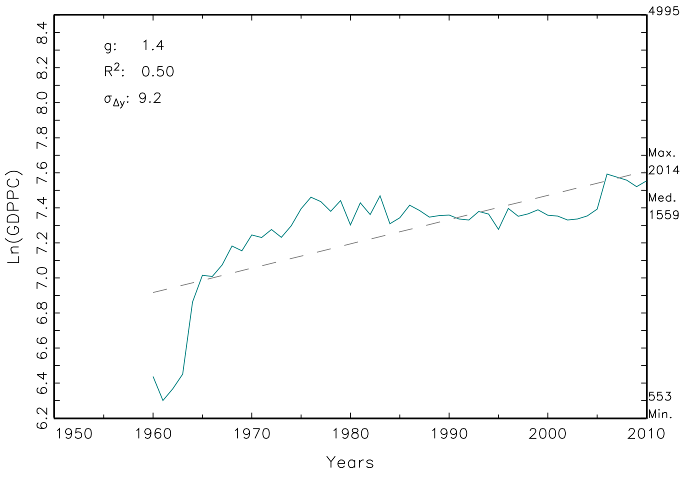


Figure 6: Breaks filtered from three possible B–P breaks: Mauritania

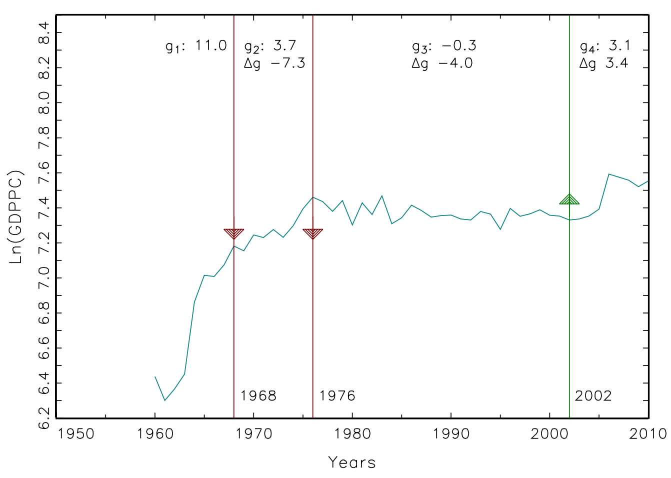


Figure 7: Bai–Perron Identified Break(s) for Mauritania

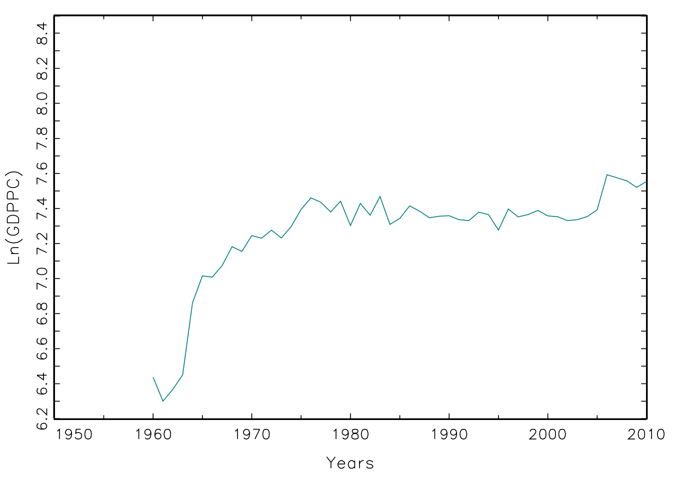
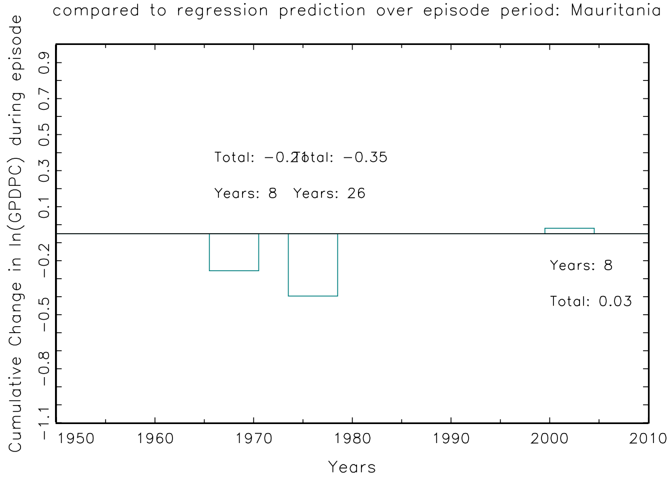


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Mauritania



Mauritius

Figure 5: Single trend for Mauritius

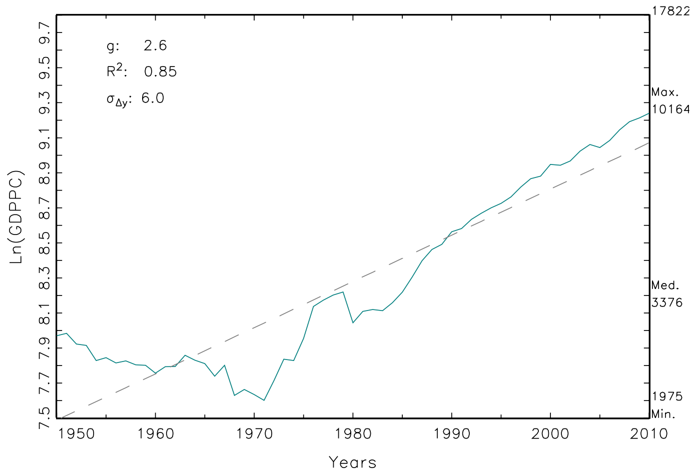


Figure 6: Breaks filtered from four possible B−P breaks: Mauritius

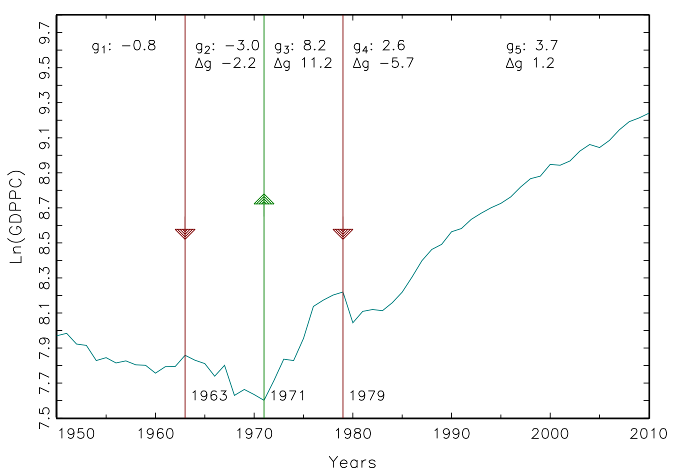


Figure 7: Bai−Perron Identified Break(s) for Mauritius

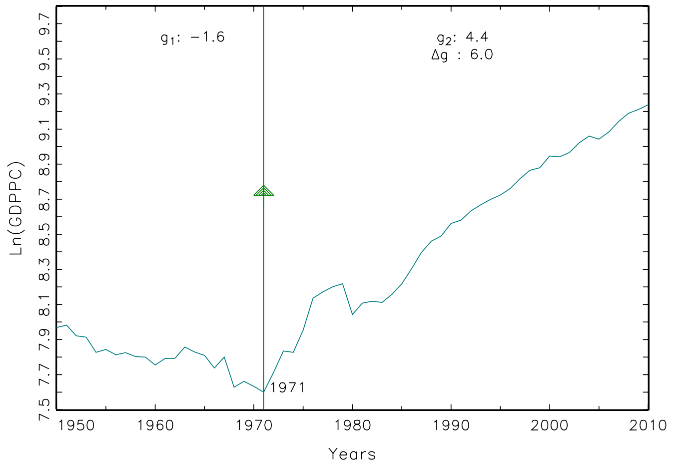
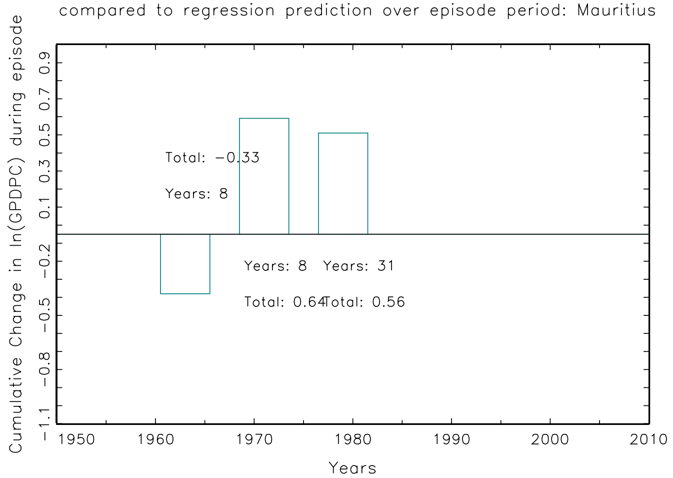


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Mauritius



Mexico

Figure 5: Single trend for Mexico

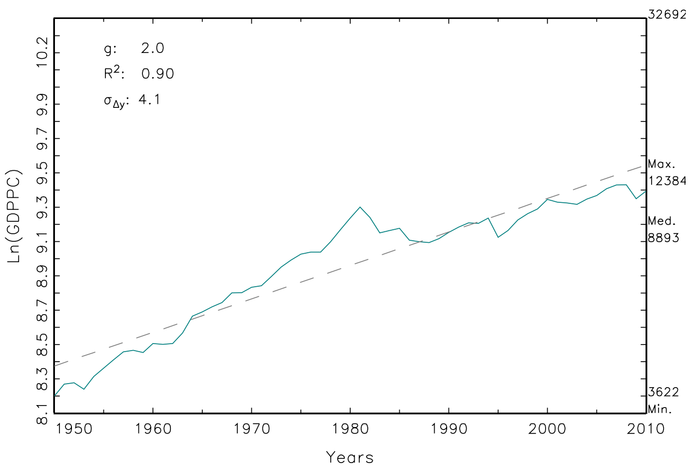


Figure 6: Breaks filtered from four possible B–P breaks: Mexico

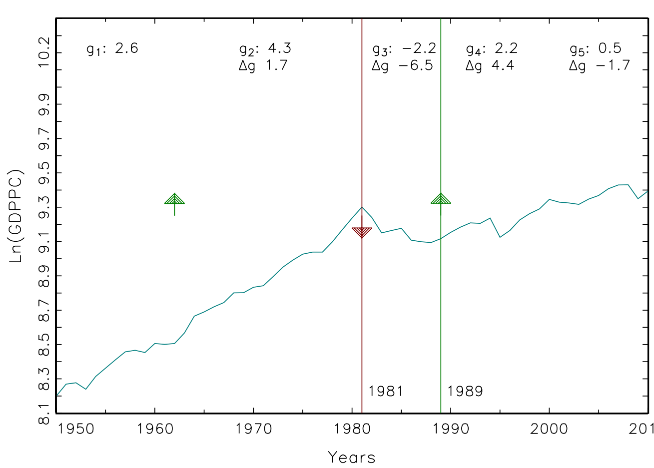


Figure 7: Bai–Perron Identified Break(s) for Mexico

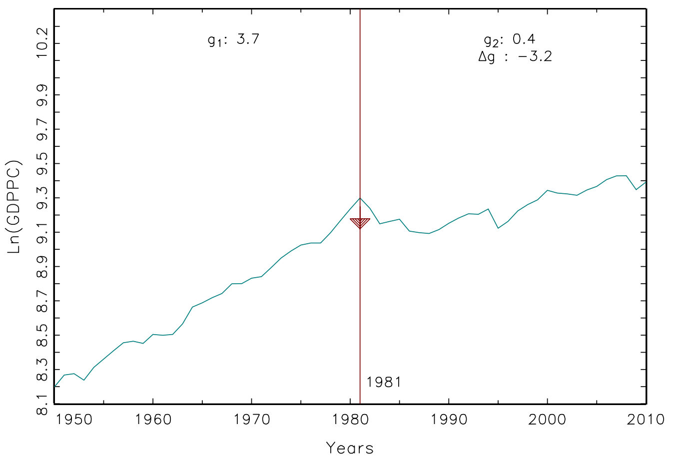
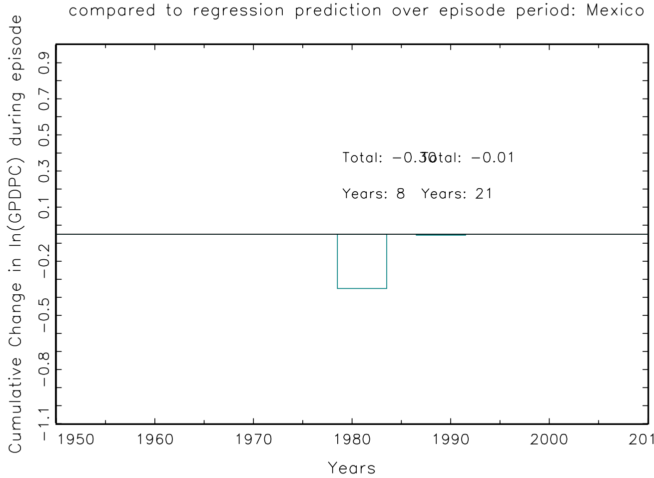


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Mexico



Mongolia

Figure 5: Single trend for Mongolia

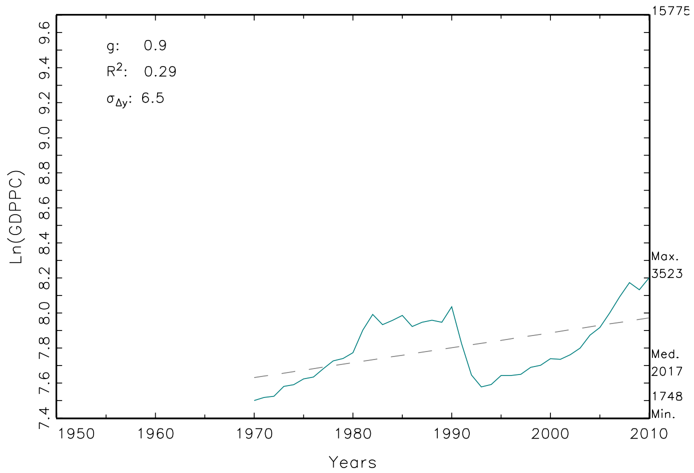


Figure 6: Breaks filtered from two possible B–P breaks: Mongolia

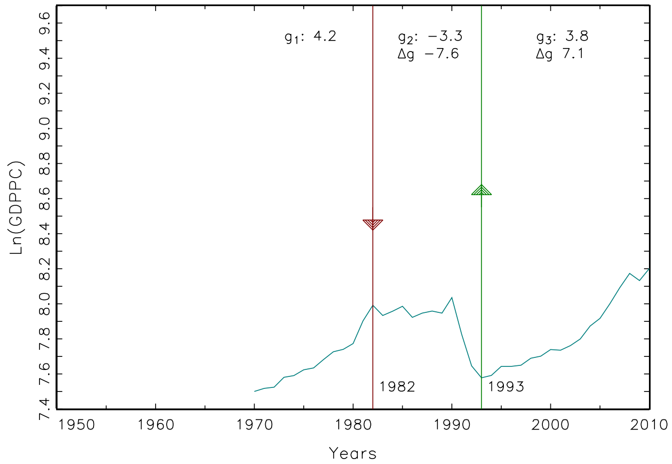


Figure 7: Bai–Perron Identified Break(s) for Mongolia

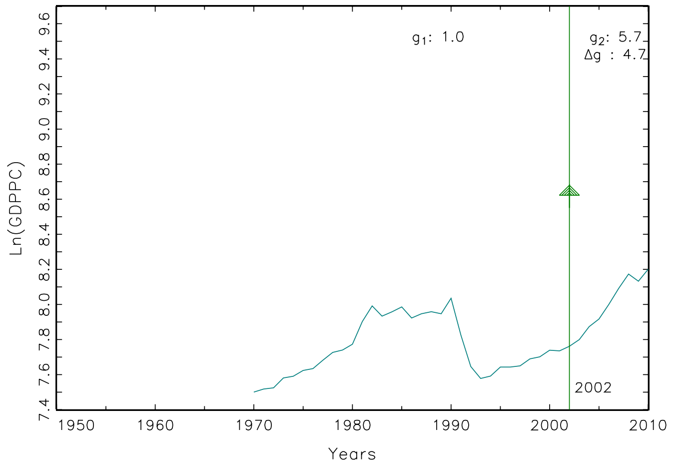
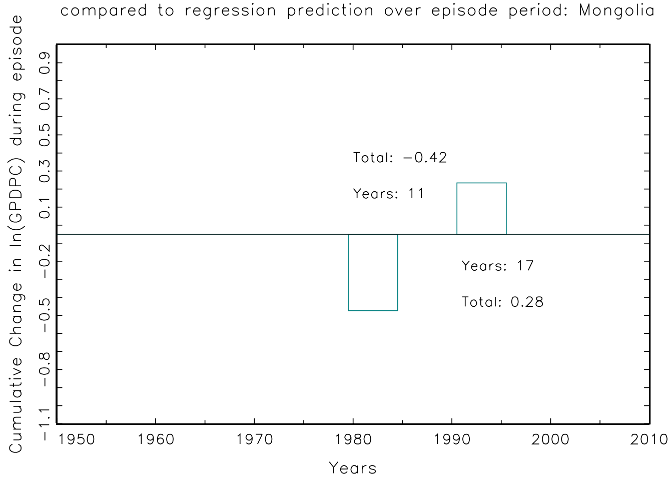


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Mongolia



Morocco

Figure 5: Single trend for Morocco

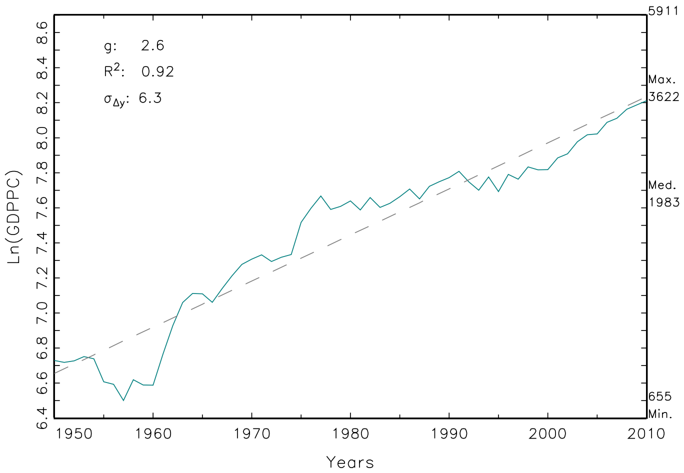


Figure 6: Breaks filtered from four possible B–P breaks: Morocco

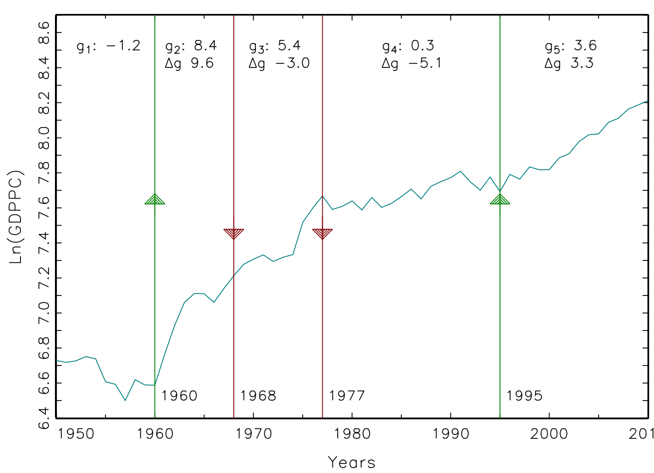


Figure 7: Bai–Perron Identified Break(s) for Morocco

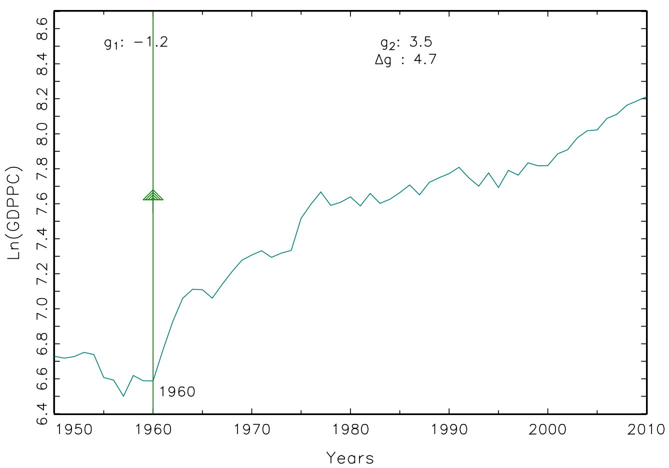
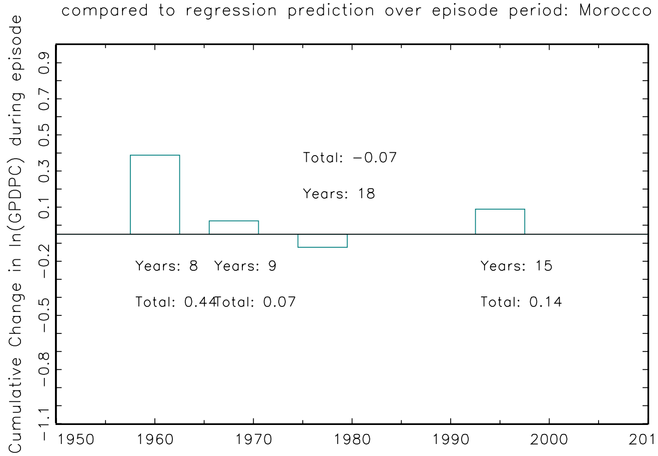


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Morocco



Mozambique

Figure 5: Single trend for Mozambique

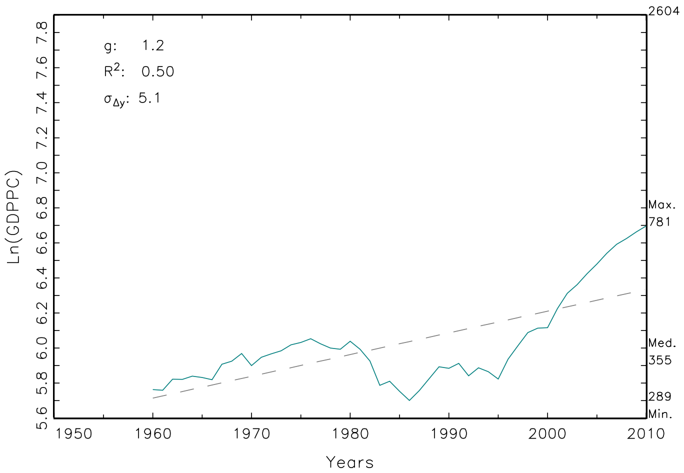


Figure 6: Breaks filtered from three possible B–P breaks: Mozambique

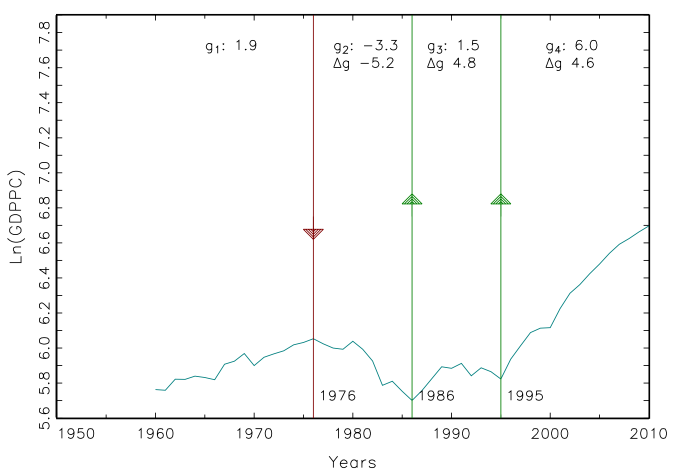


Figure 7: Bai–Perron Identified Break(s) for Mozambique

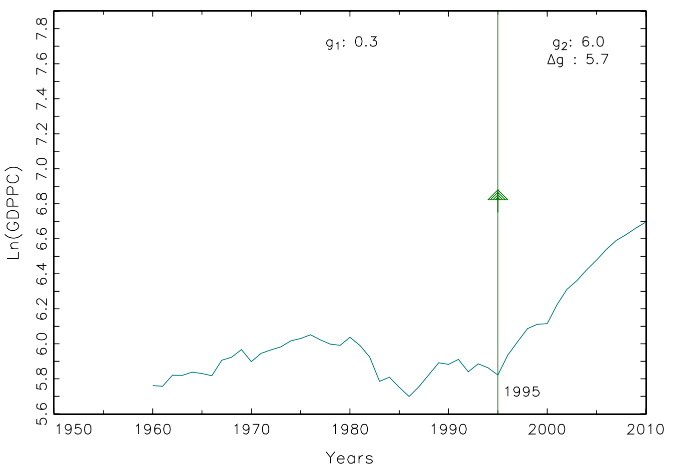
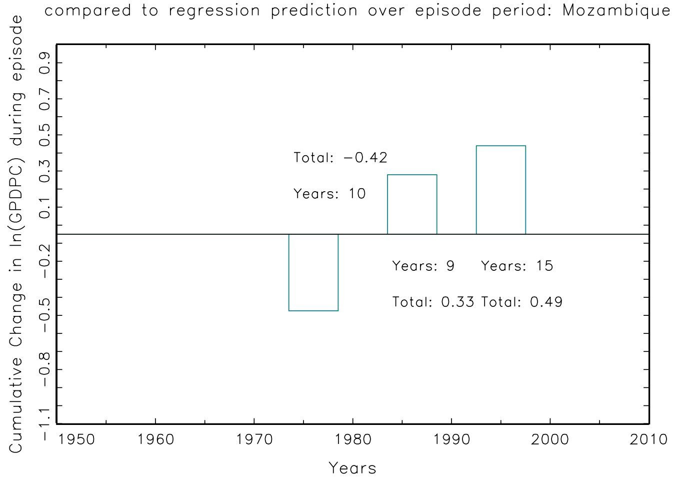


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Mozambique



Namibia

Figure 5: Single trend for Namibia

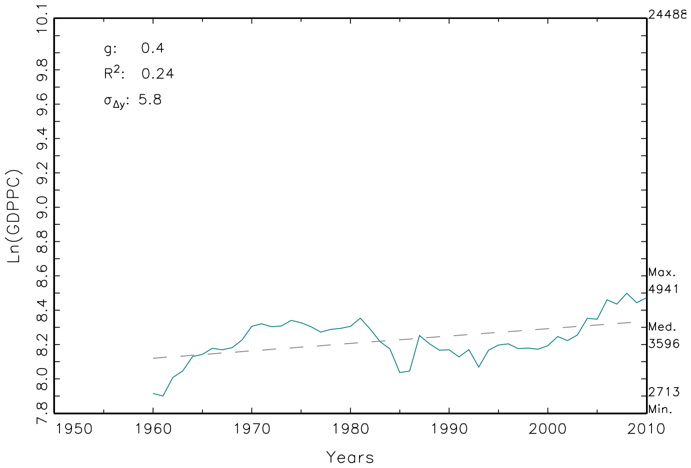


Figure 6: Breaks filtered from three possible B–P breaks: Namibia

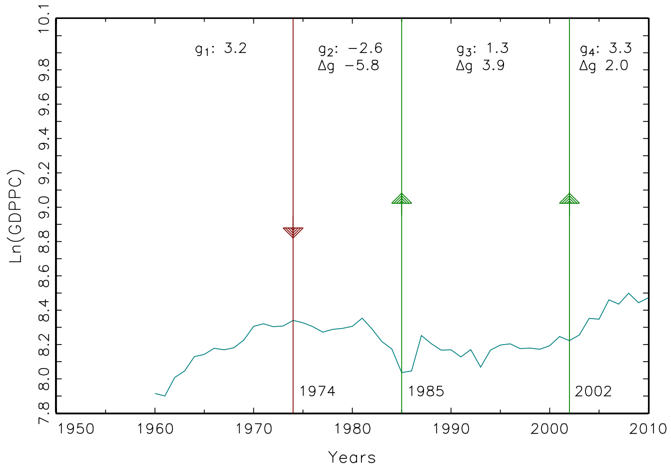


Figure 7: Bai–Perron Identified Break(s) for Namibia

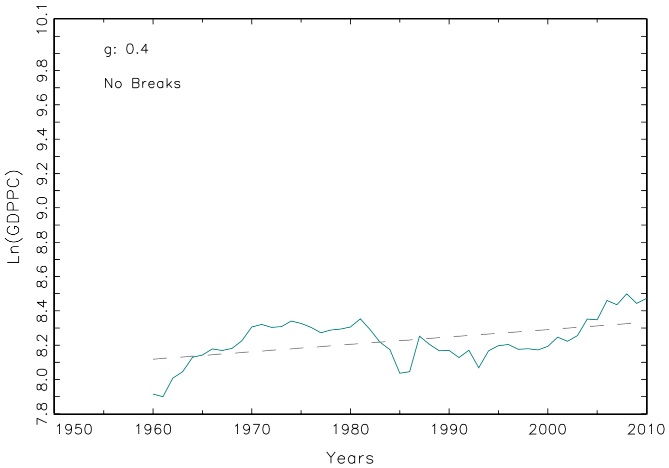
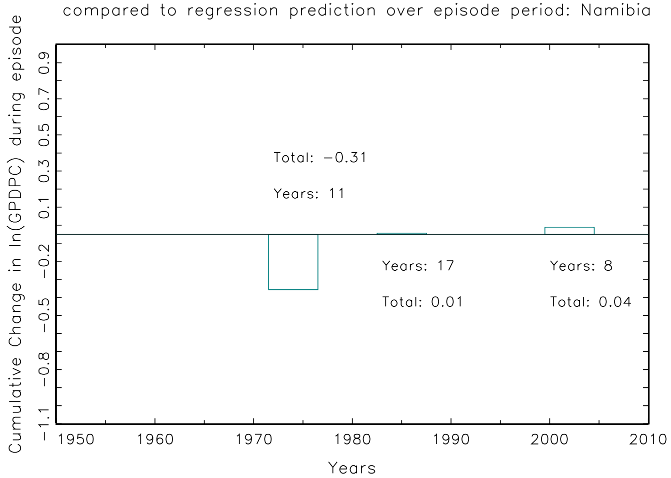


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Namibia



Nepal

Figure 5: Single trend for Nepal

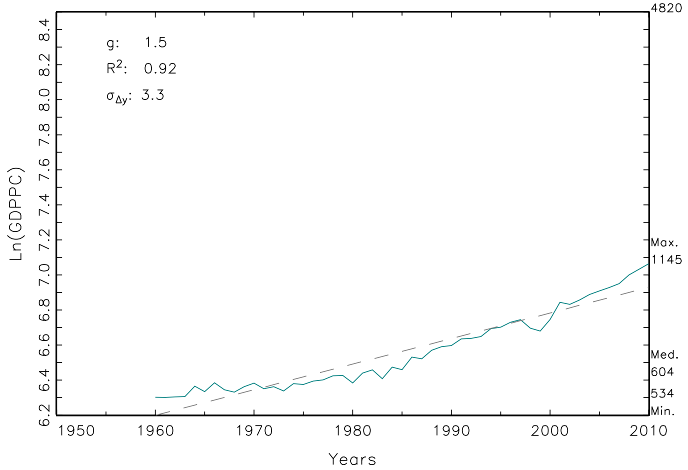


Figure 6: Breaks filtered from three possible B–P breaks: Nepal

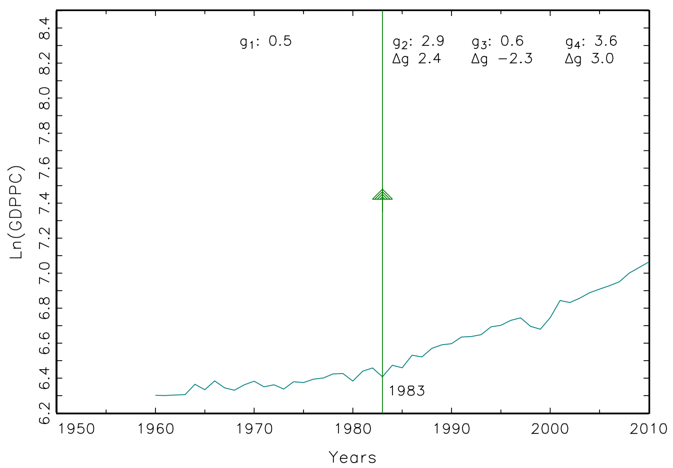


Figure 7: Bai–Perron Identified Break(s) for Nepal

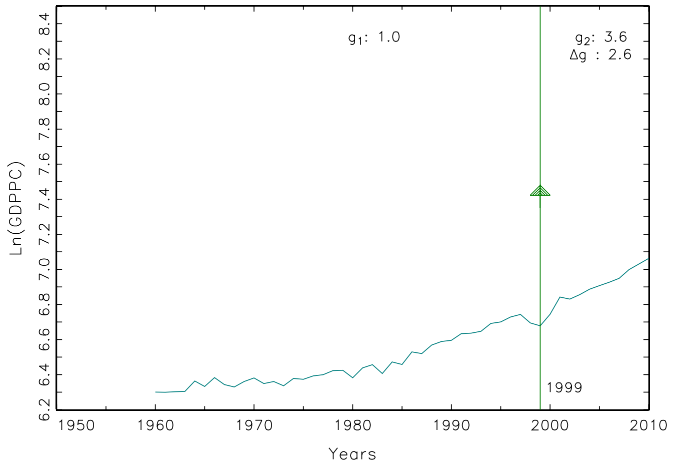
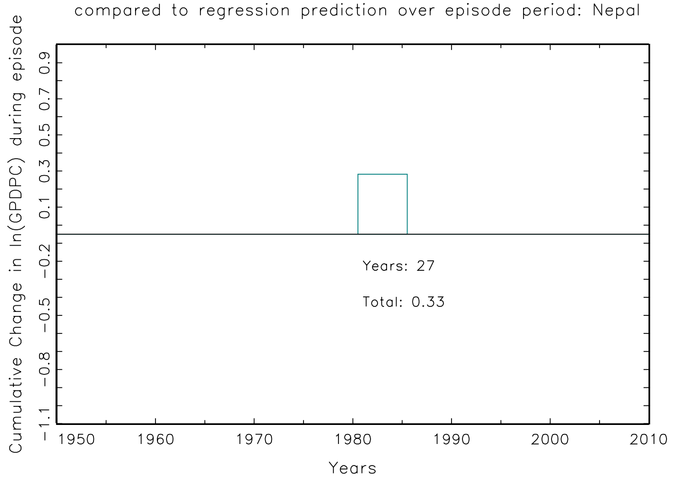


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Nepal



Netherlands

Figure 5: Single trend for Netherlands

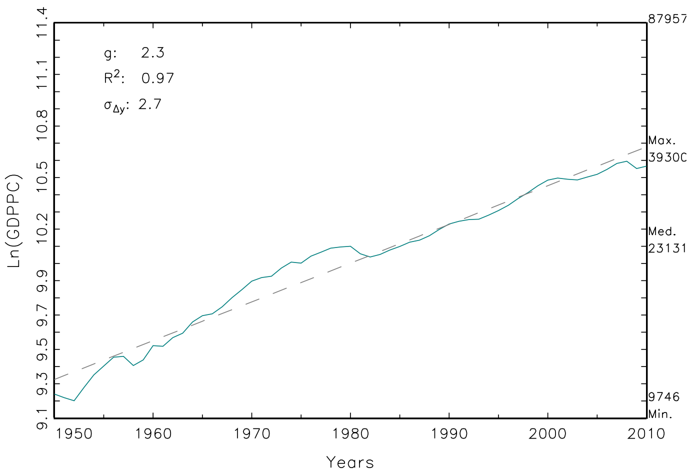


Figure 6: Breaks filtered from four possible B−P breaks: Netherlands

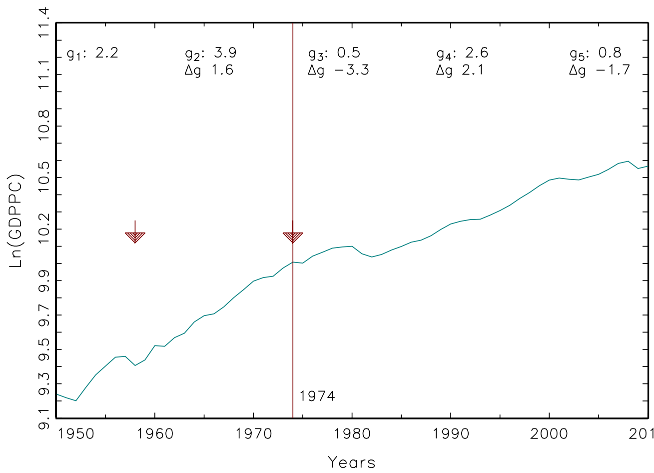


Figure 7: Bai−Perron Identified Break(s) for Netherlands

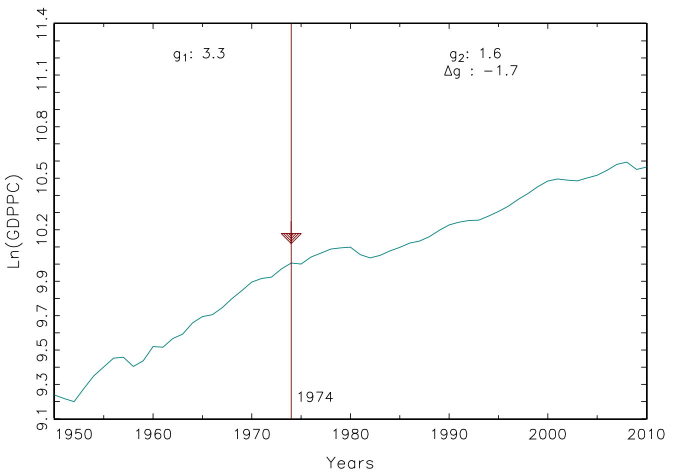
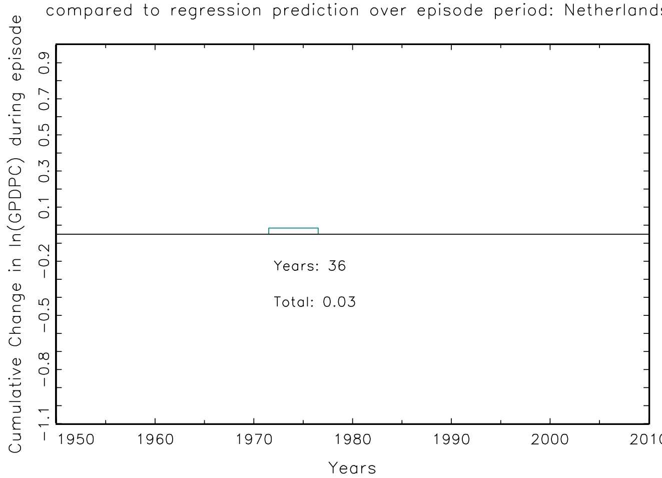


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Netherlands



New Zealand

Figure 5: Single trend for New Zealand

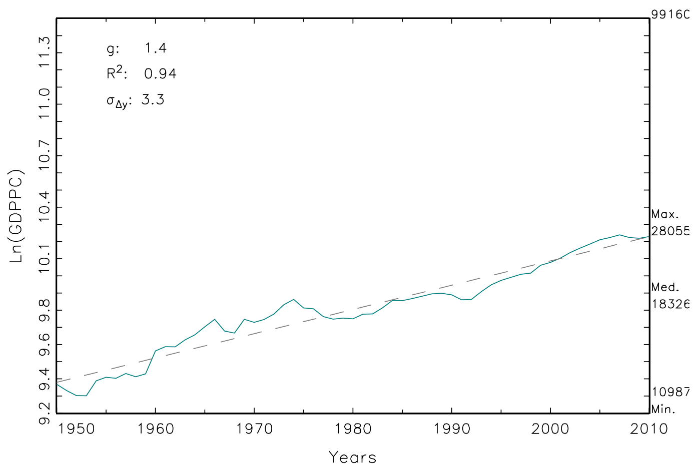


Figure 6: Breaks filtered from four possible B–P breaks: New Zealand

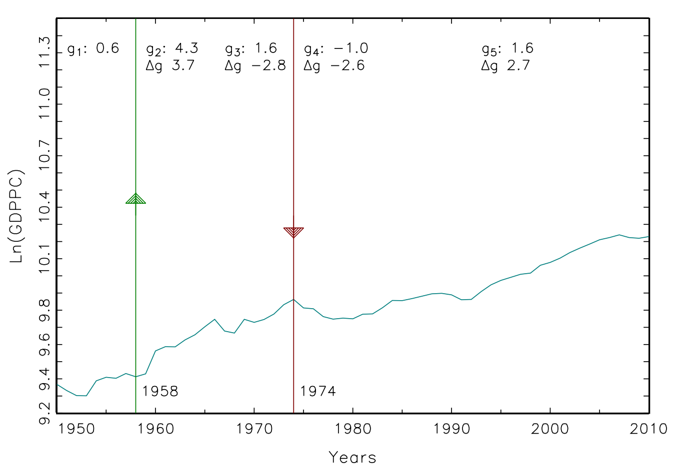


Figure 7: Bai–Perron Identified Break(s) for New Zealand

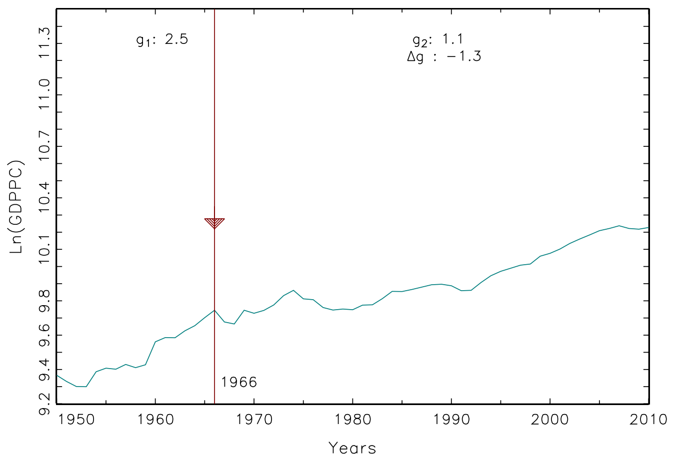
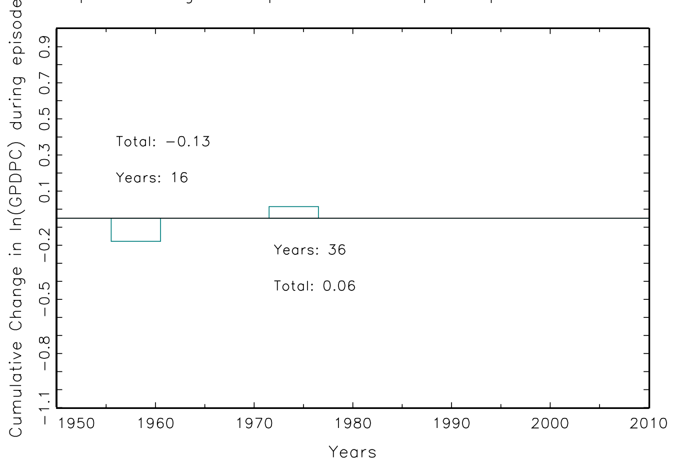


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: New Zealand



Nicaragua

Figure 5: Single trend for Nicaragua

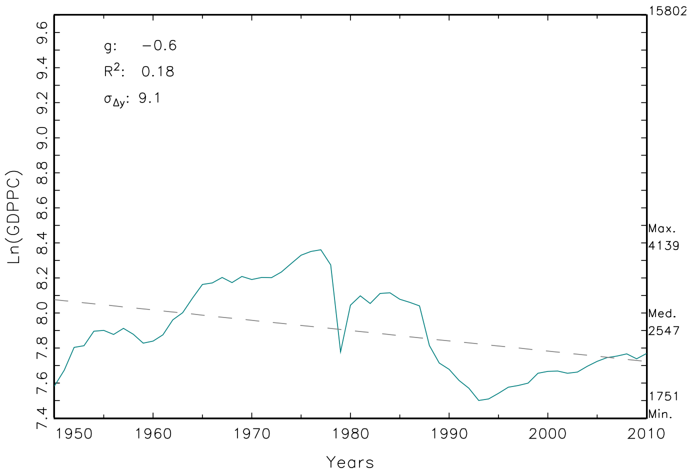


Figure 6: Breaks filtered from four possible B−P breaks: Nicaragua

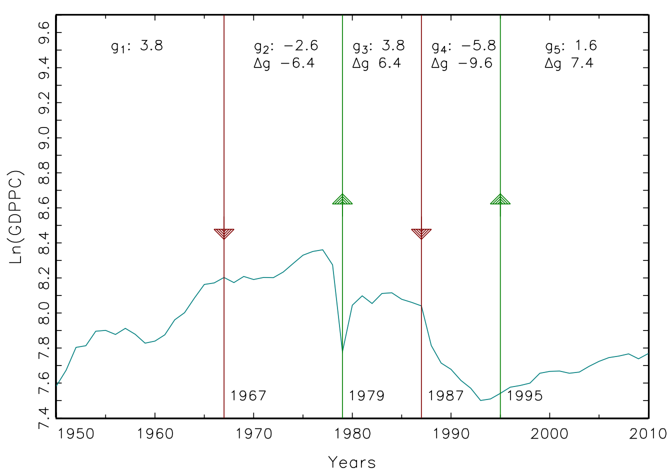


Figure 7: Bai−Perron Identified Break(s) for Nicaragua

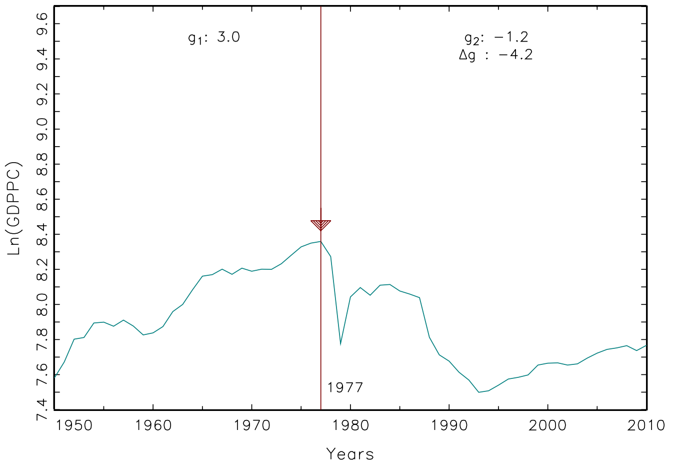
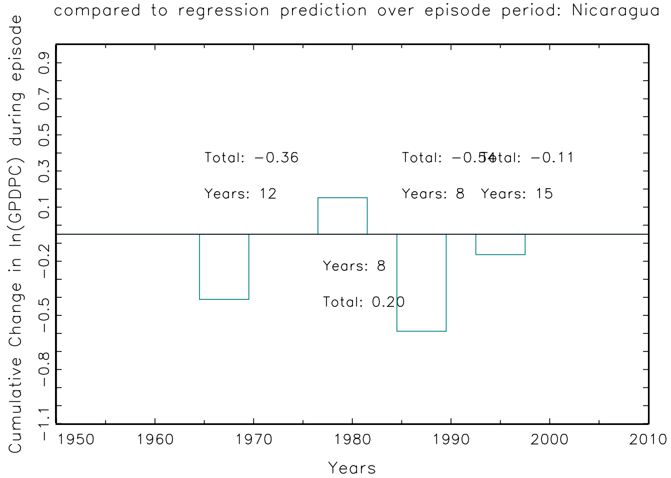


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Nicaragua



Niger

Figure 5: Single trend for Niger

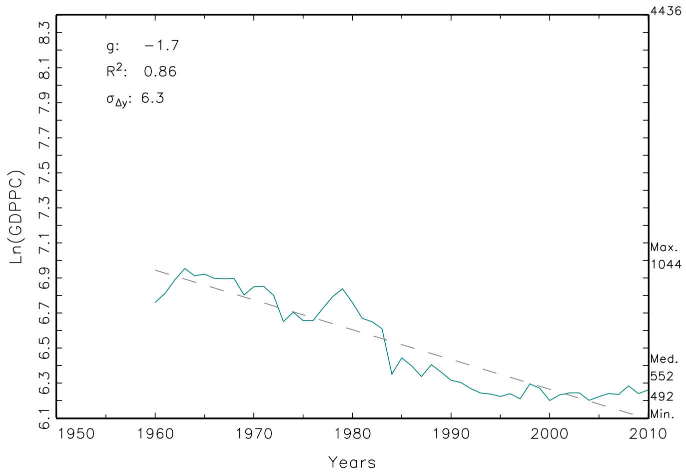


Figure 6: Breaks filtered from three possible B−P breaks: Niger

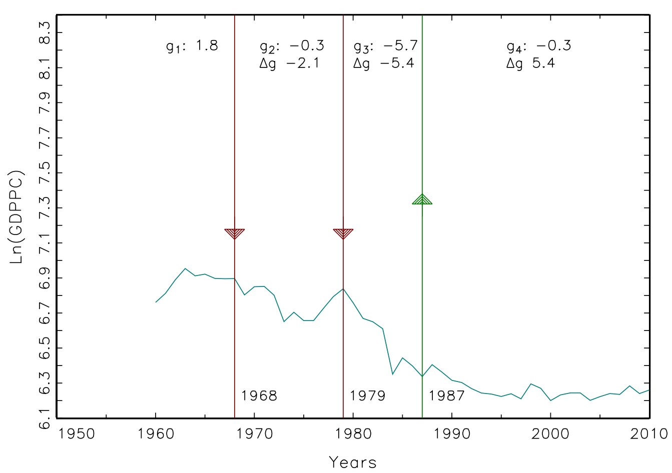


Figure 7: Bai−Perron Identified Break(s) for Niger

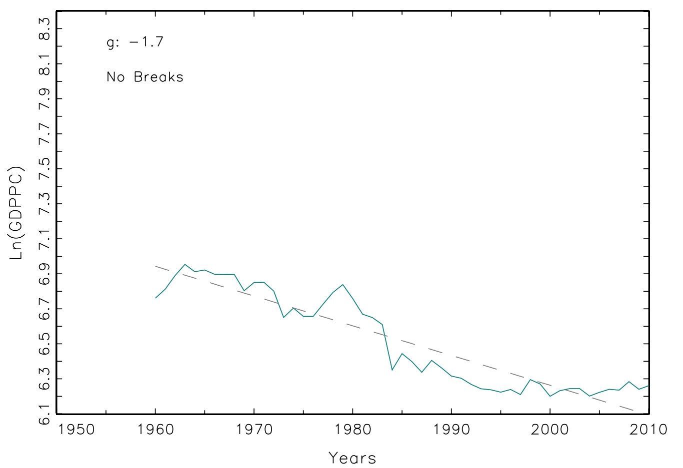
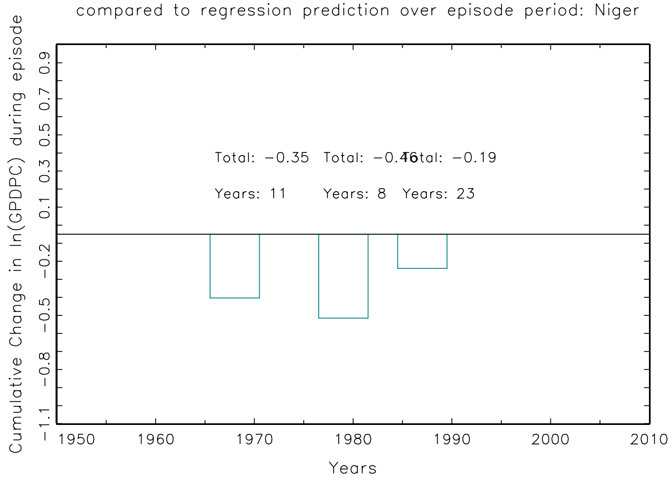


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Niger



Nigeria

Figure 5: Single trend for Nigeria

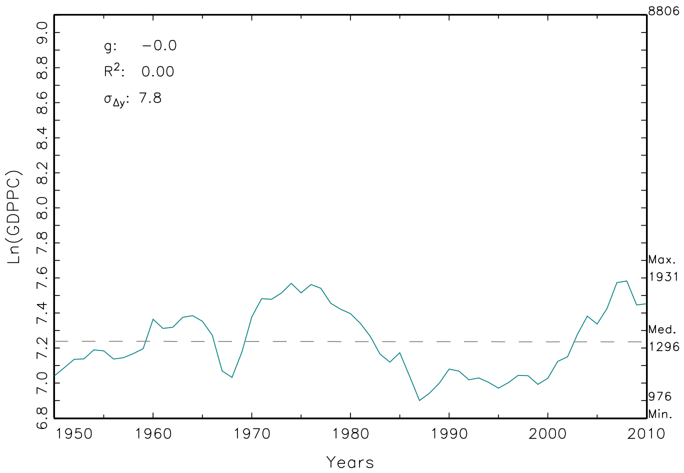


Figure 6: Breaks filtered from four possible B−P breaks: Nigeria

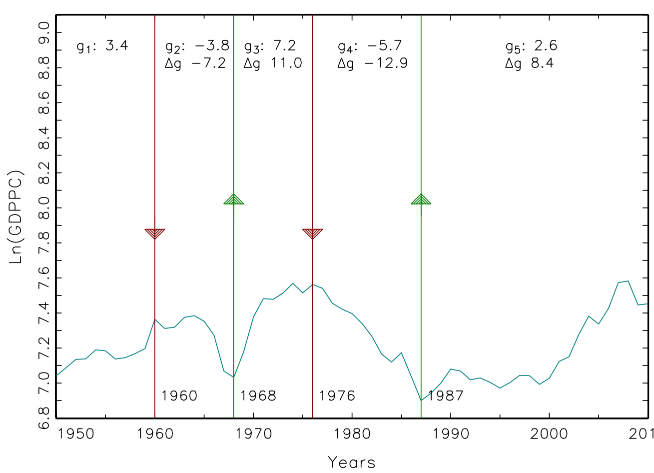


Figure 7: Bai−Perron Identified Break(s) for Nigeria

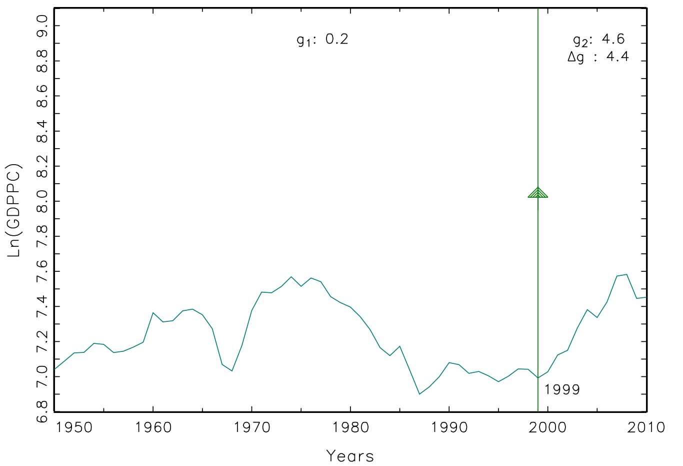
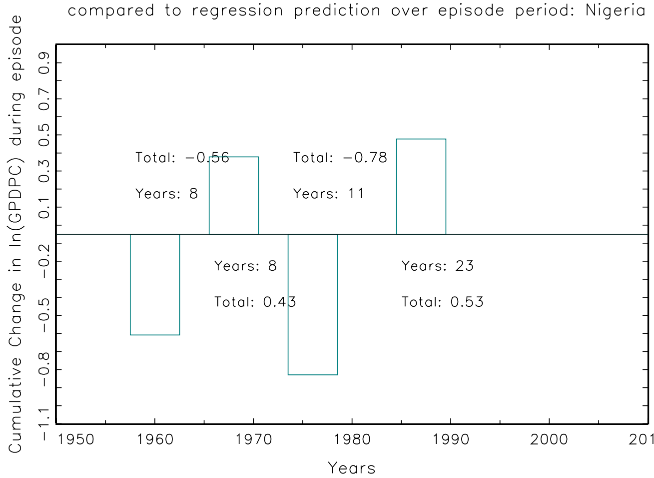


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Nigeria



Norway

Figure 5: Single trend for Norway

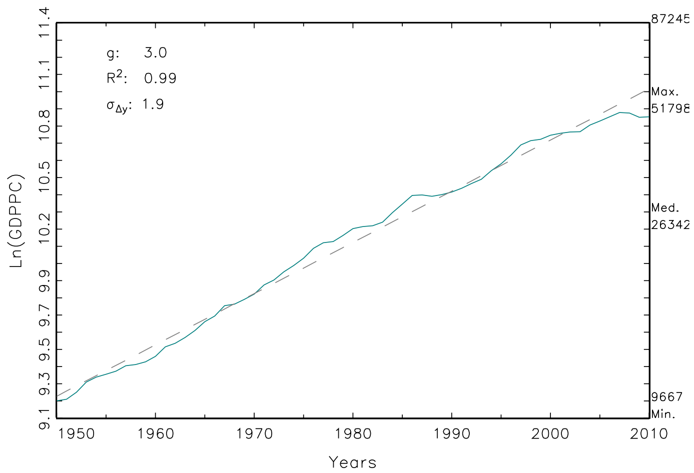


Figure 6: Breaks filtered from four possible B–P breaks: Norway

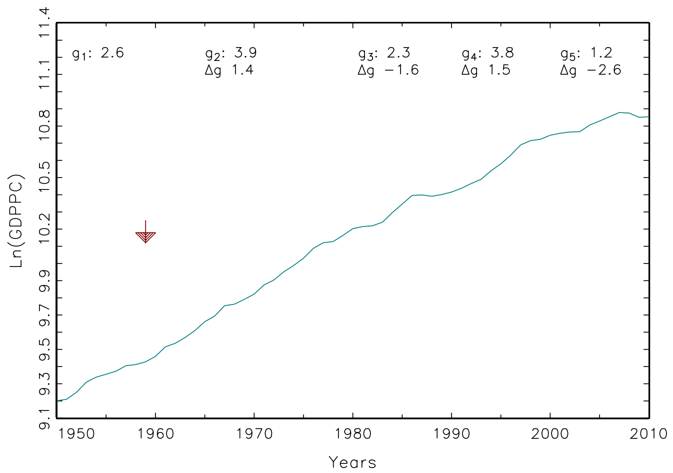


Figure 7: Bai–Perron Identified Break(s) for Norway

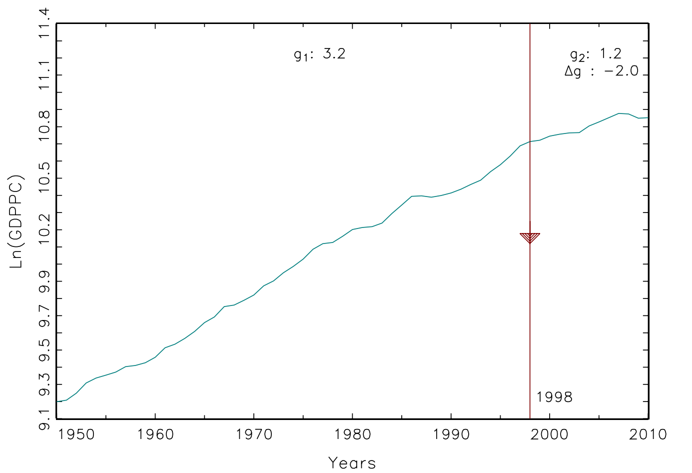
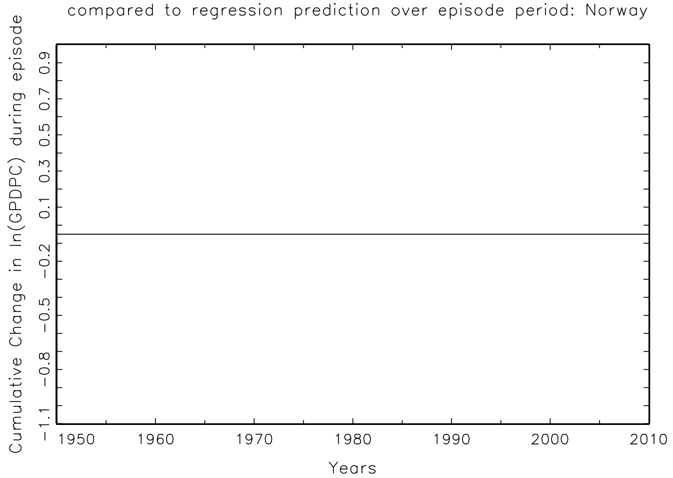


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Norway



Oman

Figure 5: Single trend for Oman

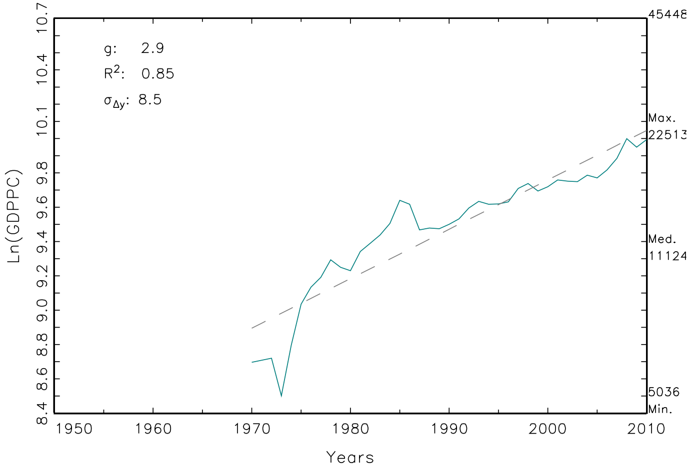


Figure 6: Breaks filtered from two possible B–P breaks: Oman

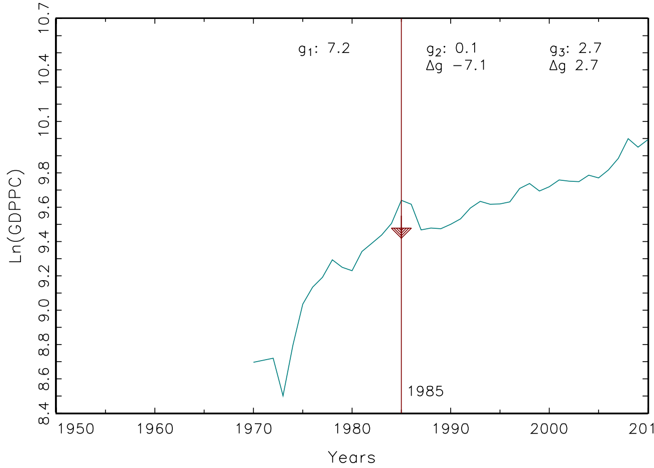


Figure 7: Bai–Perron Identified Break(s) for Oman

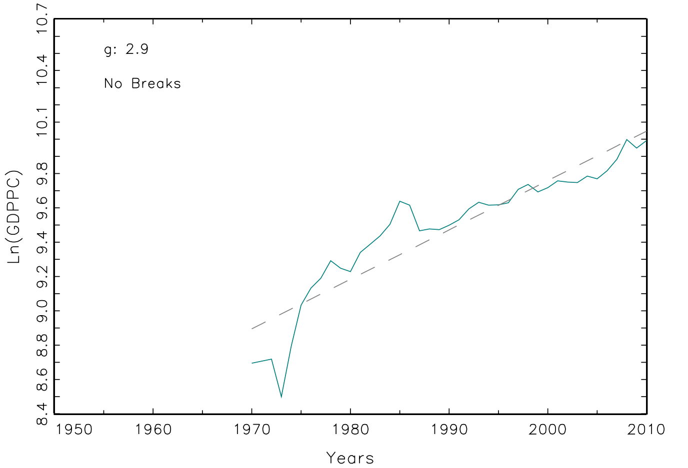
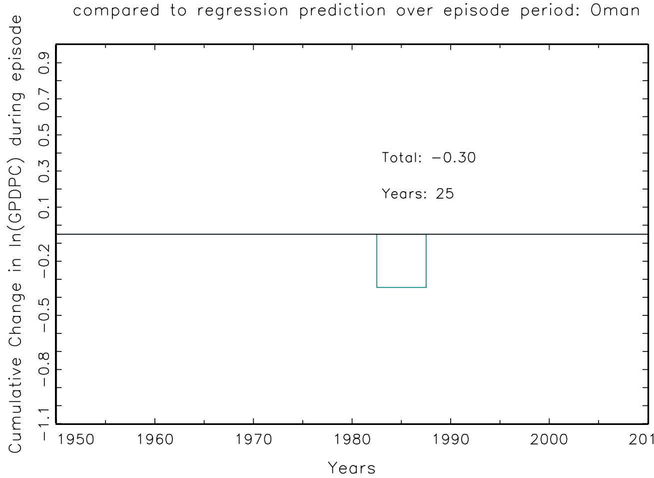


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Oman



Pakistan

Figure 5: Single trend for Pakistan

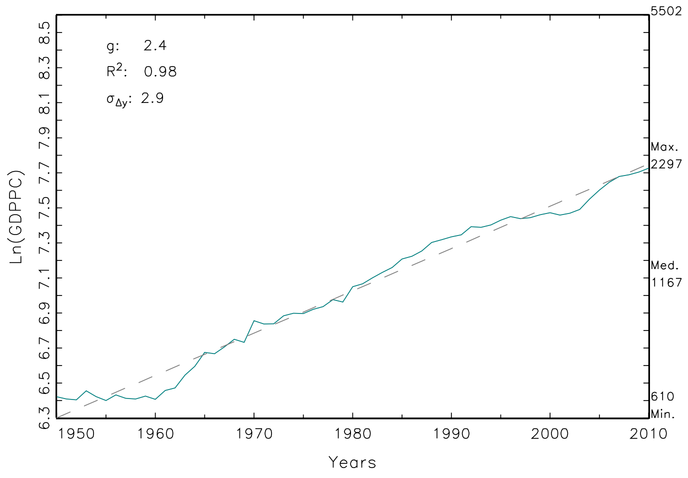


Figure 6: Breaks filtered from four possible B–P breaks: Pakistan

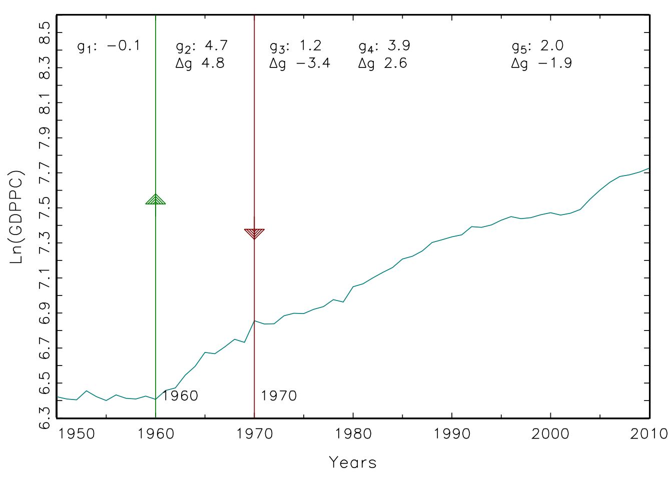


Figure 7: Bai–Perron Identified Break(s) for Pakistan

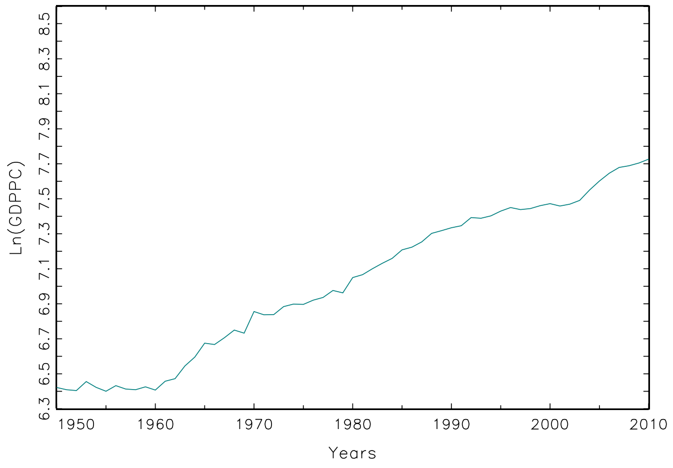
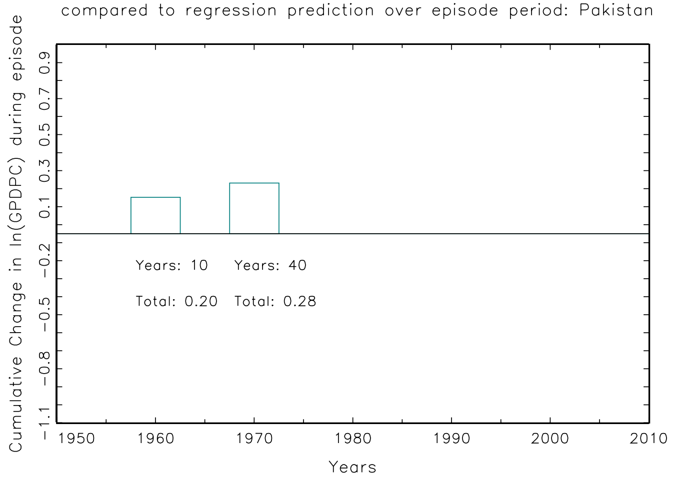


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Pakistan



Panama

Figure 5: Single trend for Panama

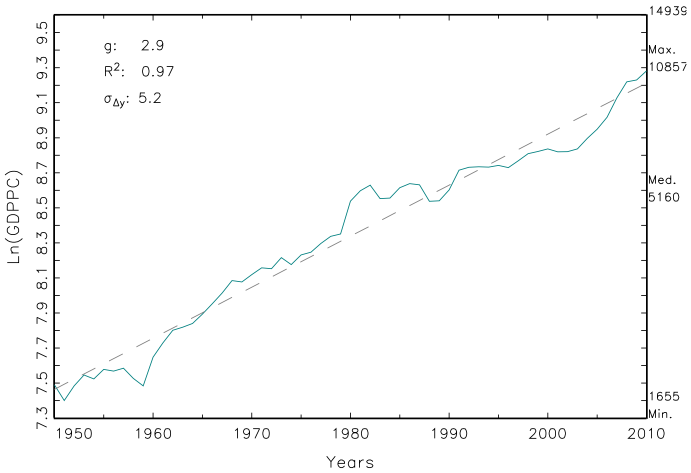


Figure 6: Breaks filtered from four possible B–P breaks: Panama

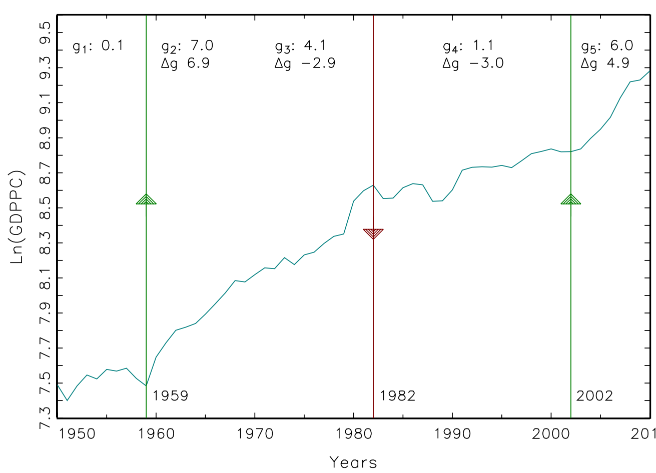


Figure 7: Bai–Perron Identified Break(s) for Panama

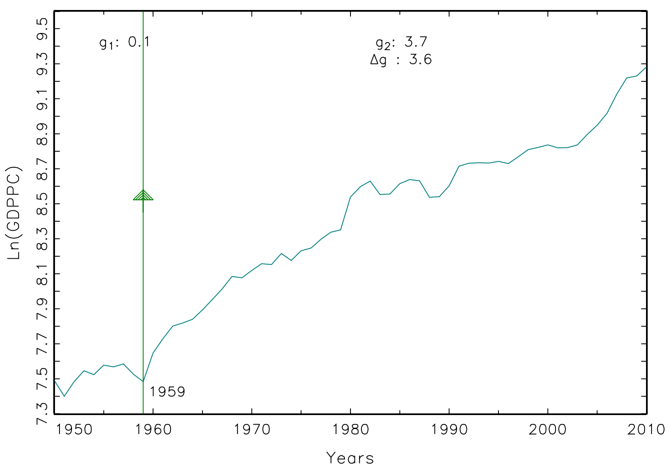
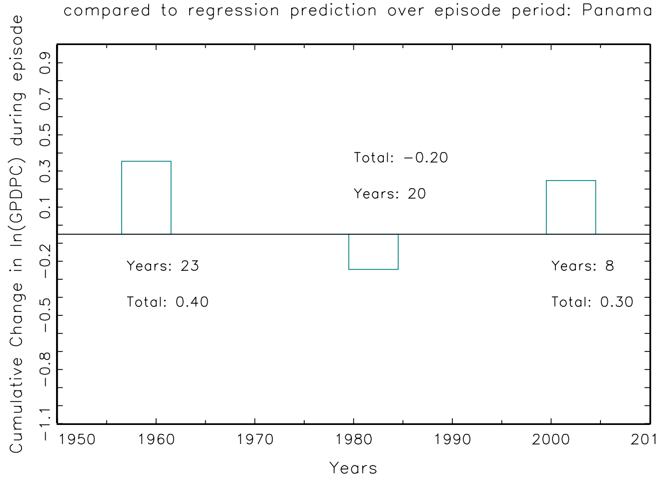


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Panama



Papua New Guinea

Figure 5: Single trend for Papua New Guinea

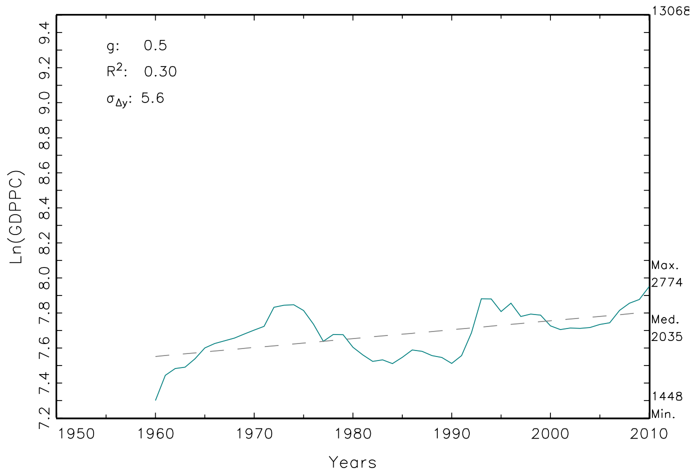


Figure 6: Breaks filtered from three possible B–P breaks: Papua New Guin

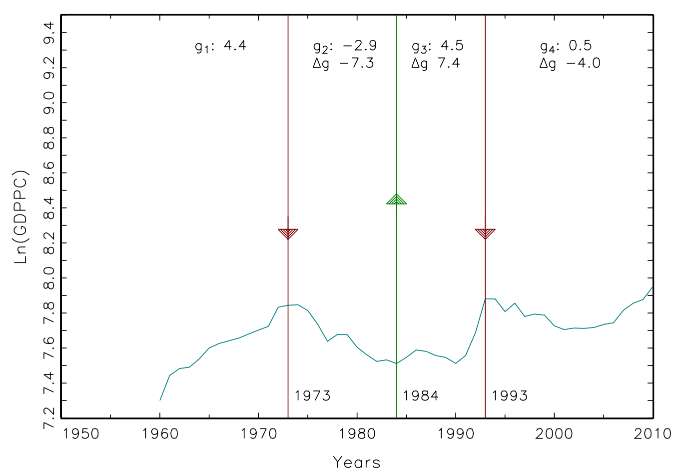


Figure 7: Bai–Perron Identified Break(s) for Papua New Guinea

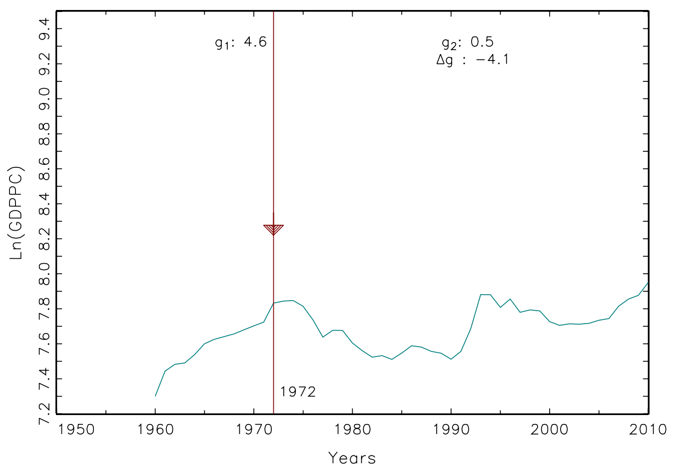
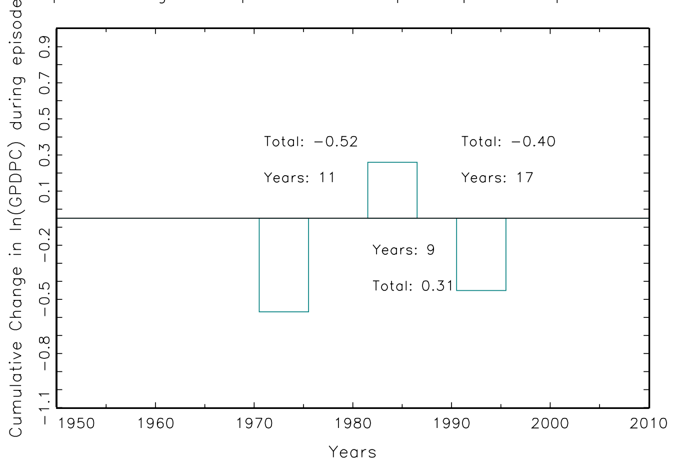


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Papua New Guine



Paraguay

Figure 5: Single trend for Paraguay

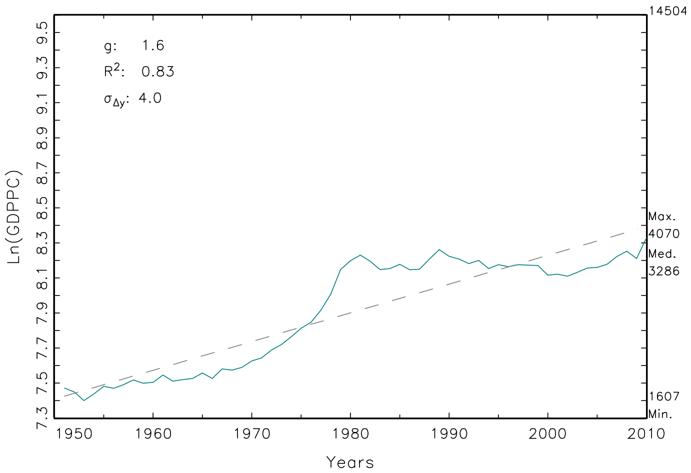


Figure 6: Breaks filtered from four possible B–P breaks: Paraguay

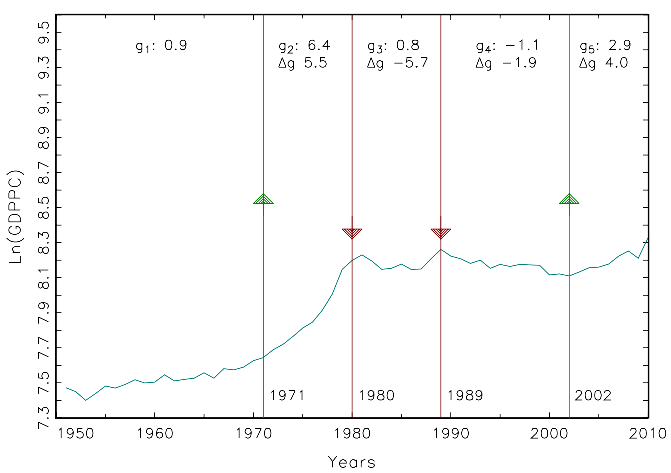


Figure 7: Bai–Perron Identified Break(s) for Paraguay

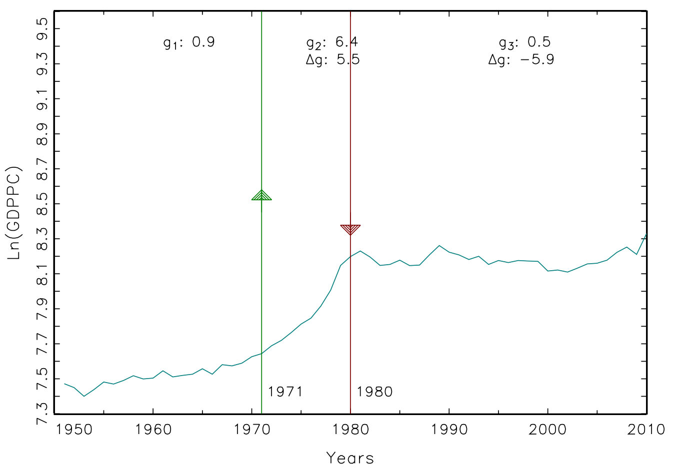
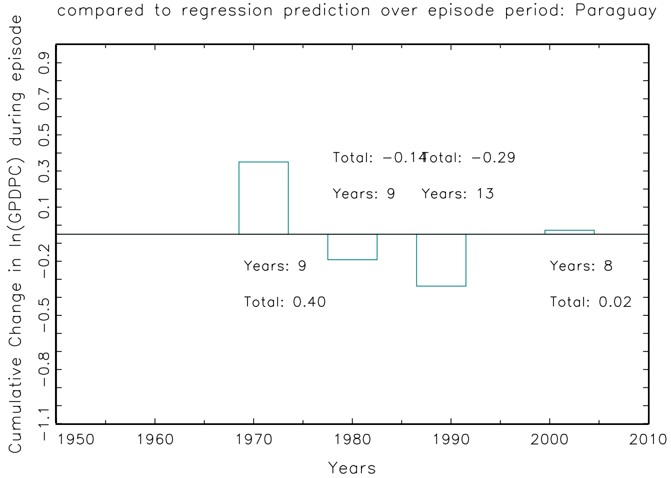


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Paraguay



Peru

Figure 5: Single trend for Peru

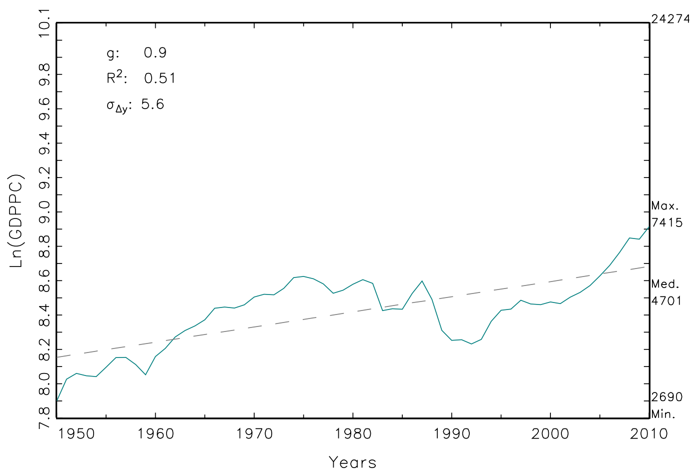


Figure 6: Breaks filtered from four possible B−P breaks: Peru

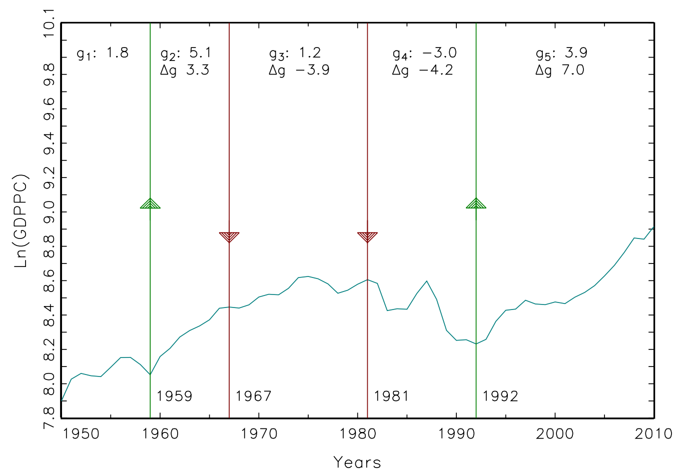


Figure 7: Bai−Perron Identified Break(s) for Peru

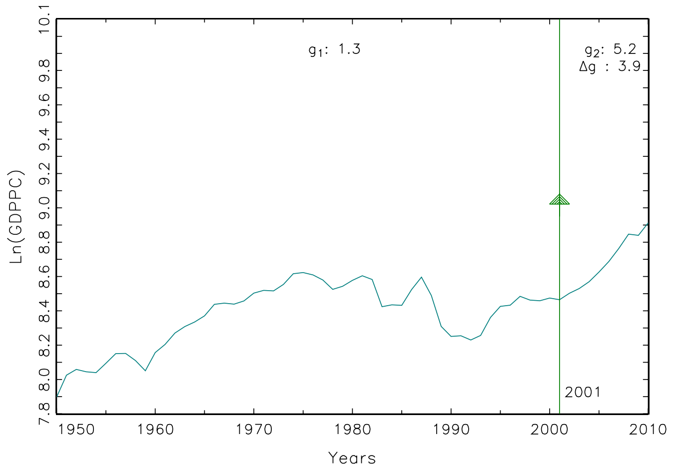
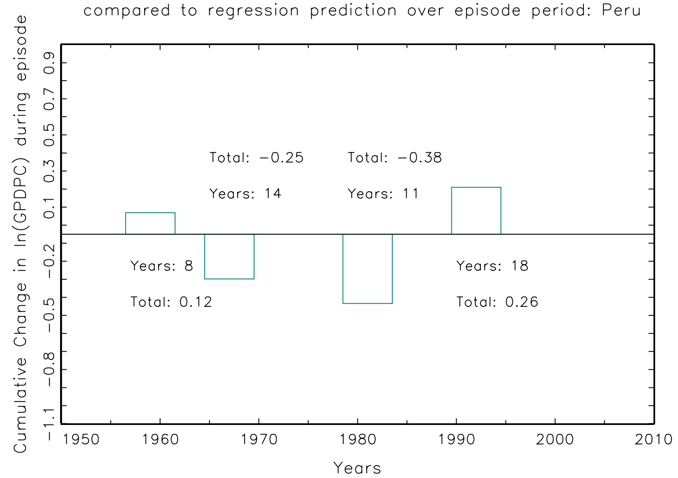


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Peru



Philippines

Figure 5: Single trend for Philippines

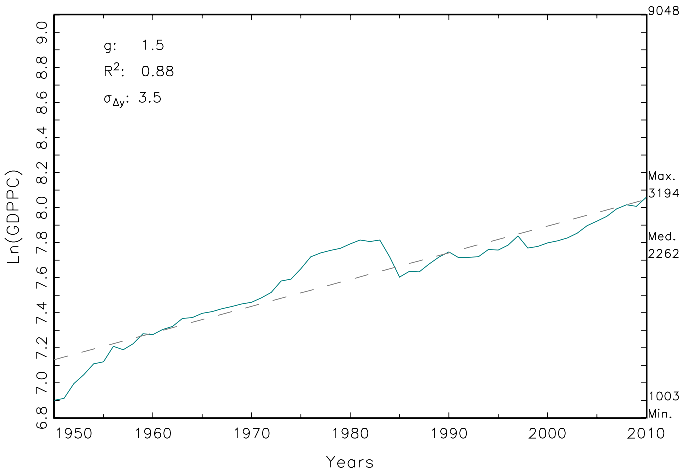


Figure 6: Breaks filtered from four possible B–P breaks: Philippines

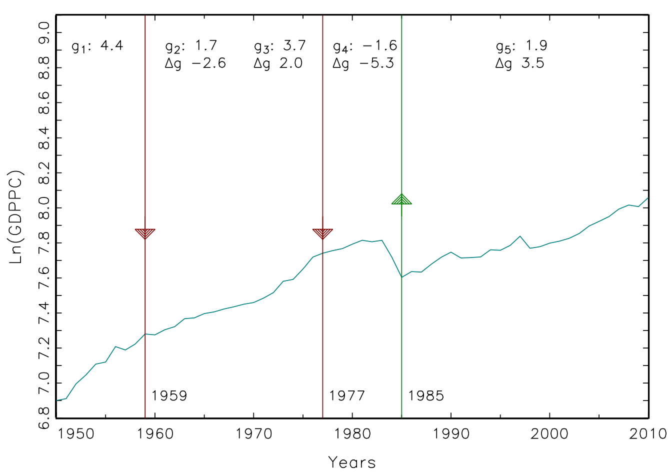


Figure 7: Bai–Perron Identified Break(s) for Philippines

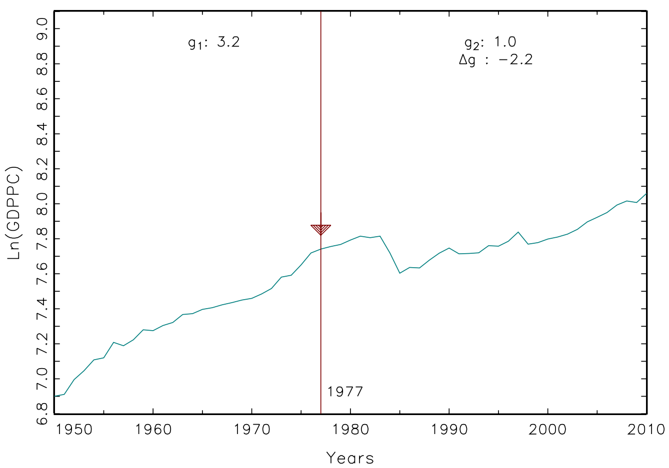
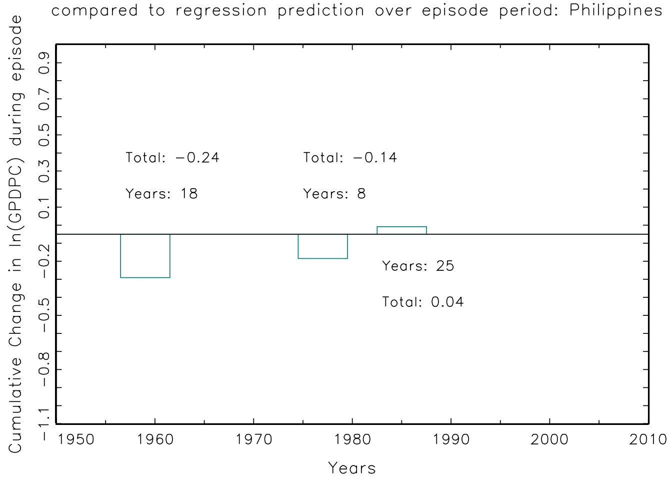


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Philippines



Poland

Figure 5: Single trend for Poland

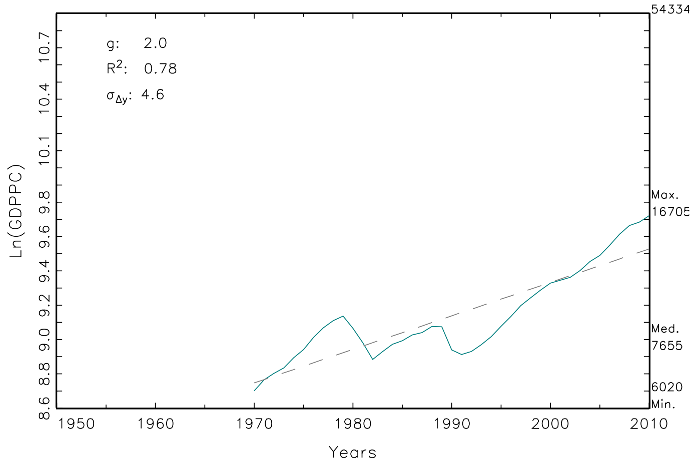


Figure 6: Breaks filtered from two possible B–P breaks: Poland

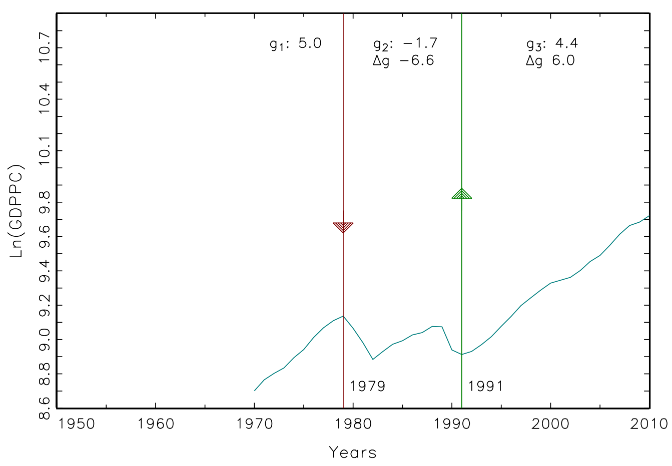


Figure 7: Bai–Perron Identified Break(s) for Poland

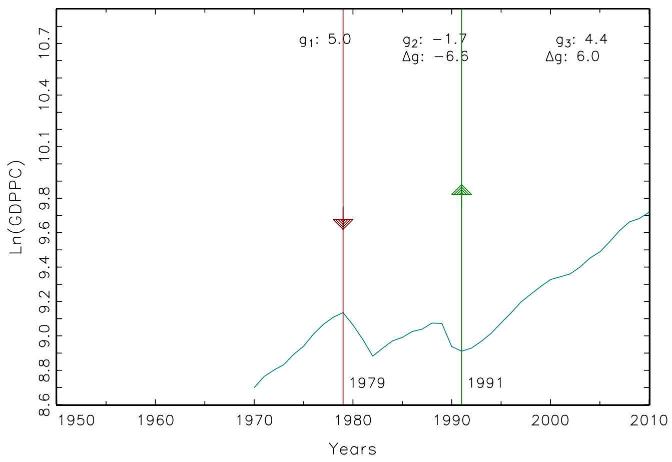
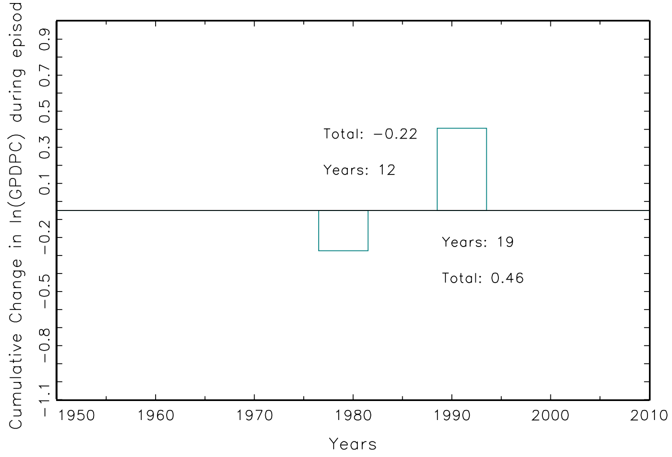


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Poland



Portugal

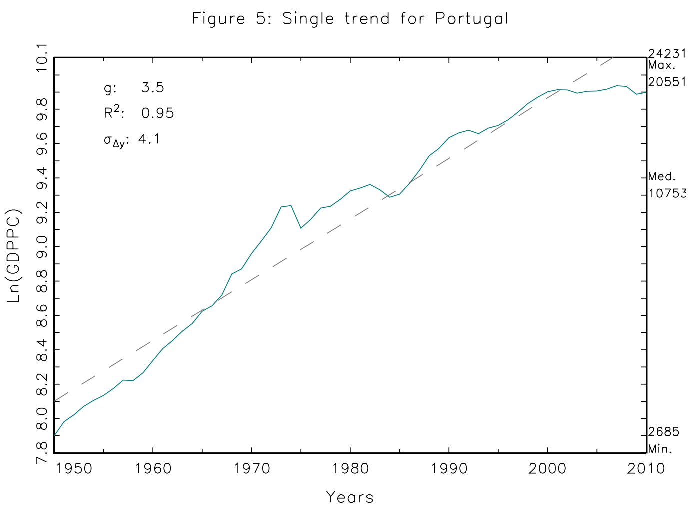


Figure 5: Single trend for Portugal
g: 3.5
R2: 0.95
σΔy: 4.1
24231
Max.
20551
Med.
10753
2685
Min.
Ln(GDPPC)
Years

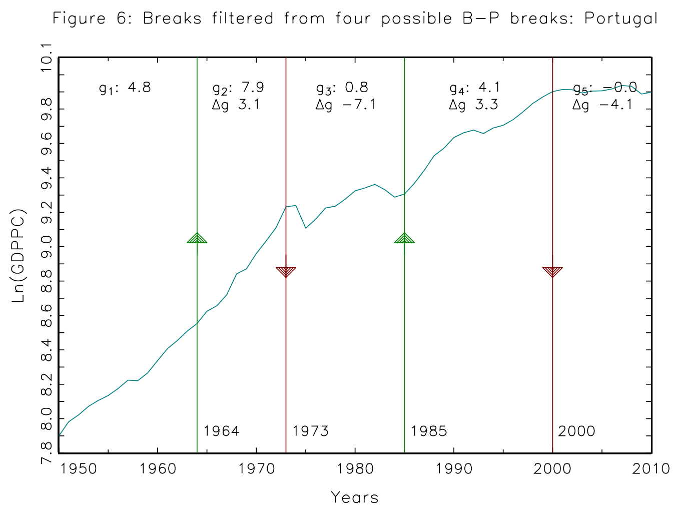


Figure 6: Breaks filtered from four possible B−P breaks: Portugal
g1: 4.8
g2: 7.9
Δg 3.1
g3: 0.8
Δg −7.1
g4: 4.1
Δg 3.3
g5: −0.0
Δg −4.1
1964
1973
1985
2000
Ln(GDPPC)
Years

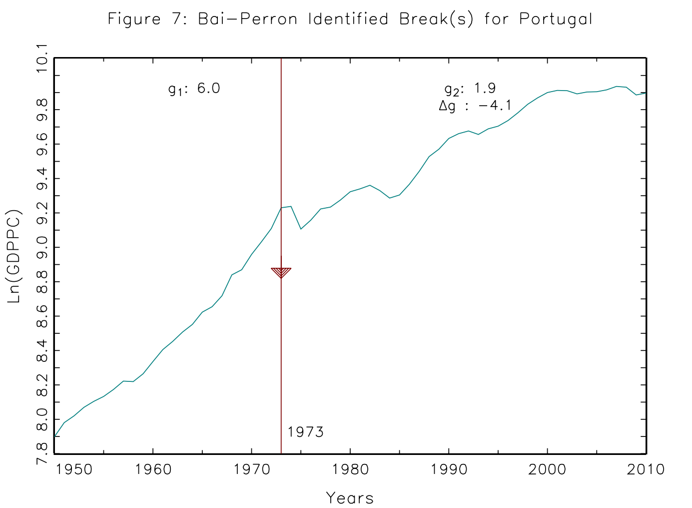


Figure 7: Bai−Perron Identified Break(s) for Portugal
g1: 6.0
g2: 1.9
Δg : −4.1
1973
Ln(GDPPC)
Years

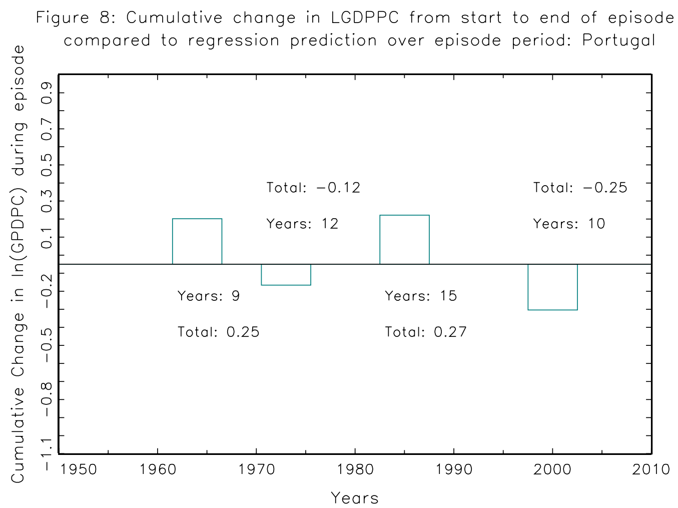


Figure 8: Cumulative change in LGDPPC from start to end of episode
compared to regression prediction over episode period: Portugal
Total: −0.12
Years: 12
Total: −0.25
Years: 10
Years: 9
Total: 0.25
Years: 15
Total: 0.27
Cumulative Change in ln(GPDPC) during episode
Years

Puerto Rico

Figure 5: Single trend for Puerto Rico

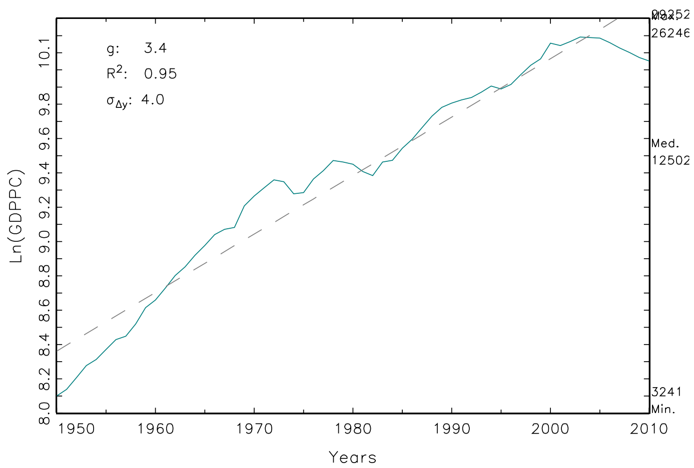


Figure 6: Breaks filtered from four possible B−P breaks: Puerto Rico

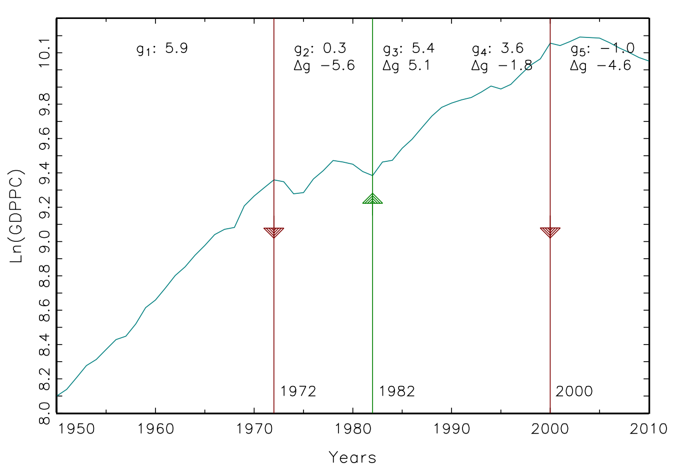


Figure 7: Bai−Perron Identified Break(s) for Puerto Rico

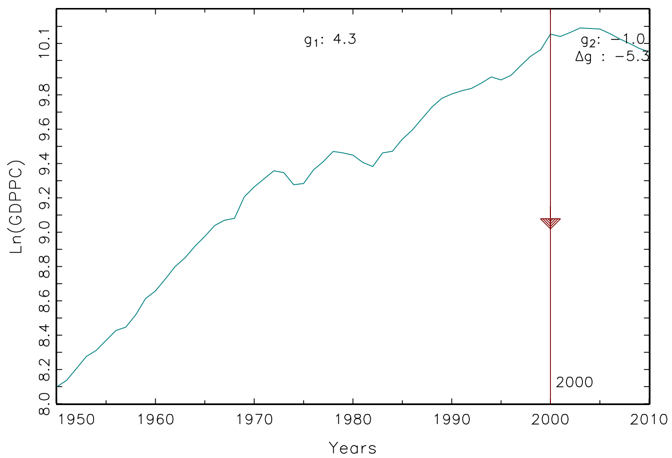
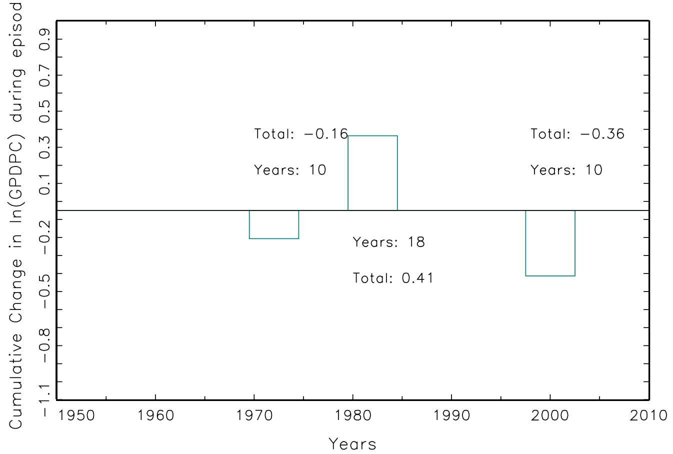


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Puerto Rico



Romania

Figure 5: Single trend for Romania

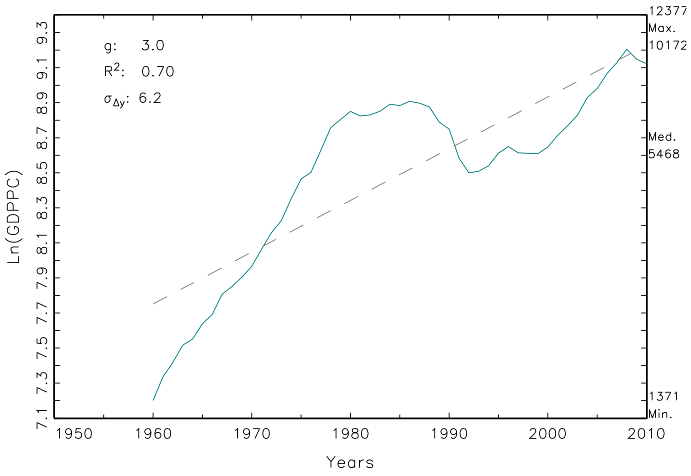


Figure 6: Breaks filtered from three possible B–P breaks: Romania

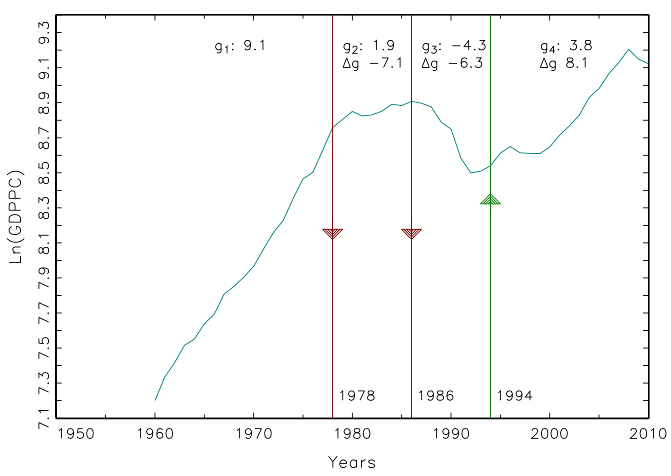


Figure 7: Bai–Perron Identified Break(s) for Romania

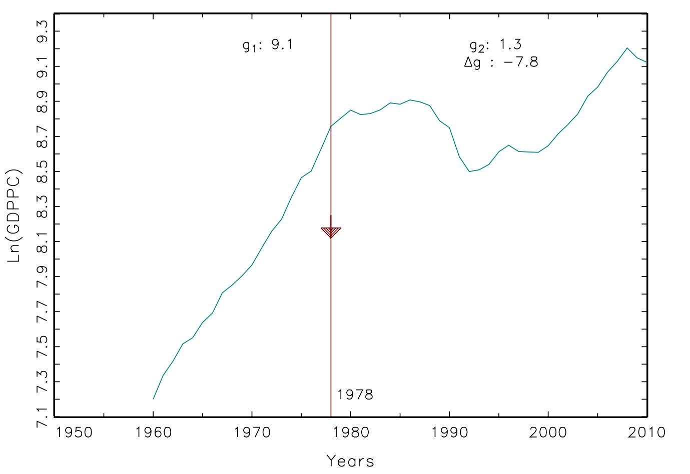
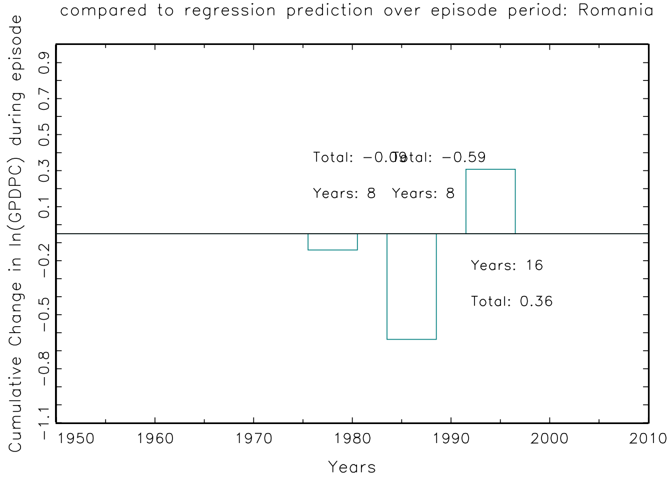


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Romania



Rwanda

Figure 5: Single trend for Rwanda

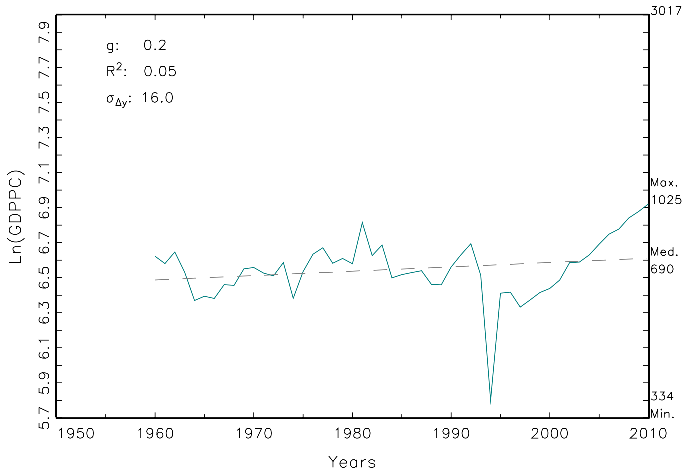


Figure 6: Breaks filtered from three possible B–P breaks: Rwanda

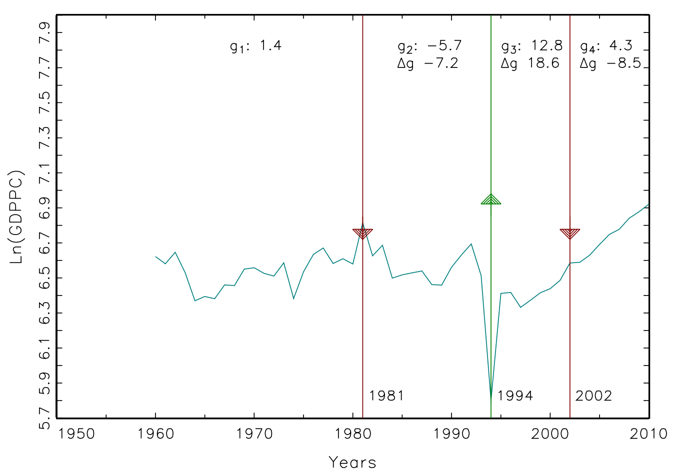


Figure 7: Bai–Perron Identified Break(s) for Rwanda

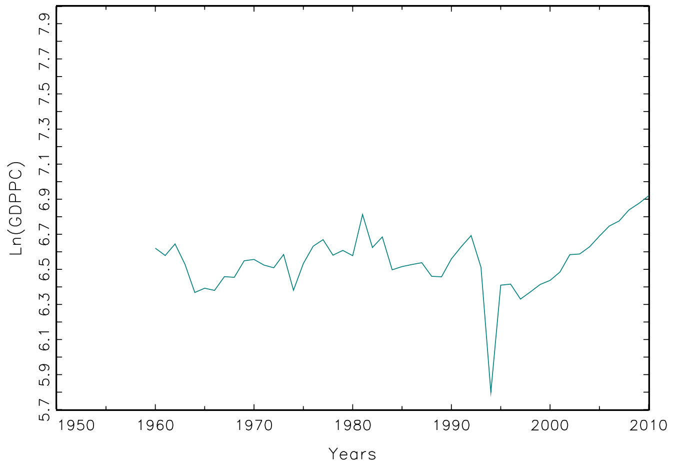
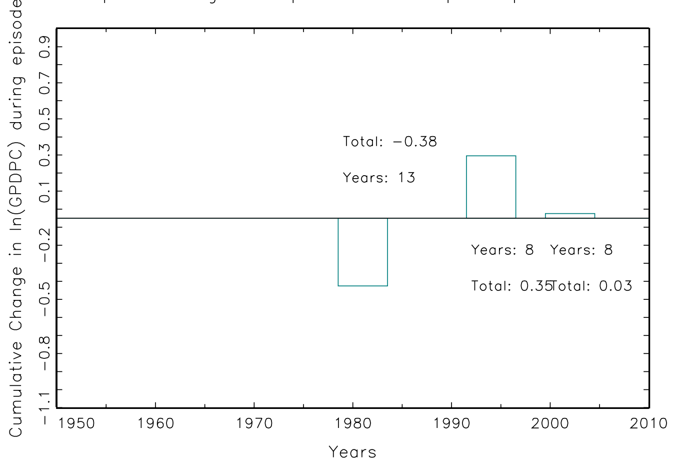


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Rwanda



Senegal

Figure 5: Single trend for Senegal

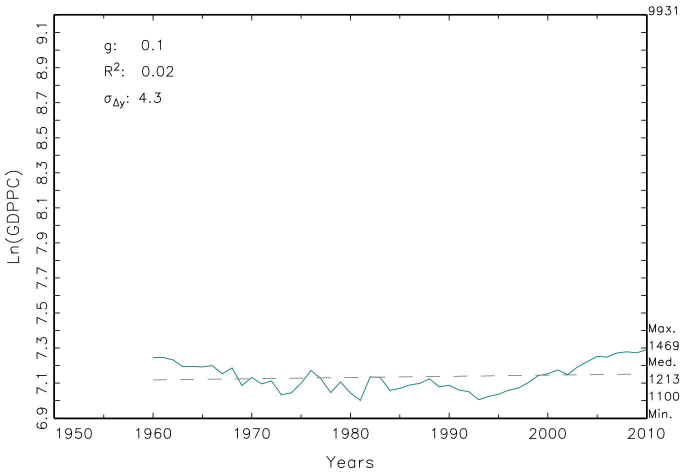


Figure 6: Breaks filtered from three possible B–P breaks: Senegal

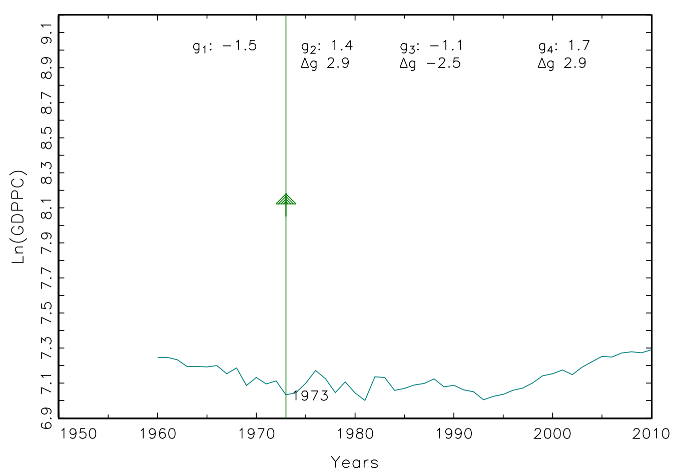


Figure 7: Bai–Perron Identified Break(s) for Senegal

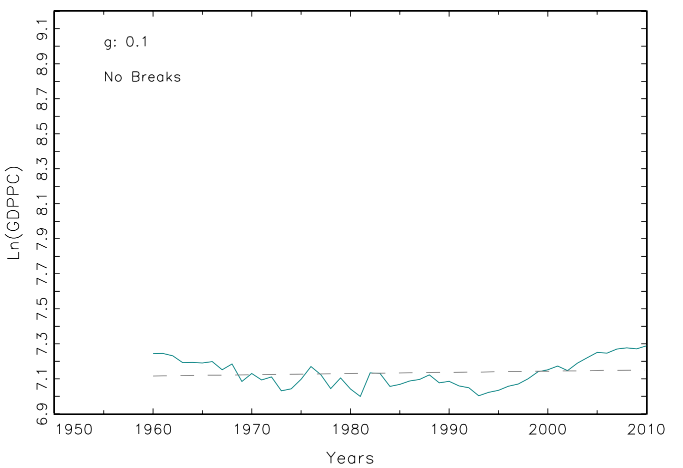
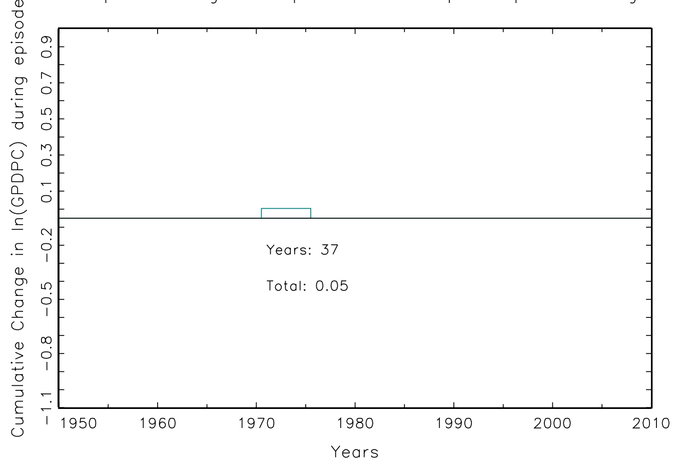


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Senegal



Sierra Leone

Figure 5: Single trend for Sierra Leone

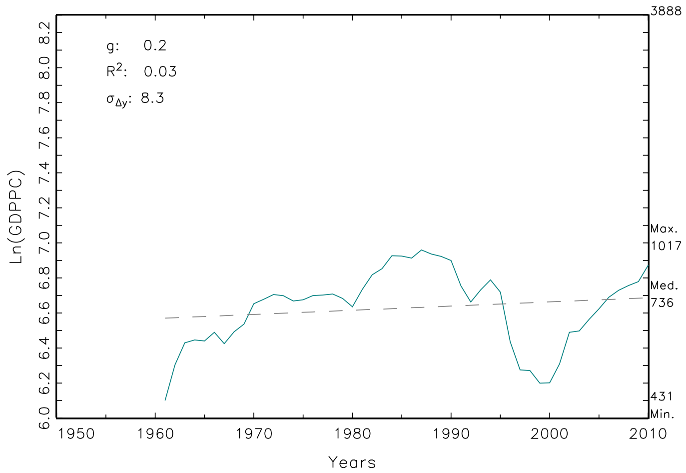


Figure 6: Breaks filtered from three possible B–P breaks: Sierra Leone

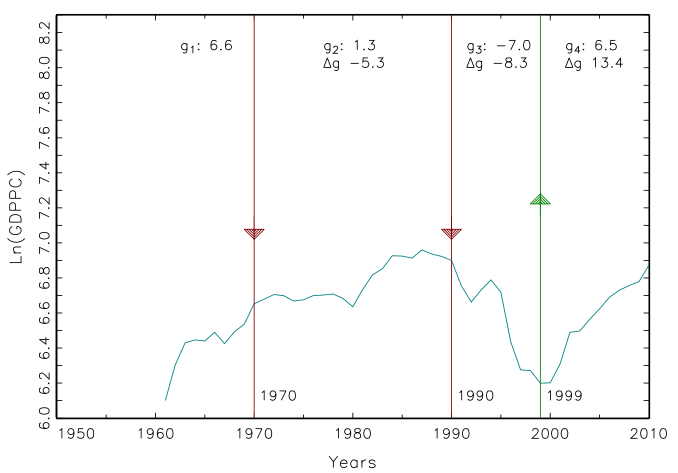


Figure 7: Bai–Perron Identified Break(s) for Sierra Leone

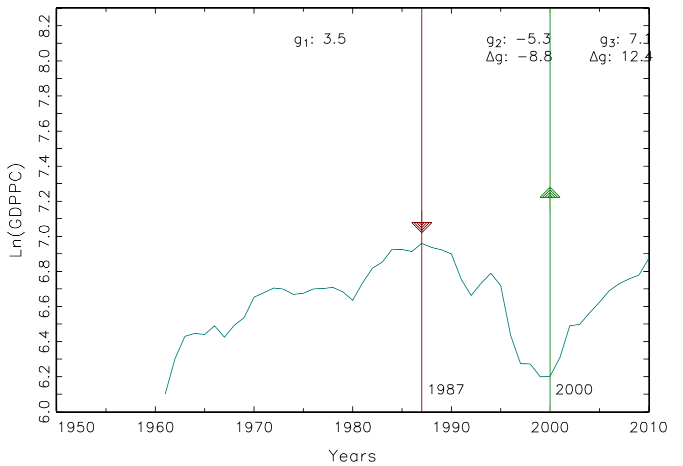
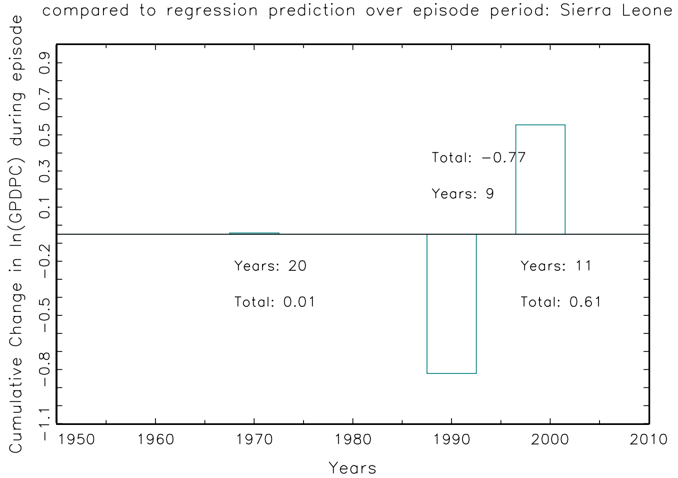


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Sierra Leone



Singapore

Figure 5: Single trend for Singapore

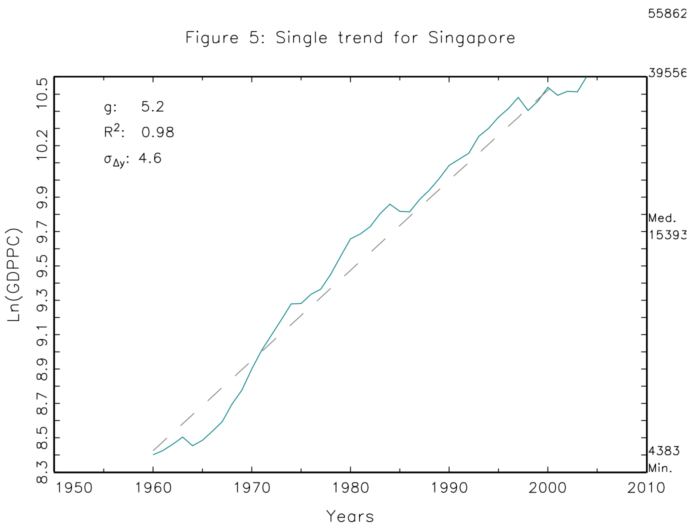


Figure 6: Breaks filtered from three possible B−P breaks: Singapore

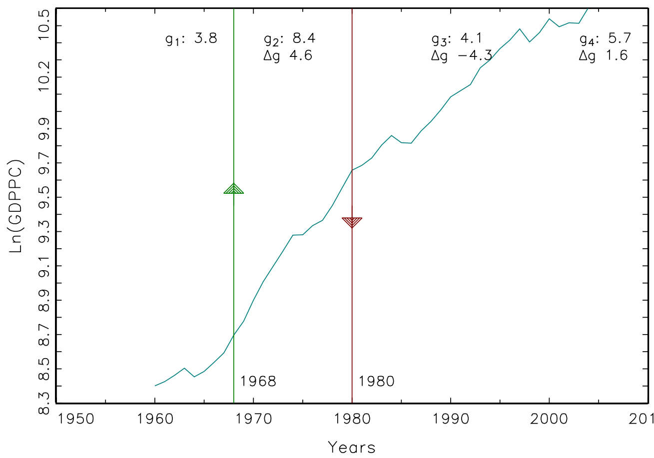


Figure 7: Bai−Perron Identified Break(s) for Singapore

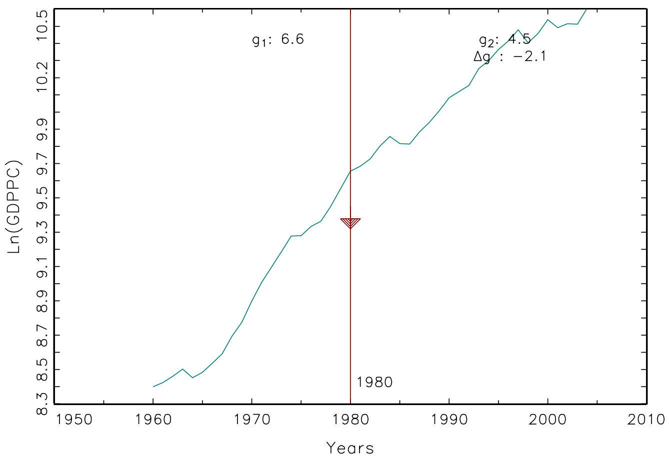
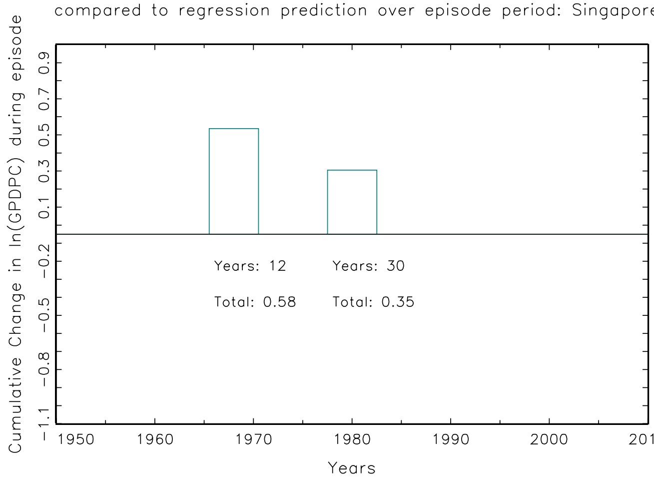


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Singapore



Somalia

Figure 5: Single trend for Somalia

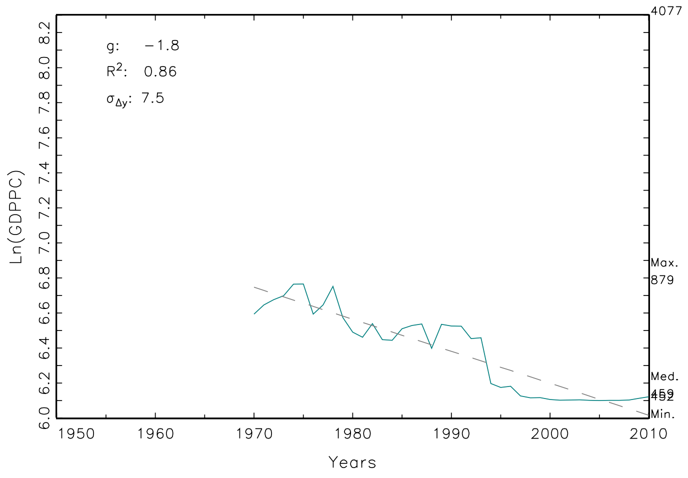


Figure 6: Breaks filtered from two possible B−P breaks: Somalia

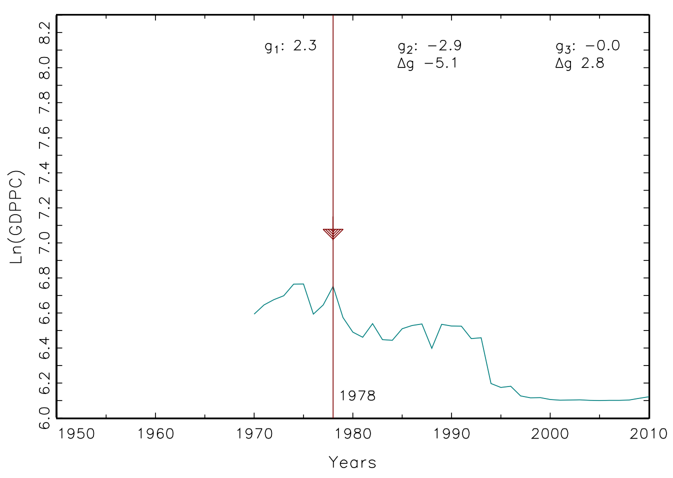


Figure 7: Bai−Perron Identified Break(s) for Somalia

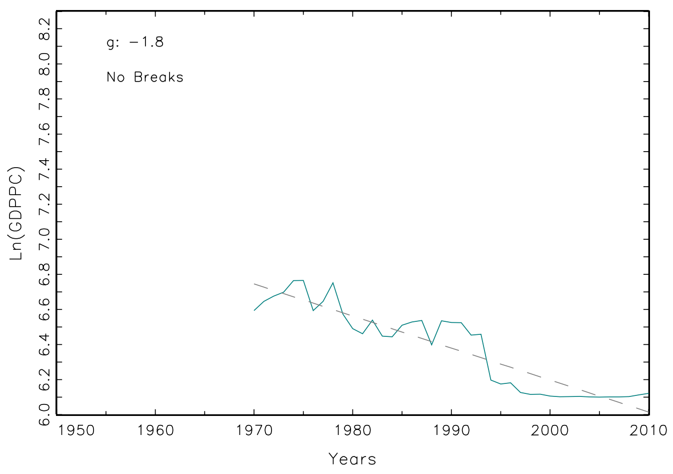
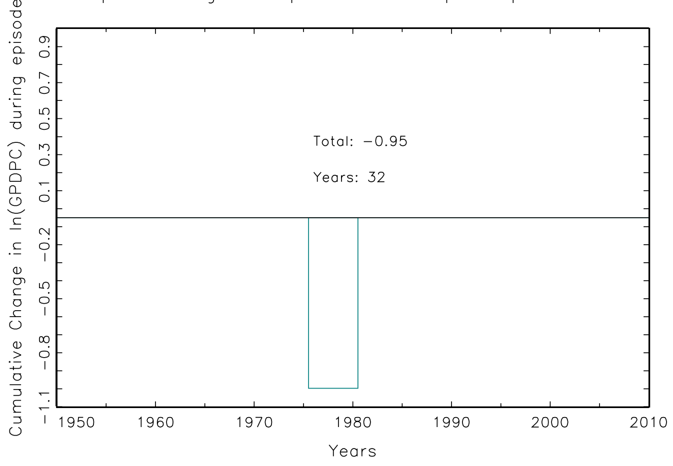


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Somalia



South Africa

Figure 5: Single trend for South Africa

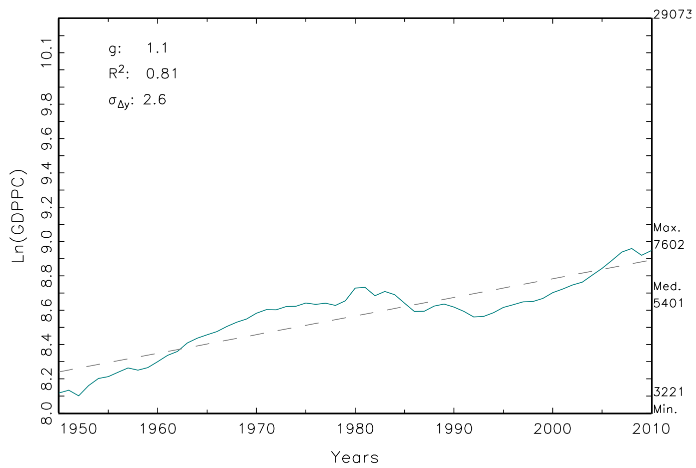


Figure 6: Breaks filtered from four possible B−P breaks: South Africa

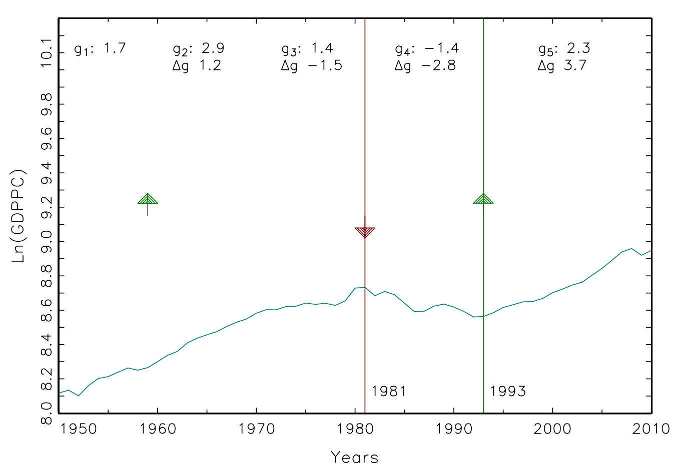


Figure 7: Bai−Perron Identified Break(s) for South Africa

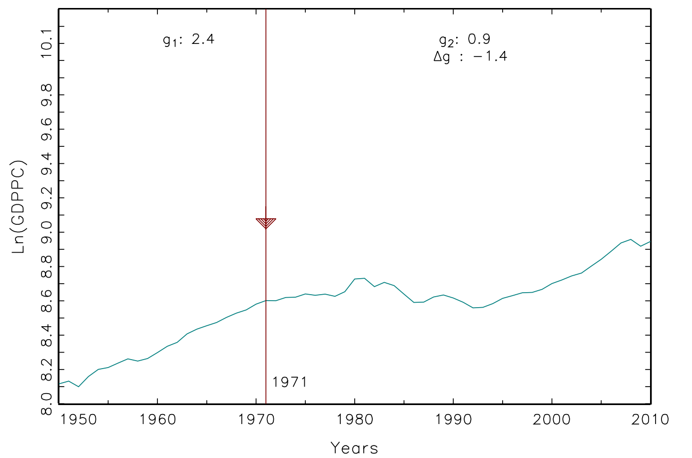
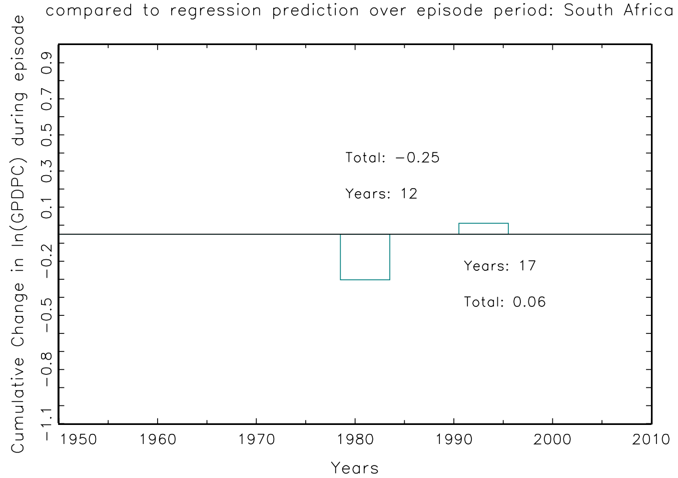


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: South Africa



Spain

Figure 5: Single trend for Spain

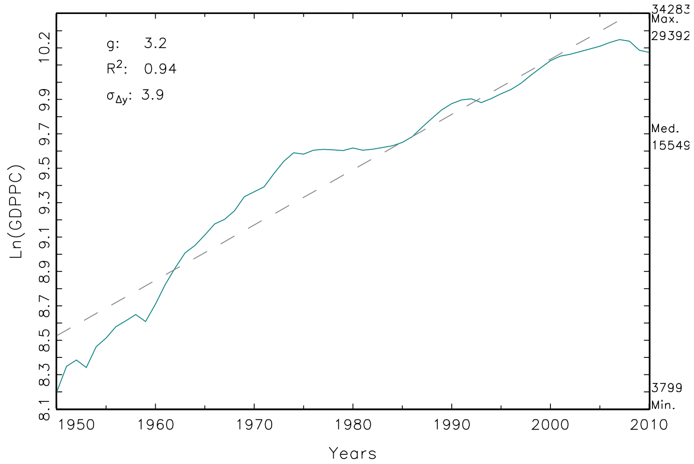


Figure 6: Breaks filtered from four possible B–P breaks: Spain

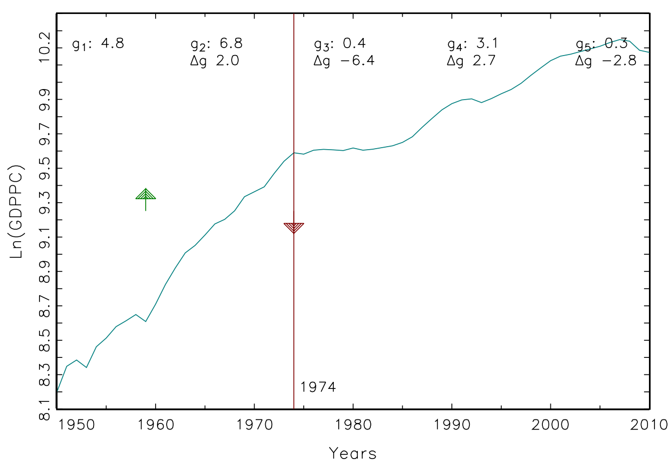


Figure 7: Bai–Perron Identified Break(s) for Spain

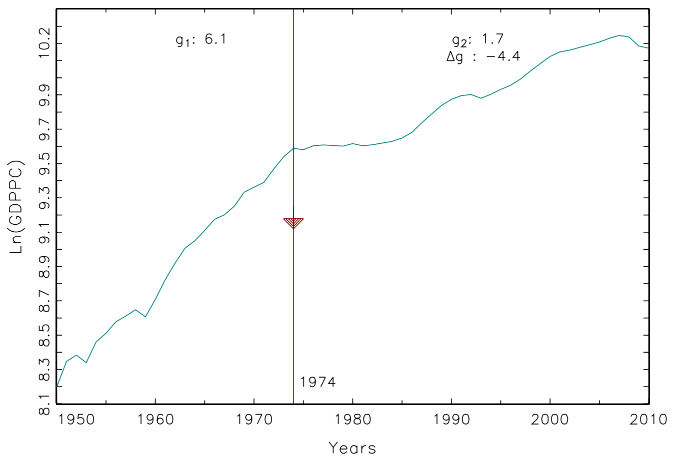
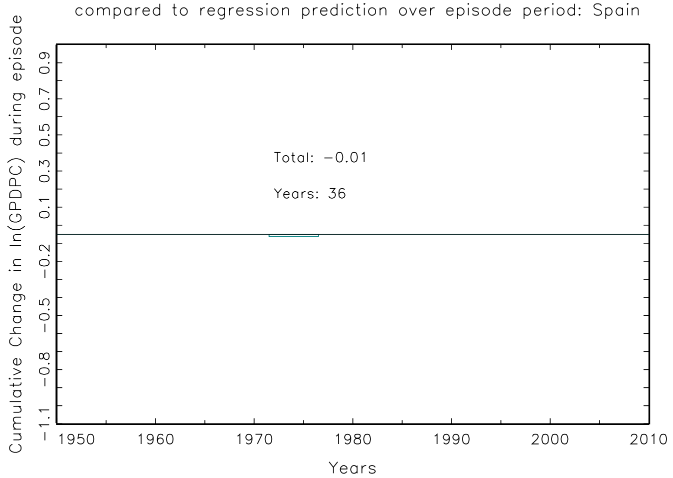


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Spain



Sri Lanka

Figure 5: Single trend for Sri Lanka

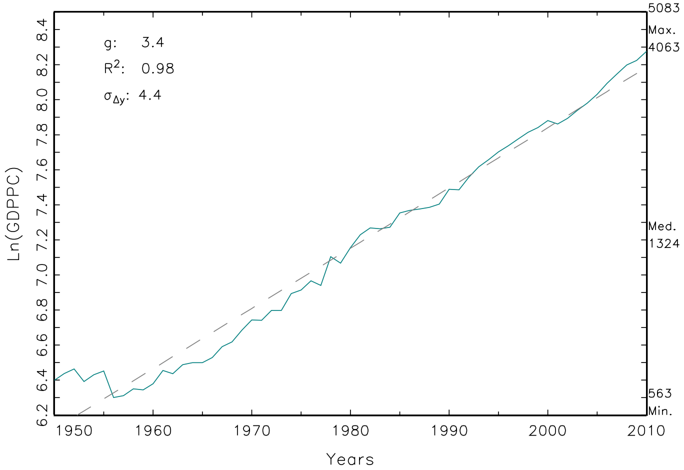


Figure 6: Breaks filtered from four possible B–P breaks: Sri Lanka

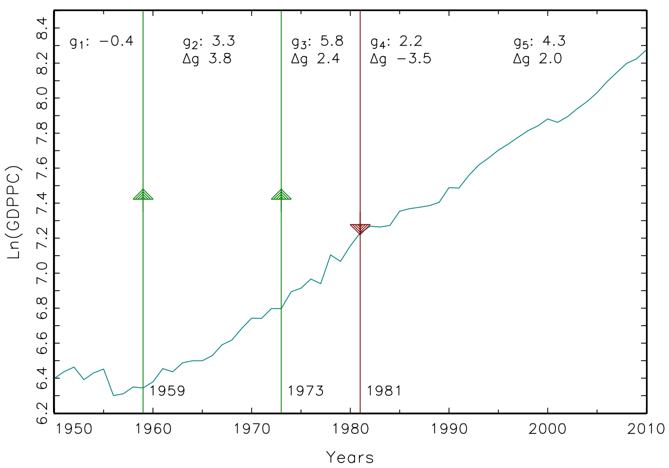


Figure 7: Bai–Perron Identified Break(s) for Sri Lanka

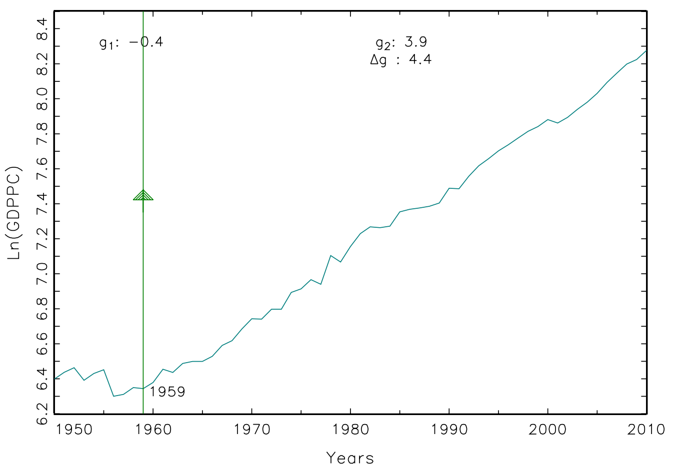
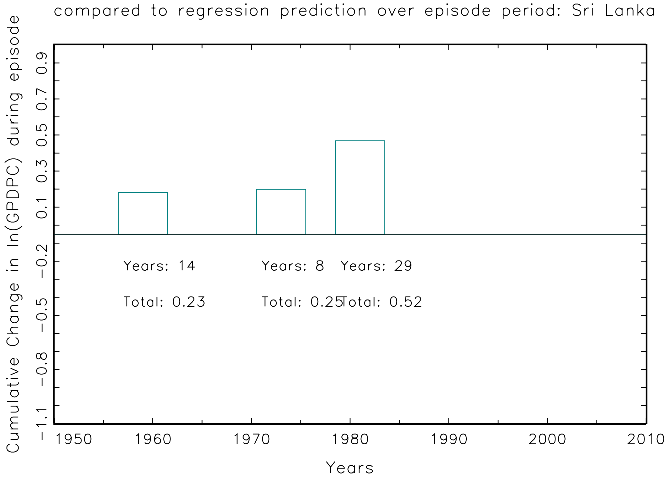


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Sri Lanka



Sudan

Figure 5: Single trend for Sudan

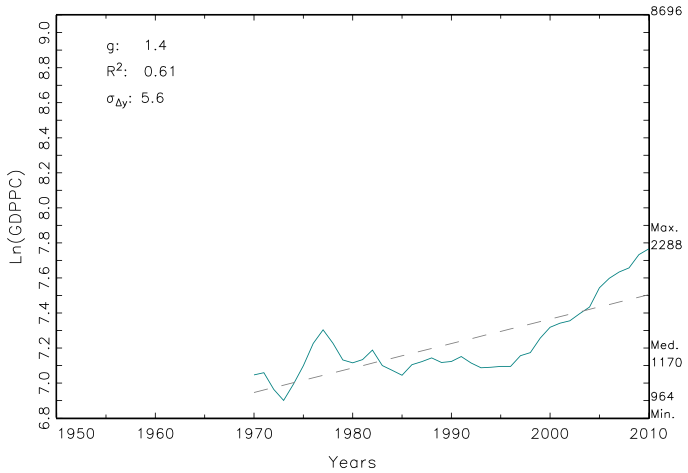


Figure 6: Breaks filtered from two possible B–P breaks: Sudan

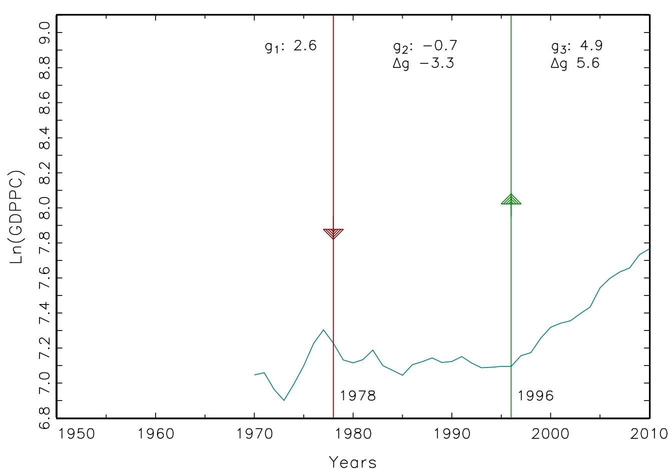


Figure 7: Bai–Perron Identified Break(s) for Sudan

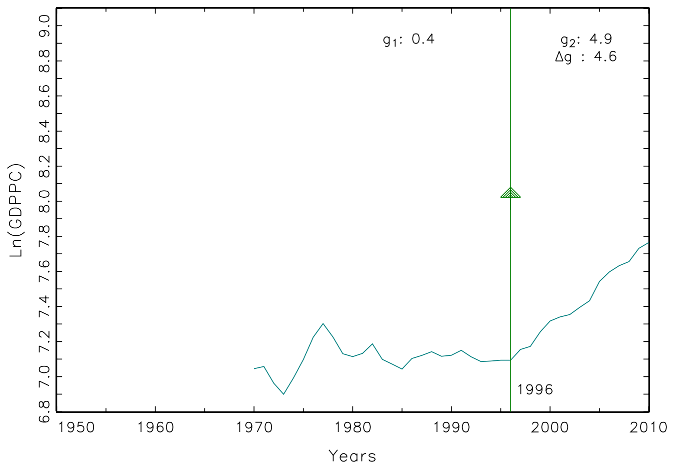
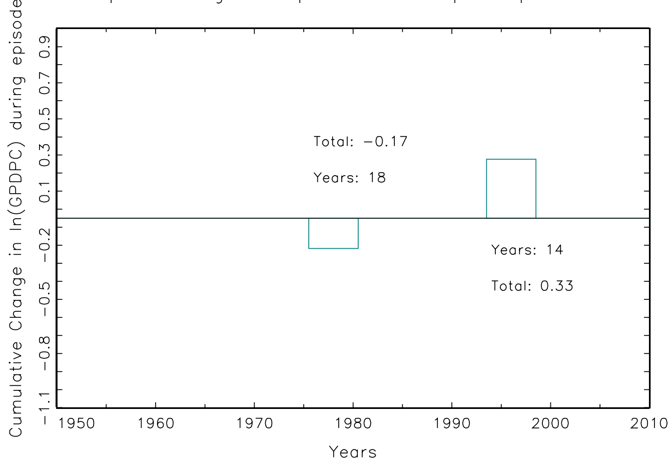


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Sudan



Swaziland

Figure 5: Single trend for Swaziland

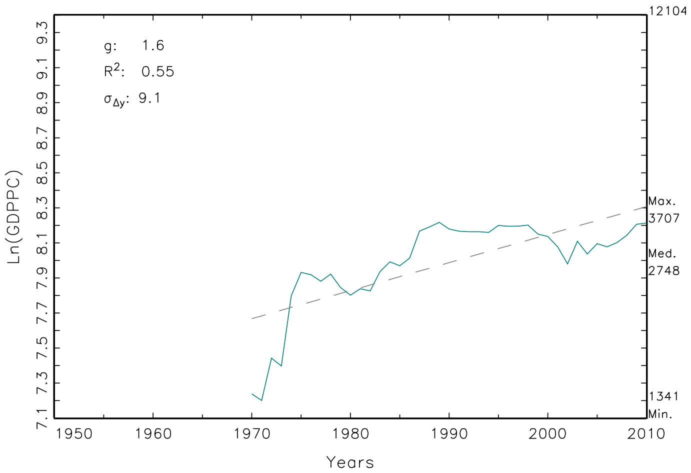


Figure 6: Breaks filtered from two possible B–P breaks: Swaziland

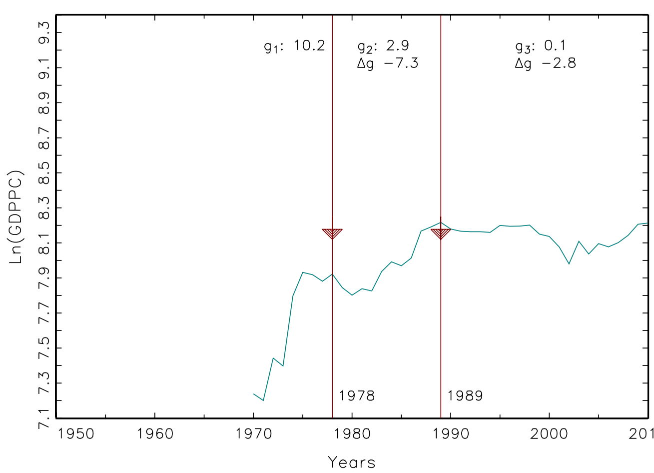


Figure 7: Bai–Perron Identified Break(s) for Swaziland

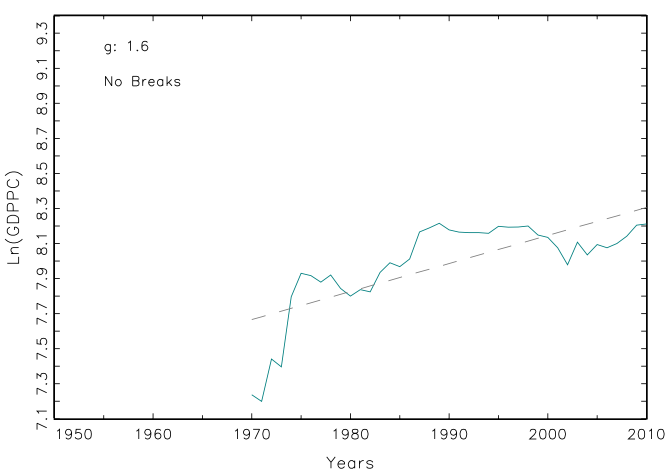
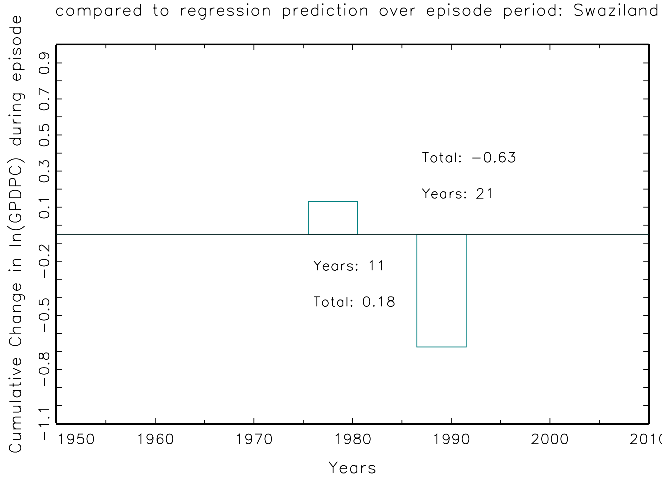


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Swaziland



Sweden

Figure 5: Single trend for Sweden

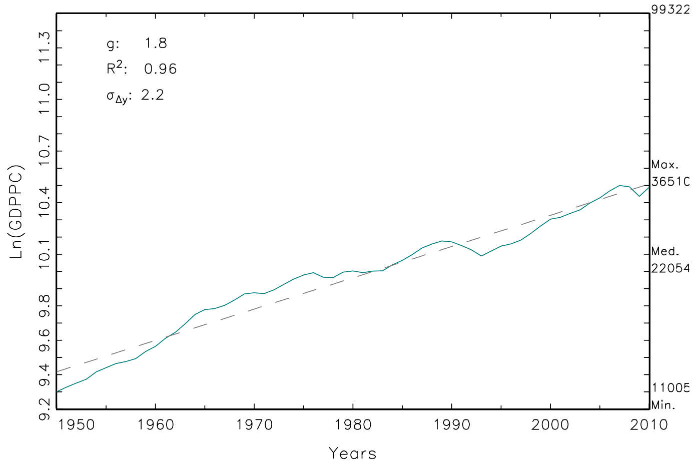


Figure 6: Breaks filtered from four possible B–P breaks: Sweden

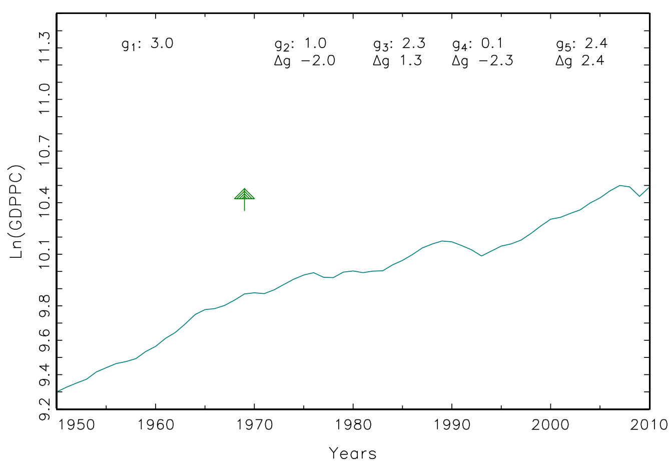


Figure 7: Bai–Perron Identified Break(s) for Sweden

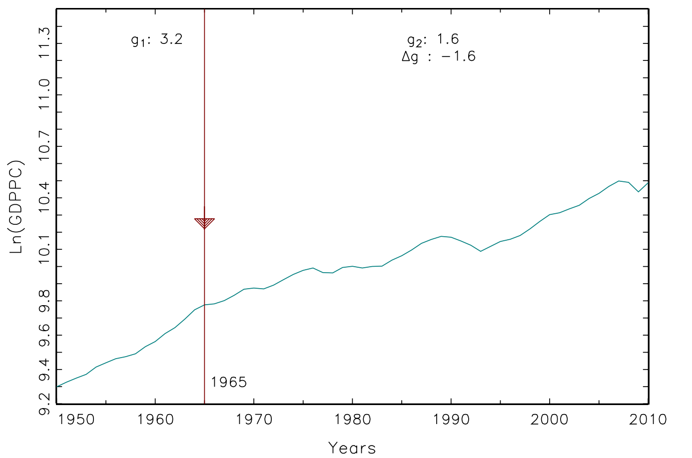
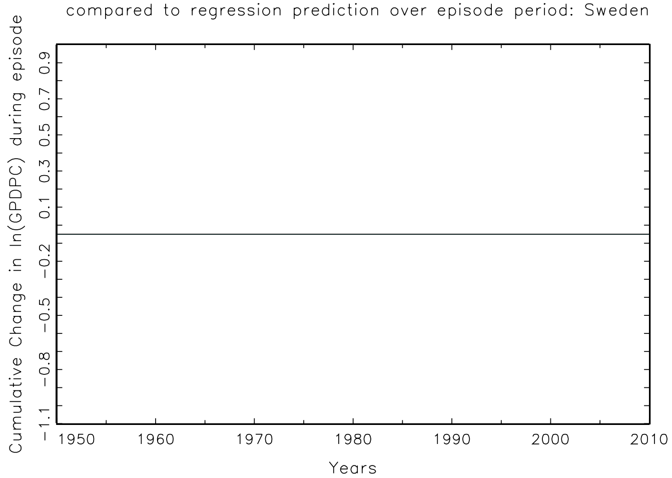
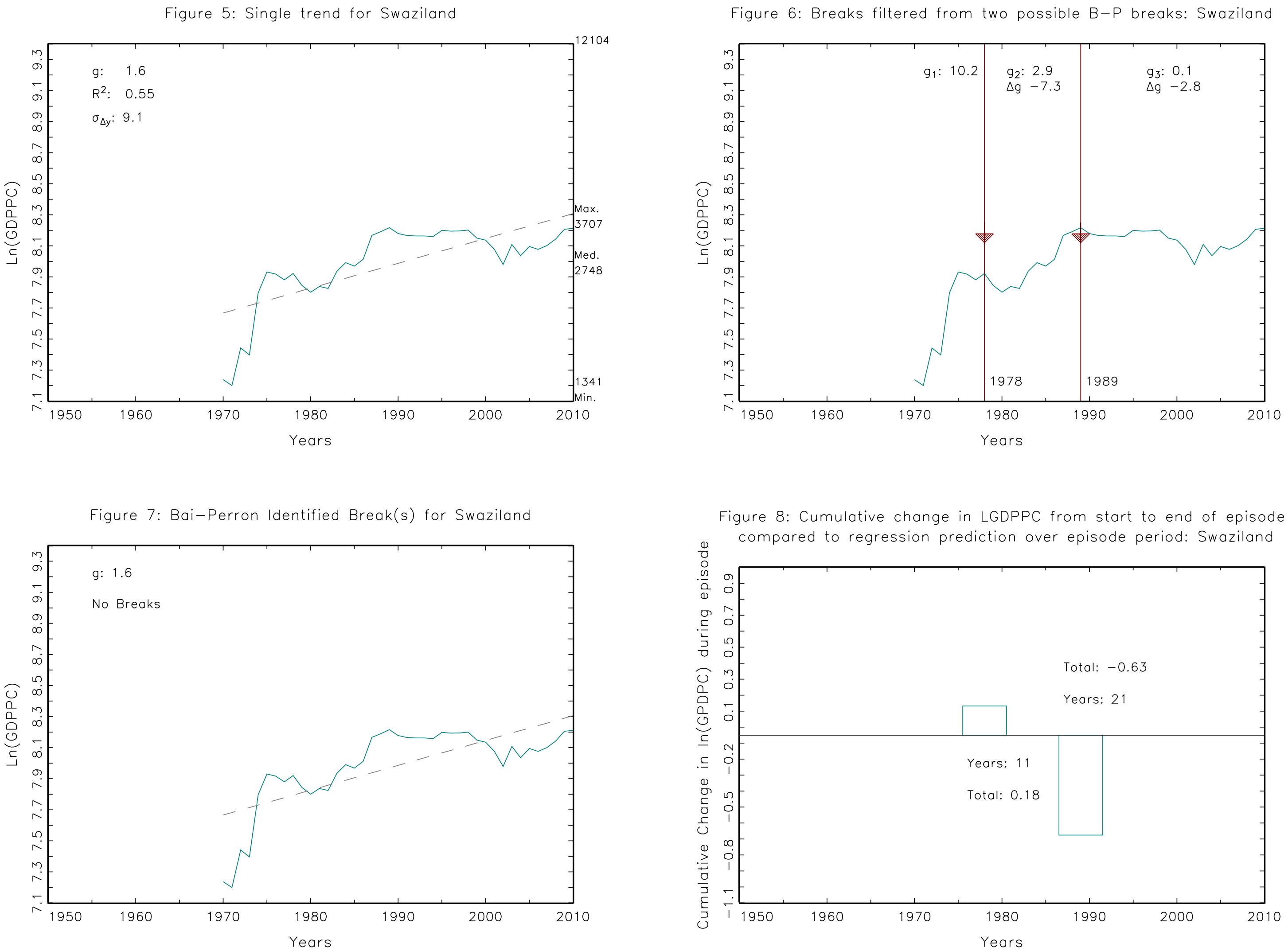


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Sweden



Switzerland



Syrian Arab Republic

Figure 5: Single trend for Syria

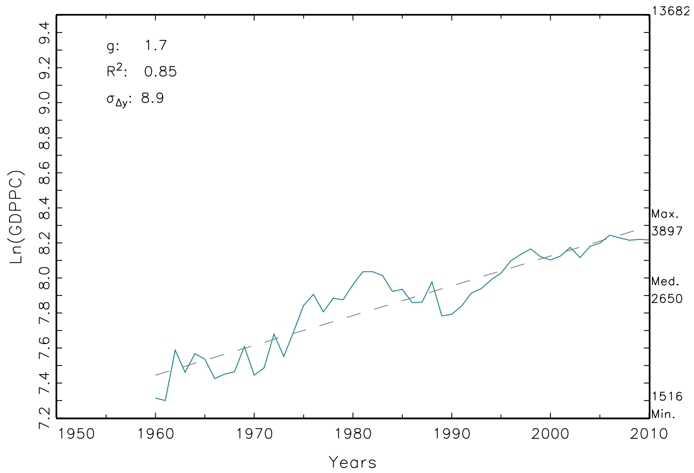


Figure 6: Breaks filtered from three possible B–P breaks: Syria

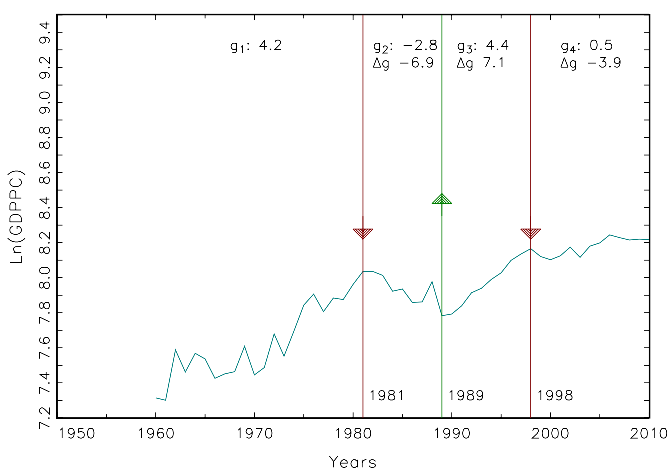


Figure 7: Bai–Perron Identified Break(s) for Syria

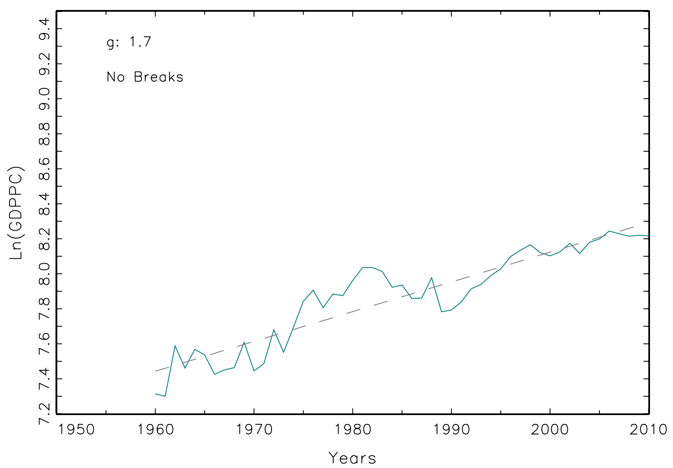
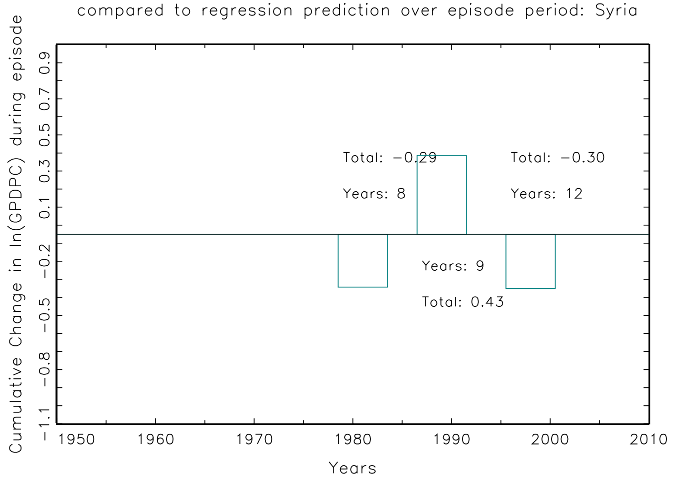


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Syria



Taiwan

Figure 5: Single trend for Taiwan

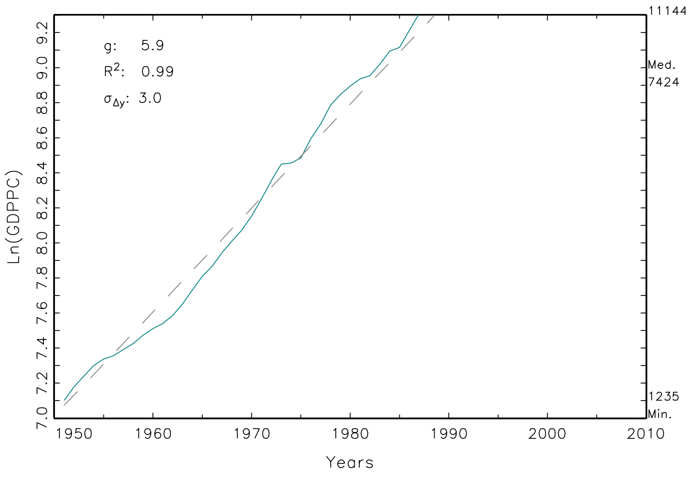


Figure 6: Breaks filtered from four possible B–P breaks: Taiwan

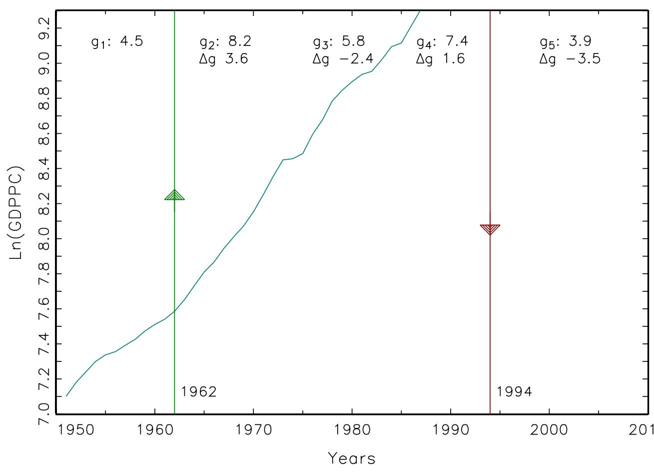


Figure 7: Bai–Perron Identified Break(s) for Taiwan

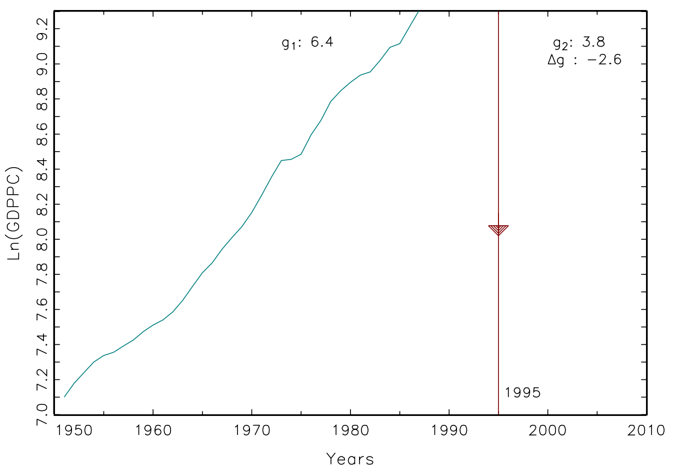
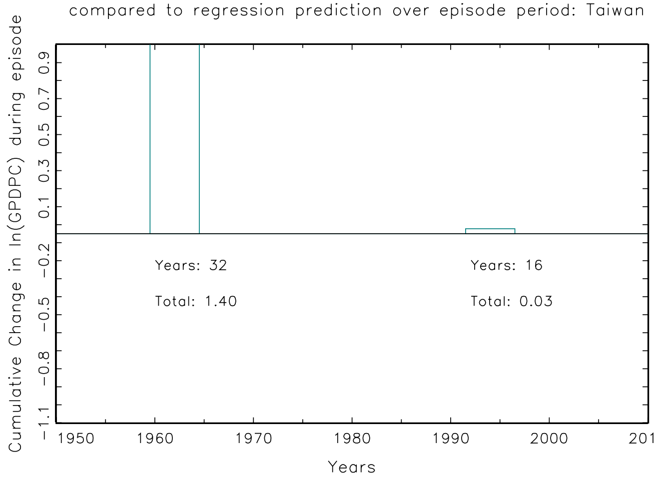


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Taiwan



Tanzania

Figure 5: Single trend for Tanzania

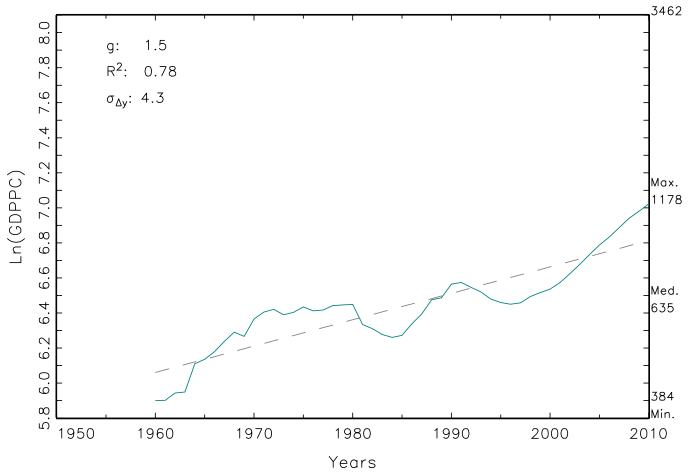


Figure 6: Breaks filtered from three possible B–P breaks: Tanzania

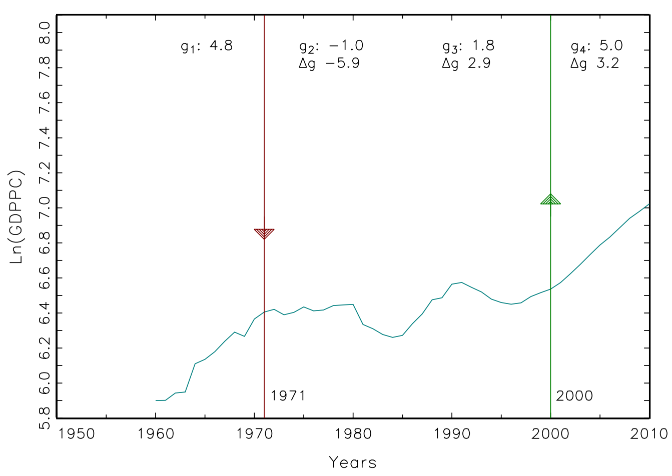


Figure 7: Bai–Perron Identified Break(s) for Tanzania

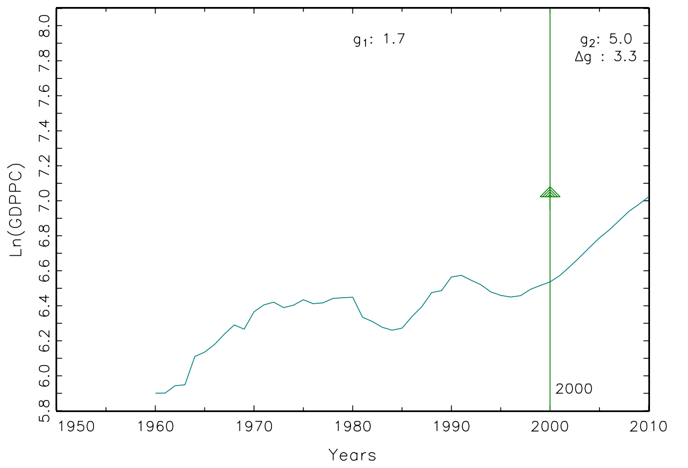
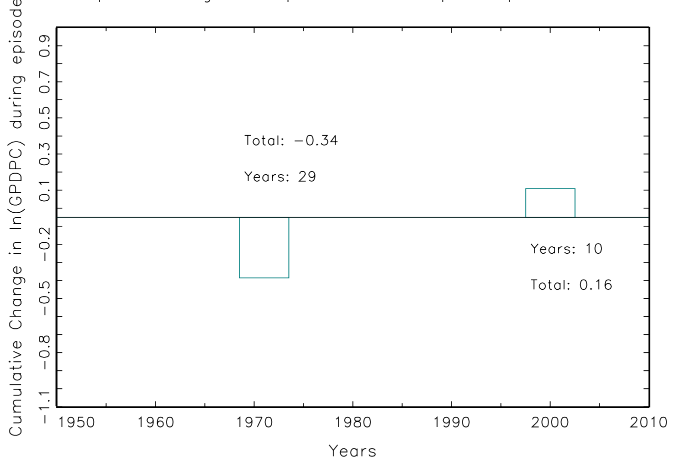


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Tanzania



Thailand

Figure 5: Single trend for Thailand

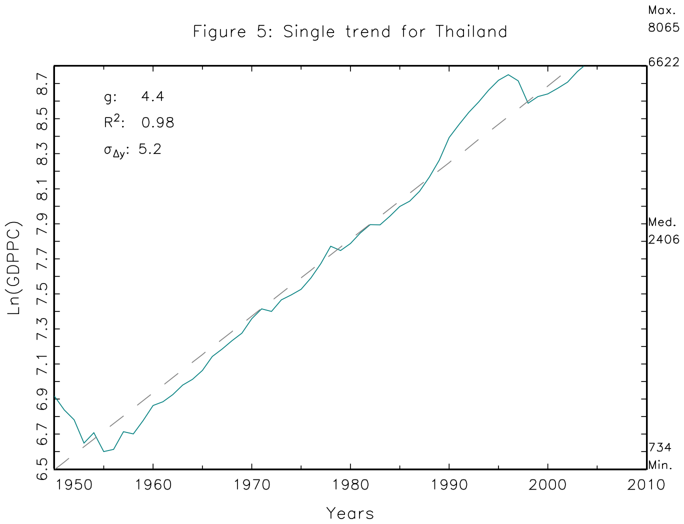


Figure 6: Breaks filtered from four possible B–P breaks: Thailand

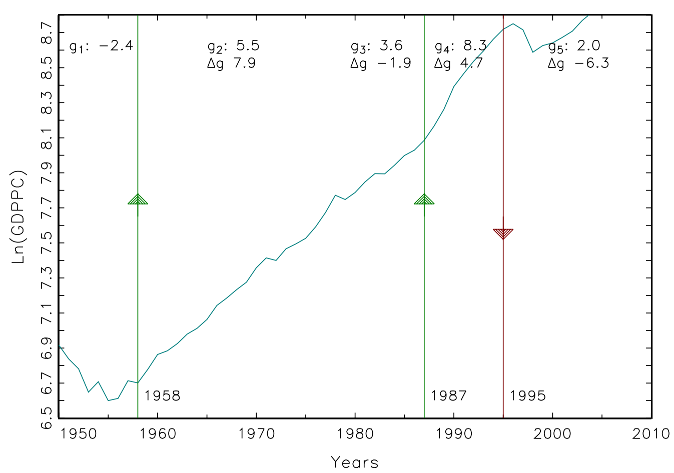


Figure 7: Bai–Perron Identified Break(s) for Thailand

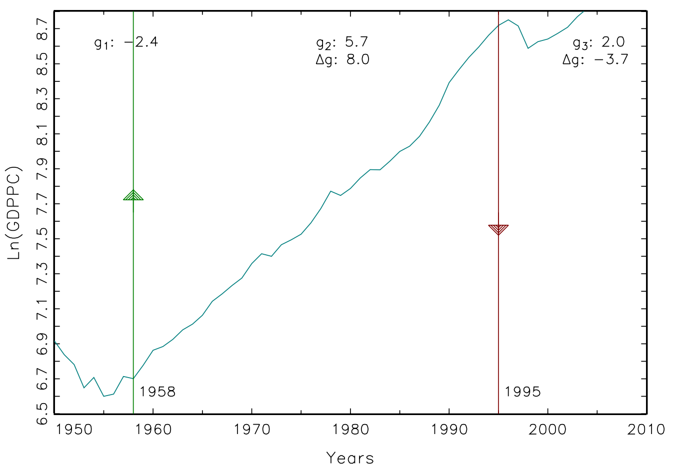
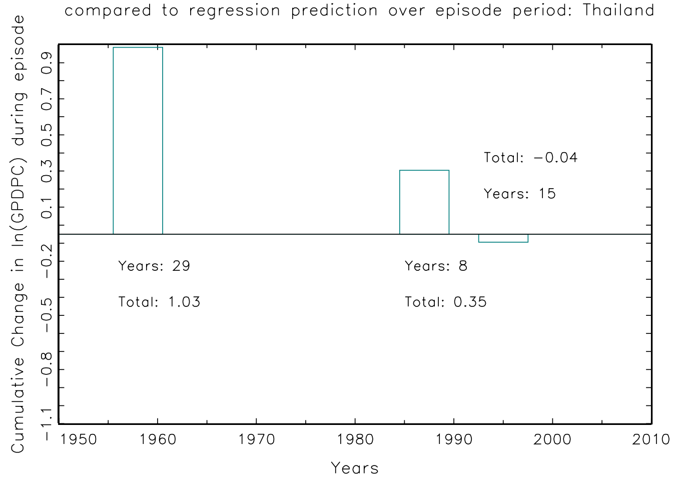


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Thailand



Togo

Figure 5: Single trend for Togo

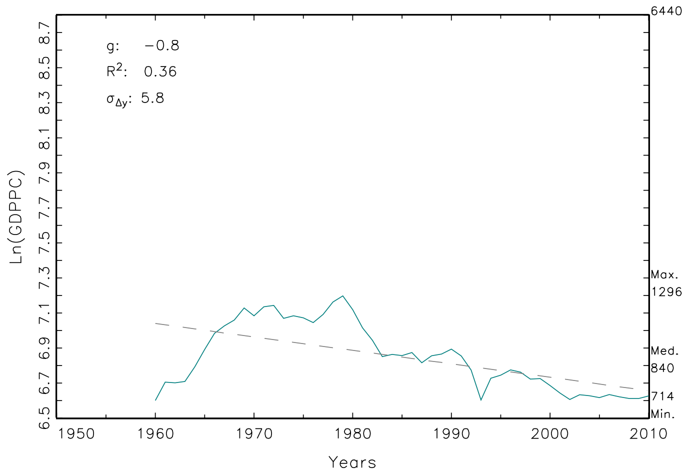


Figure 6: Breaks filtered from three possible B−P breaks: Togo

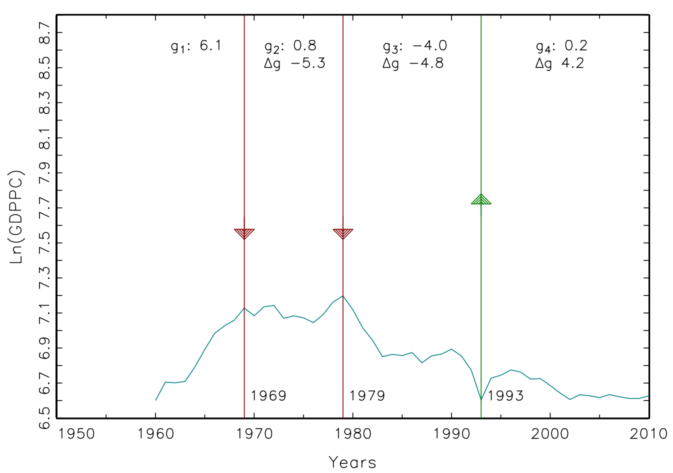


Figure 7: Bai−Perron Identified Break(s) for Togo

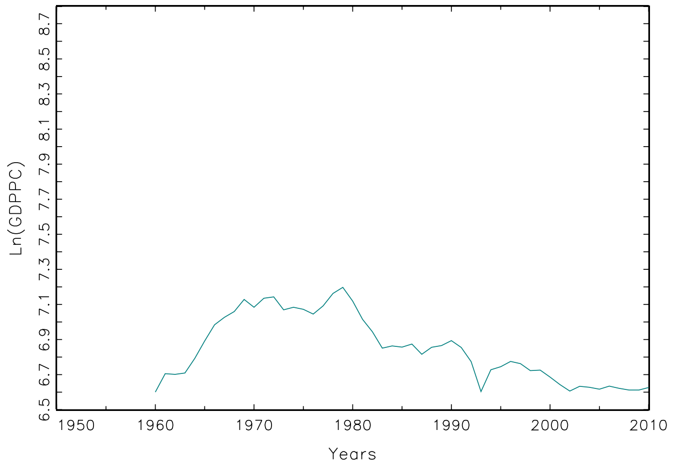
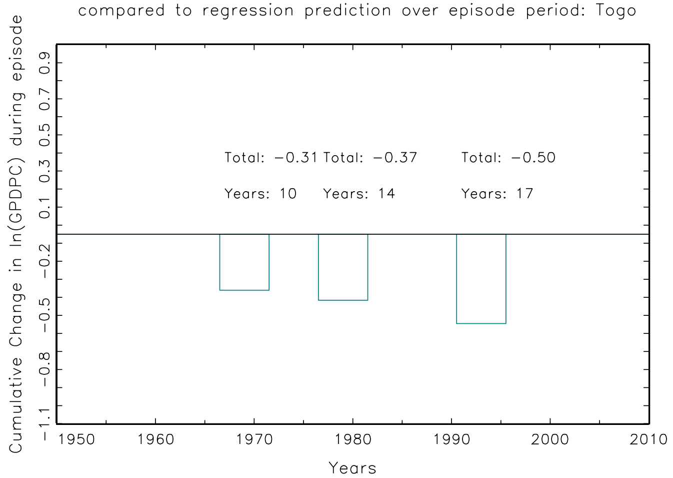


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Togo



Trinidad and Tobago

Figure 5: Single trend for Trinidad &Tobago

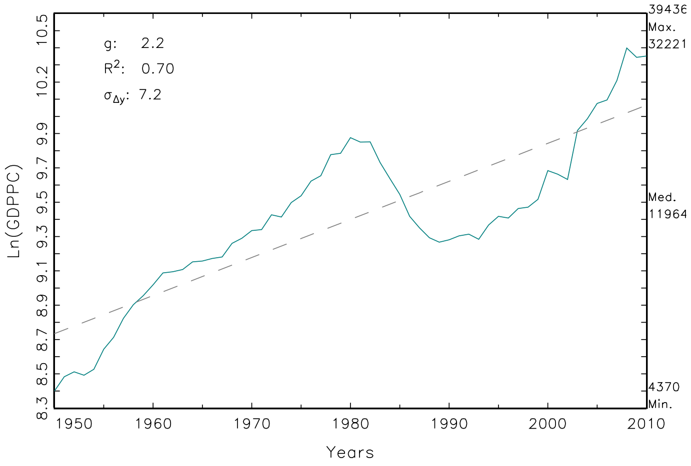


Figure 6: Breaks filtered from four possible B–P breaks: Trinidad &Tobag

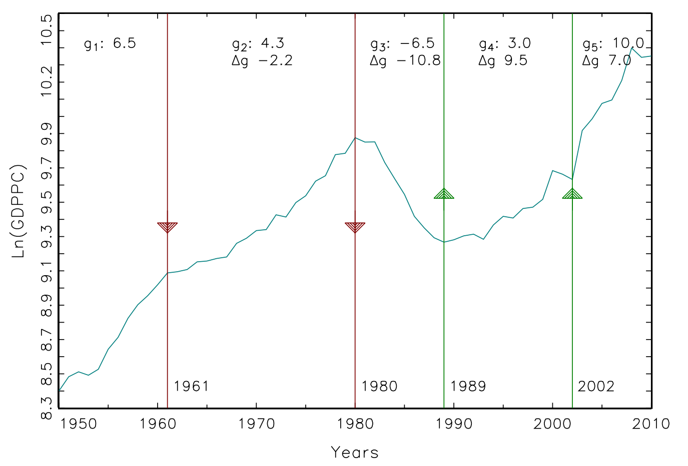


Figure 7: Bai–Perron Identified Break(s) for Trinidad &Tobago

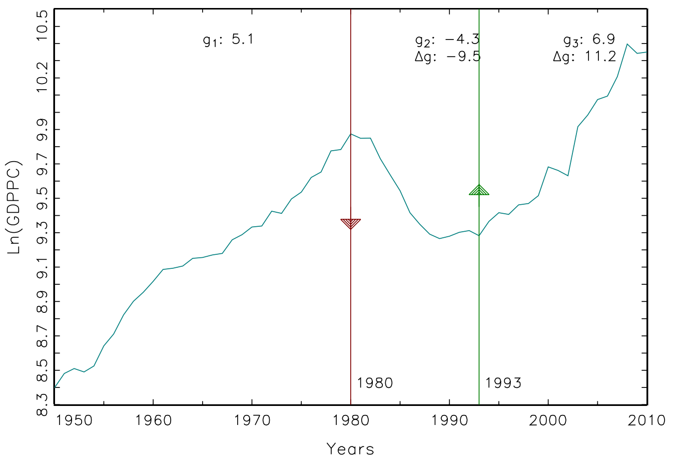
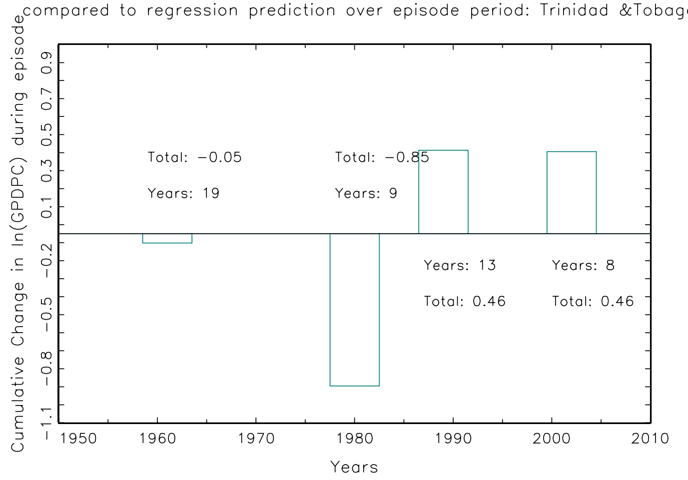


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Trinidad &Tobago



Tunisia

Figure 5: Single trend for Tunisia

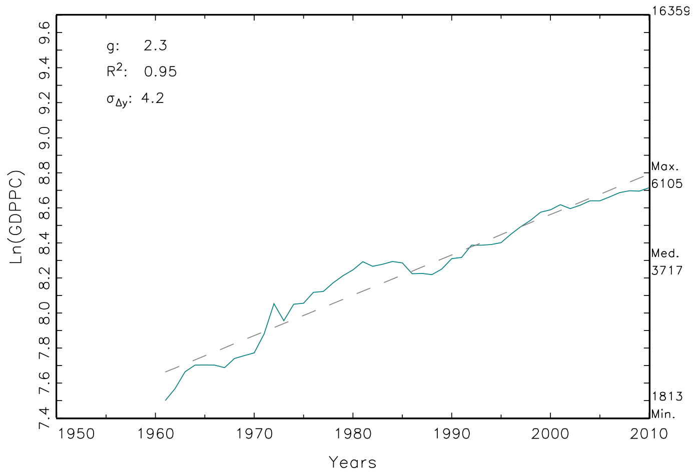


Figure 6: Breaks filtered from three possible B–P breaks: Tunisia

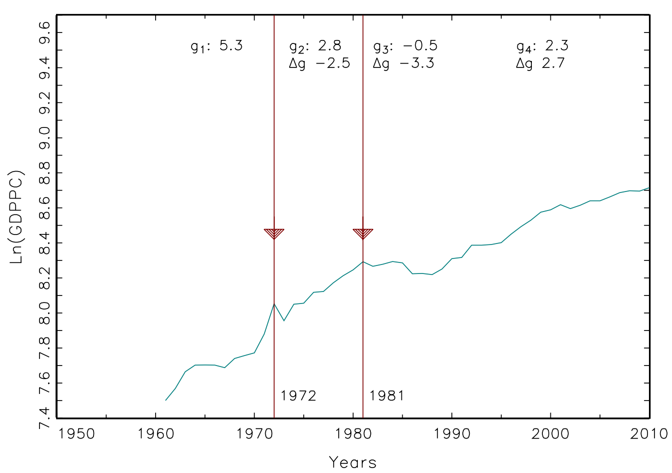


Figure 7: Bai–Perron Identified Break(s) for Tunisia

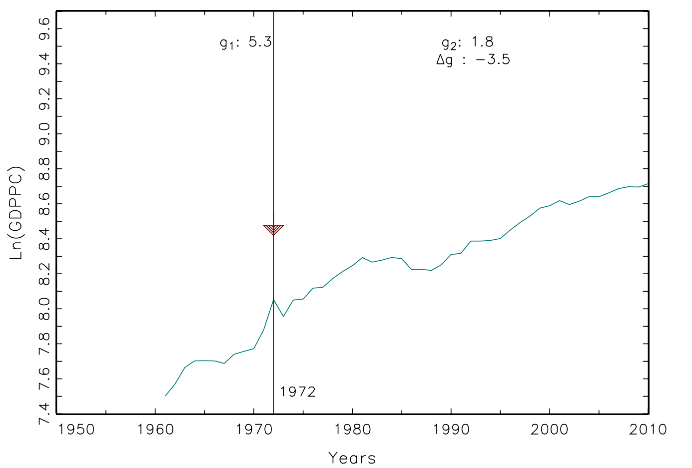
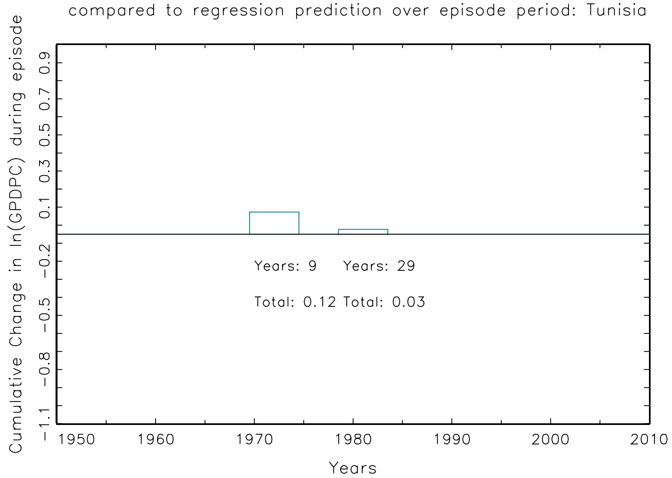


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Tunisia



Turkey

Figure 5: Single trend for Turkey

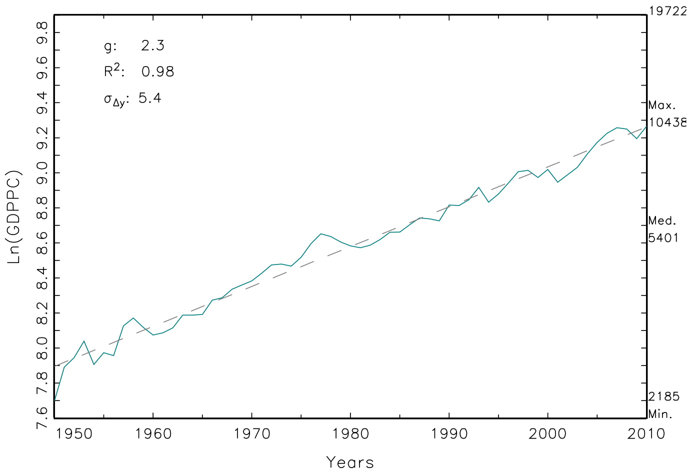


Figure 6: Breaks filtered from four possible B–P breaks: Turkey

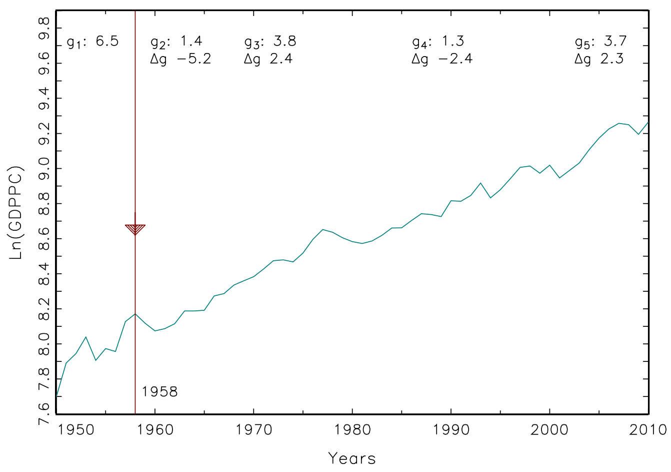


Figure 7: Bai–Perron Identified Break(s) for Turkey

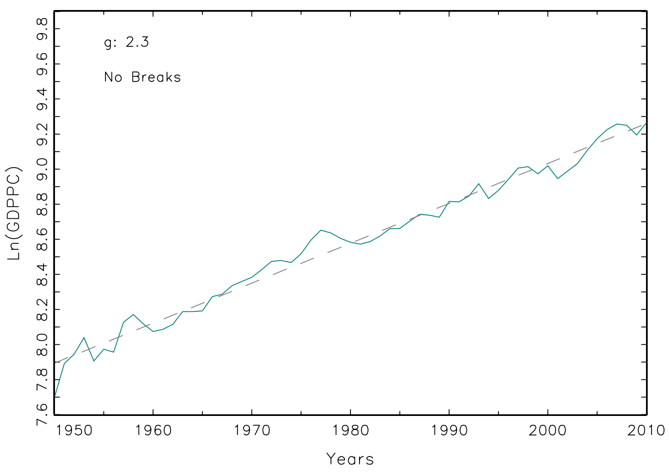
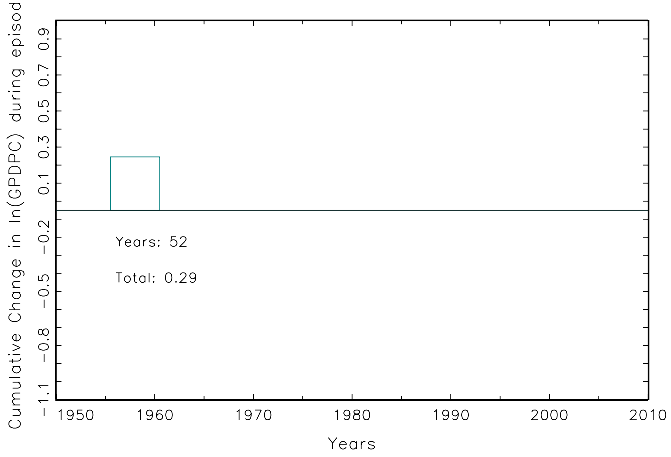


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Turkey



Uganda

Figure 5: Single trend for Uganda

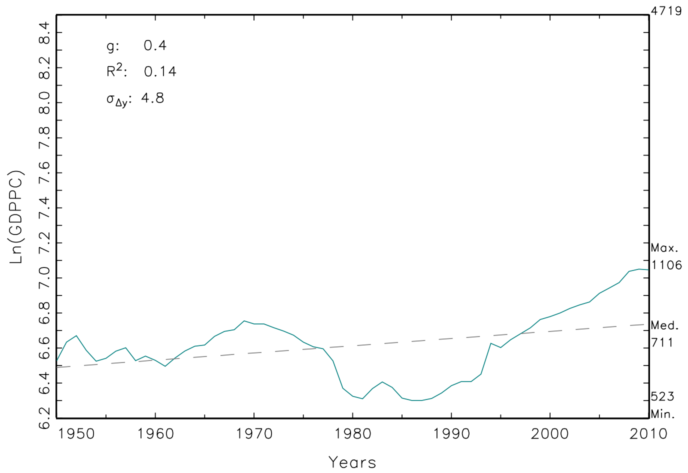


Figure 6: Breaks filtered from four possible B–P breaks: Uganda

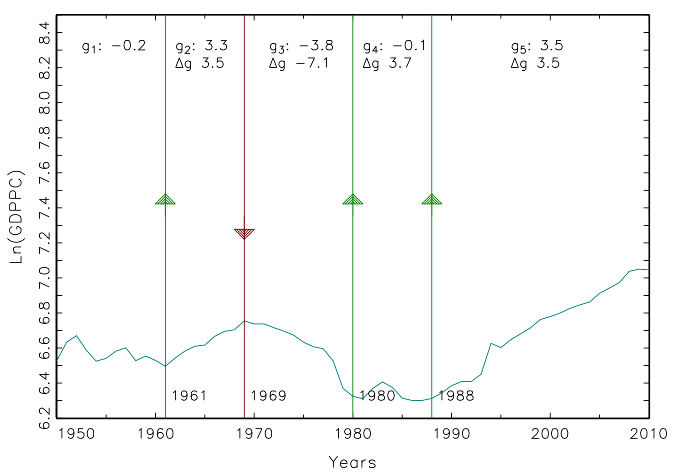


Figure 7: Bai–Perron Identified Break(s) for Uganda

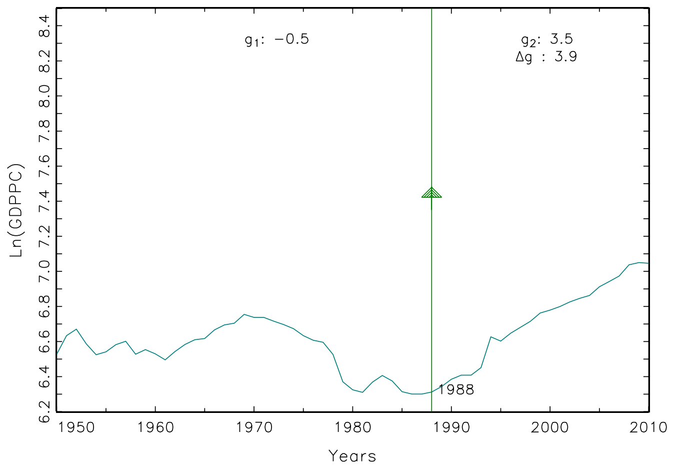
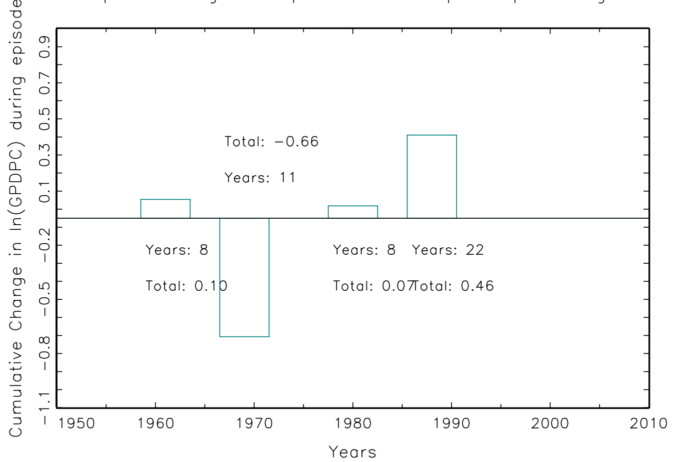


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Uganda



United Kingdom

Figure 5: Single trend for United Kingdom

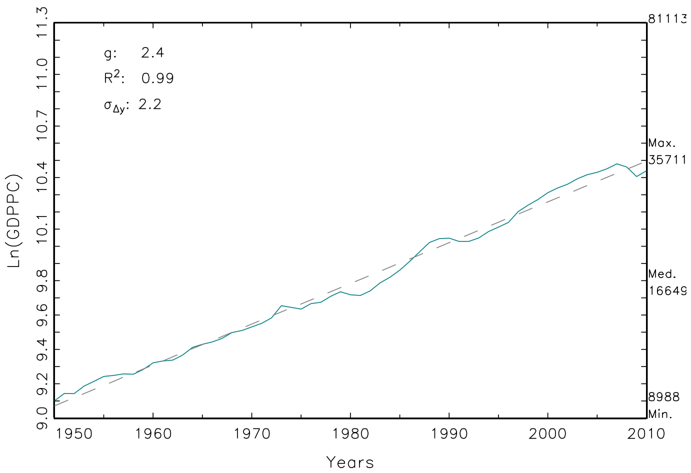


Figure 6: Breaks filtered from four possible B–P breaks: United Kingdom

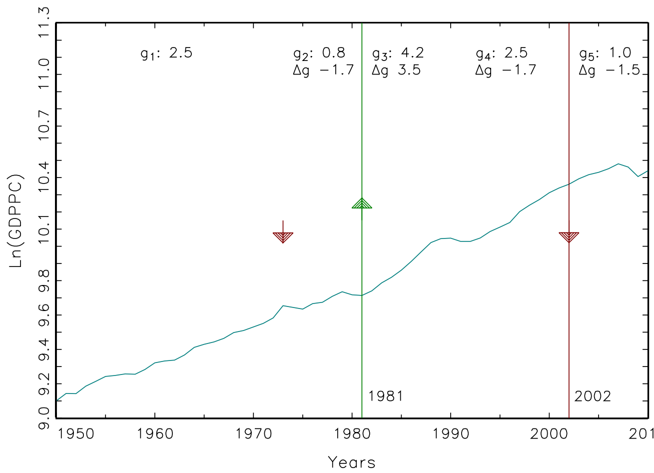


Figure 7: Bai–Perron Identified Break(s) for United Kingdom

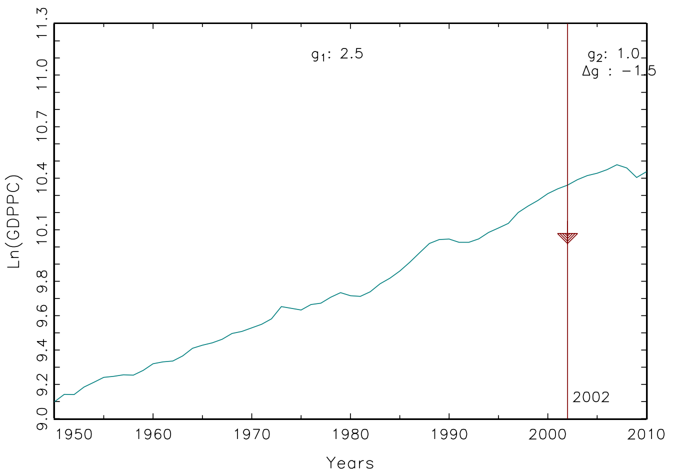
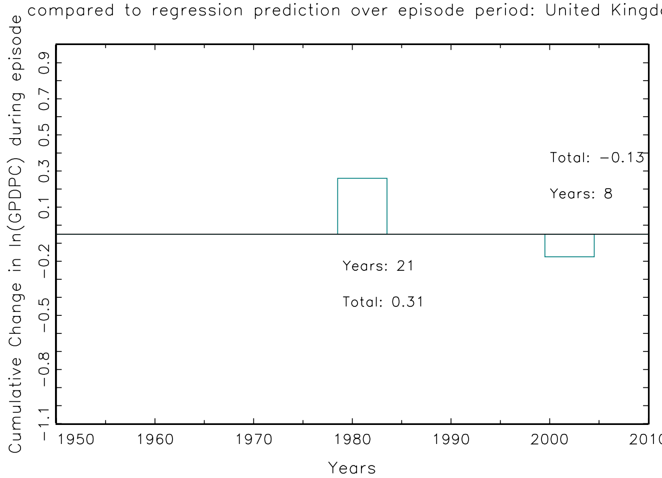


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: United Kingdom



United States

Figure 5: Single trend for United States

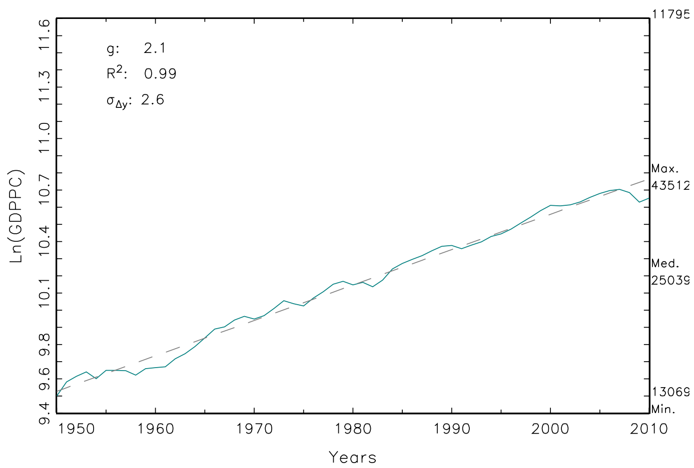


Figure 6: Breaks filtered from four possible B–P breaks: United States

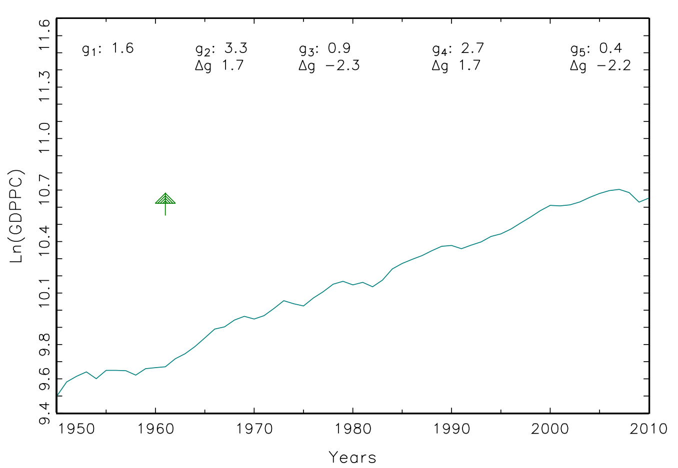


Figure 7: Bai–Perron Identified Break(s) for United States

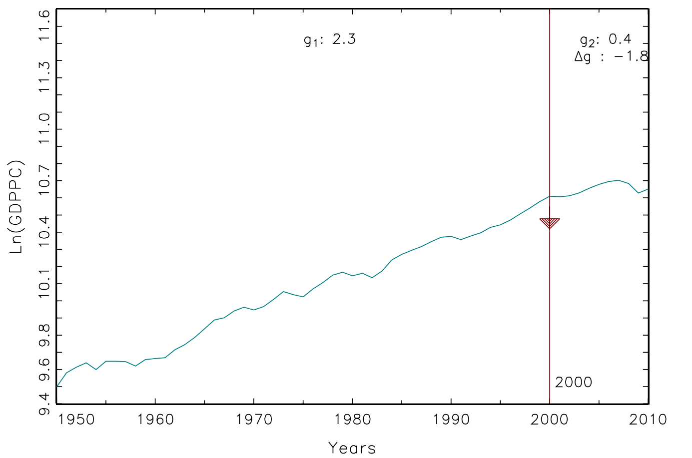
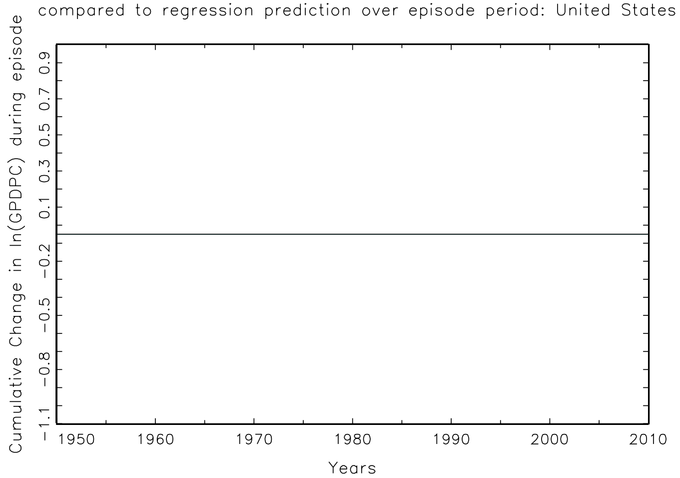


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: United States



Uruguay

Figure 5: Single trend for Uruguay

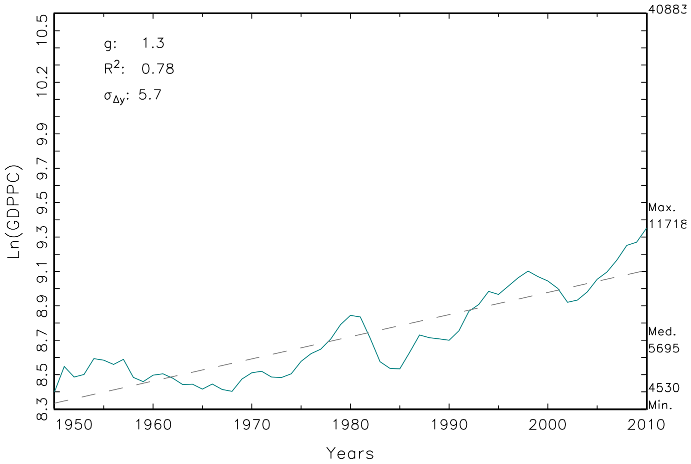


Figure 6: Breaks filtered from four possible B−P breaks: Uruguay

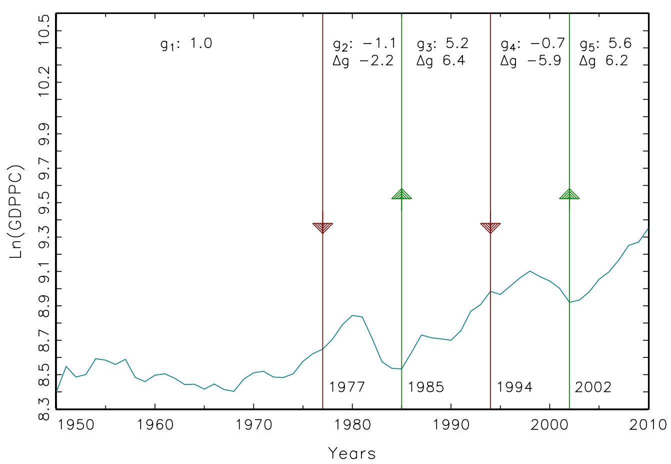


Figure 7: Bai−Perron Identified Break(s) for Uruguay

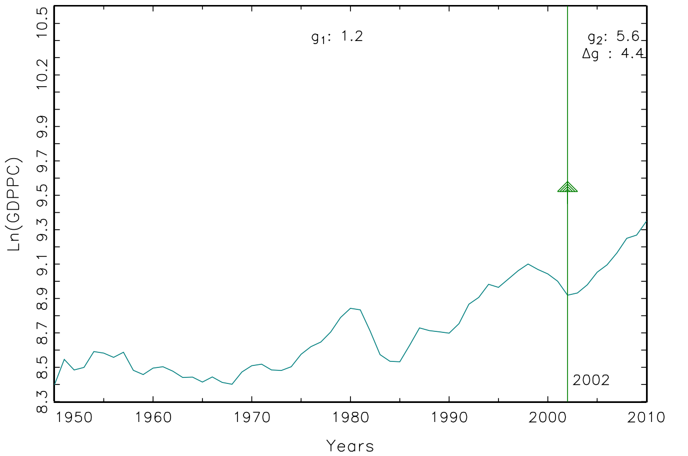
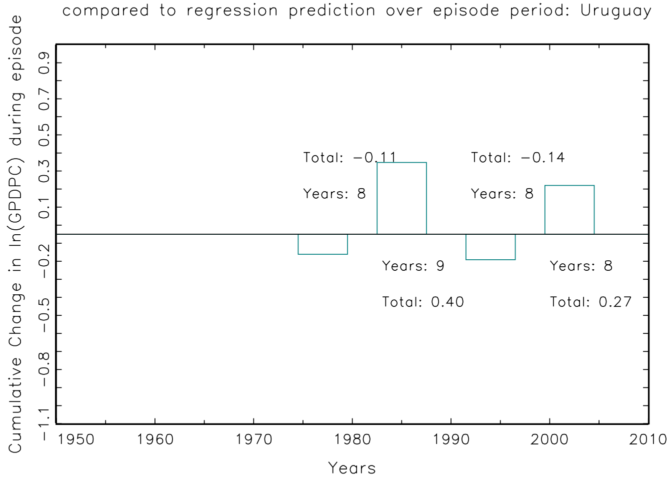


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Uruguay



Venezuela, RB

Figure 5: Single trend for Venezuela

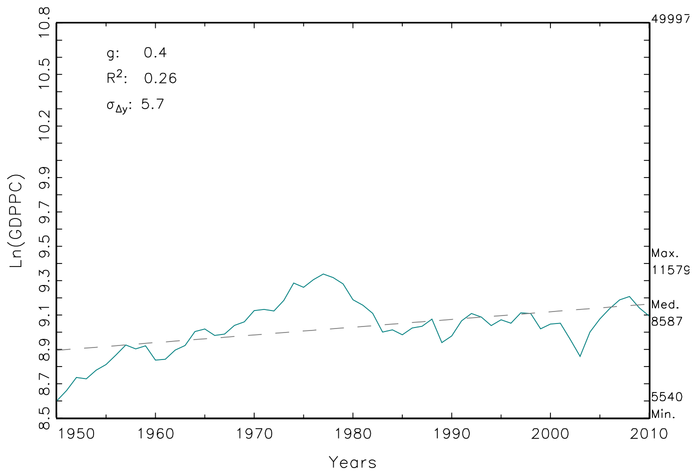


Figure 6: Breaks filtered from four possible B–P breaks: Venezuela

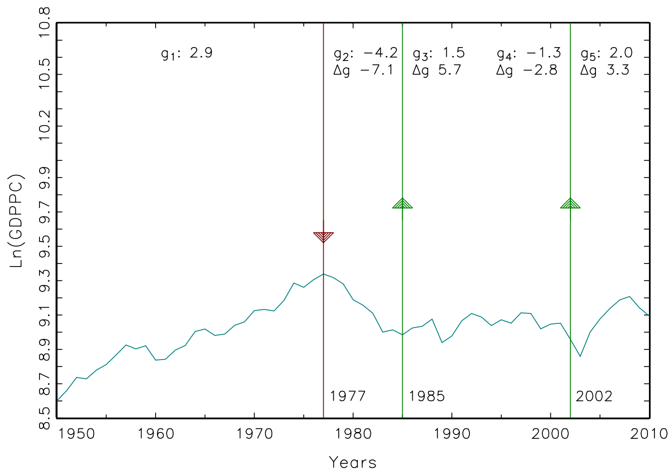


Figure 7: Bai–Perron Identified Break(s) for Venezuela

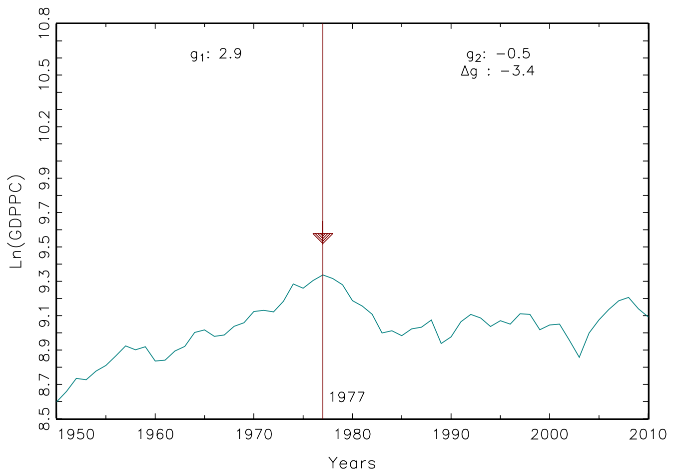
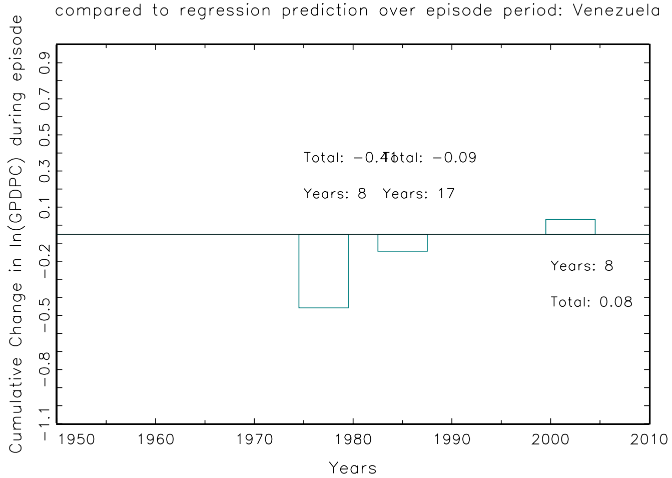


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Venezuela



Vietnam

Figure 5: Single trend for Vietnam

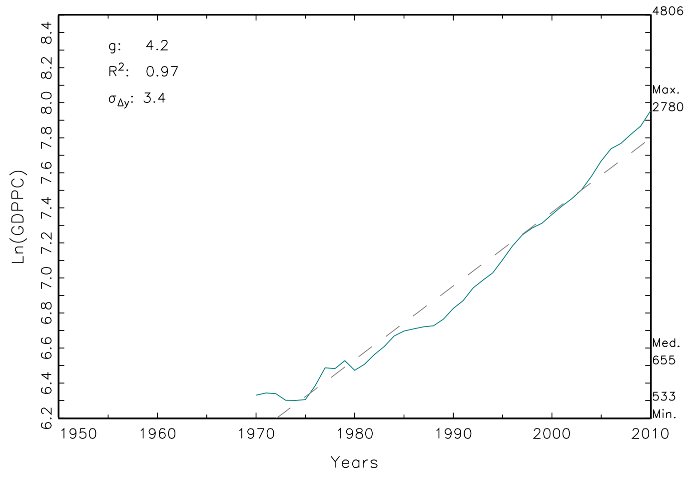


Figure 6: Breaks filtered from two possible B–P breaks: Vietnam

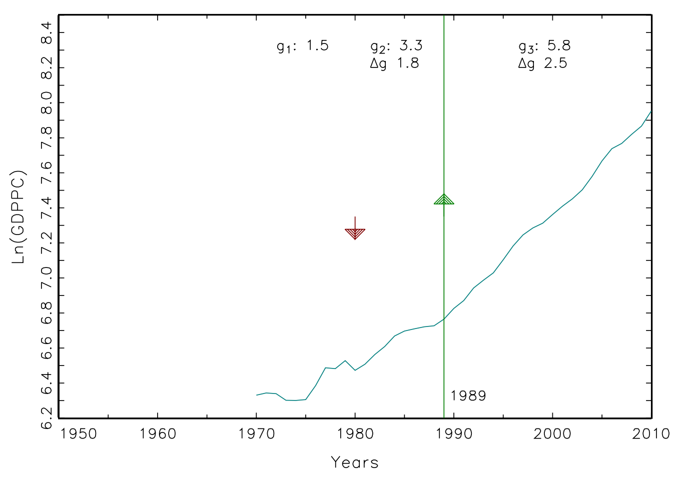


Figure 7: Bai–Perron Identified Break(s) for Vietnam

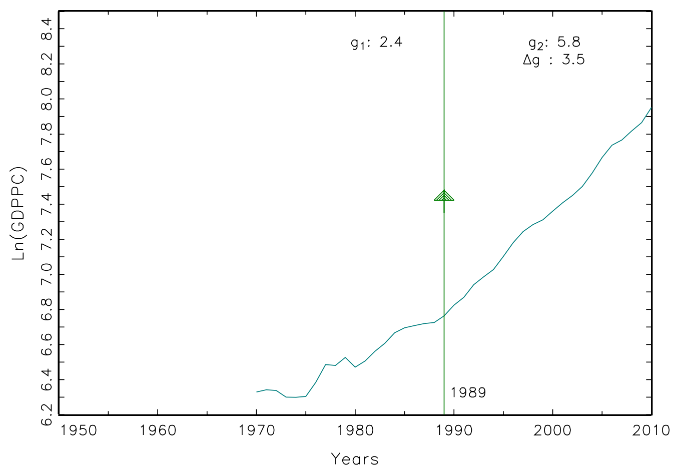
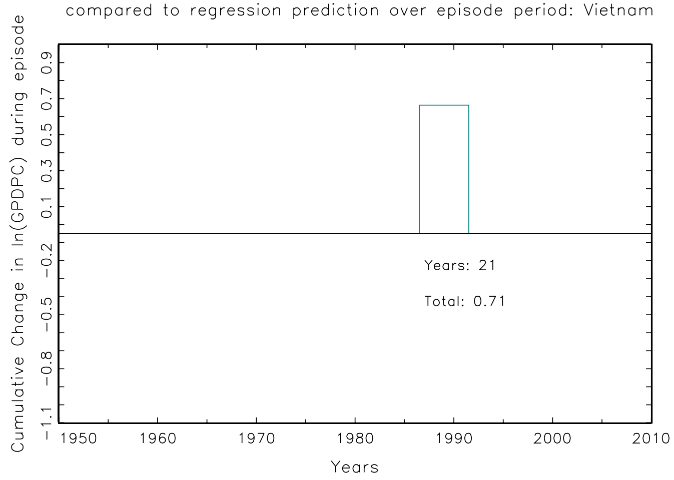


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Vietnam



Zambia

Figure 5: Single trend for Zambia

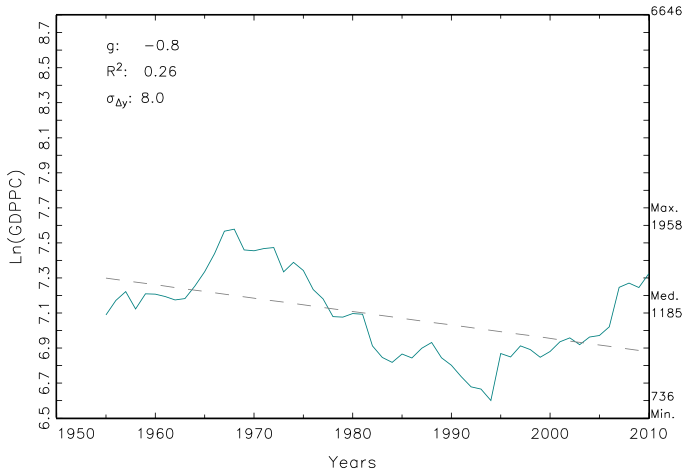


Figure 6: Breaks filtered from three possible B−P breaks: Zambia

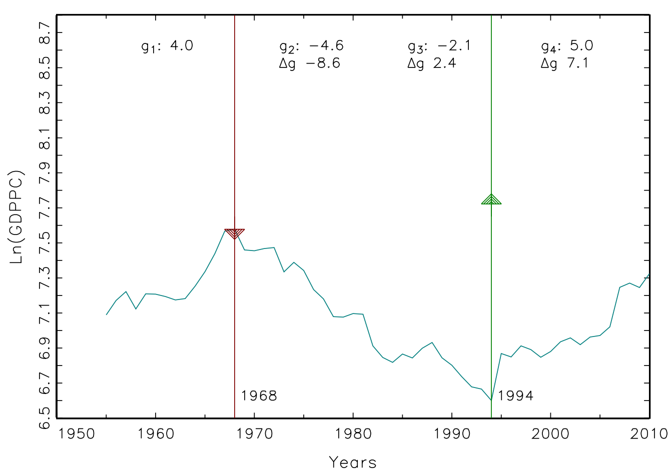


Figure 7: Bai−Perron Identified Break(s) for Zambia

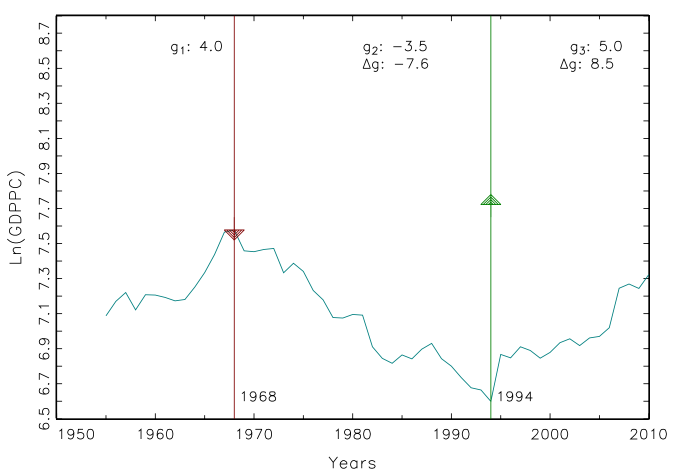
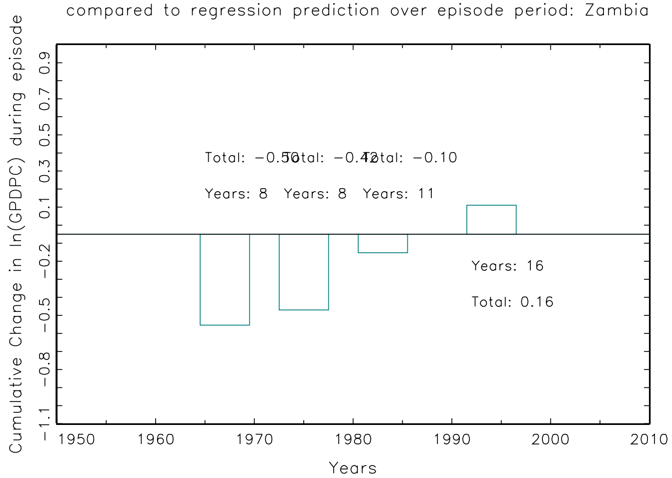


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Zambia



Zimbabwe

Figure 5: Single trend for Zimbabwe

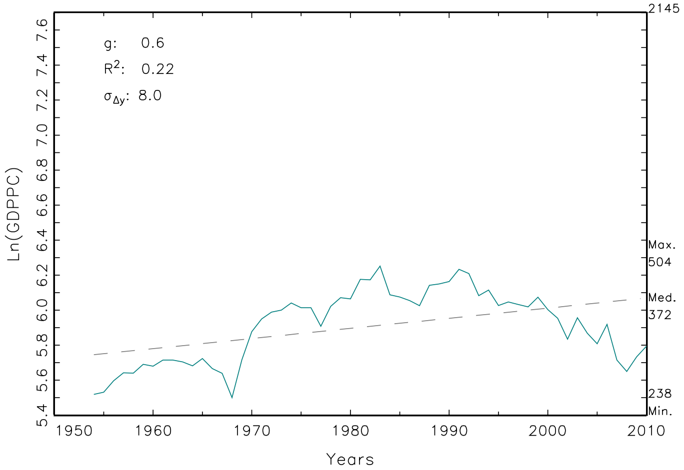


Figure 6: Breaks filtered from four possible B–P breaks: Zimbabwe

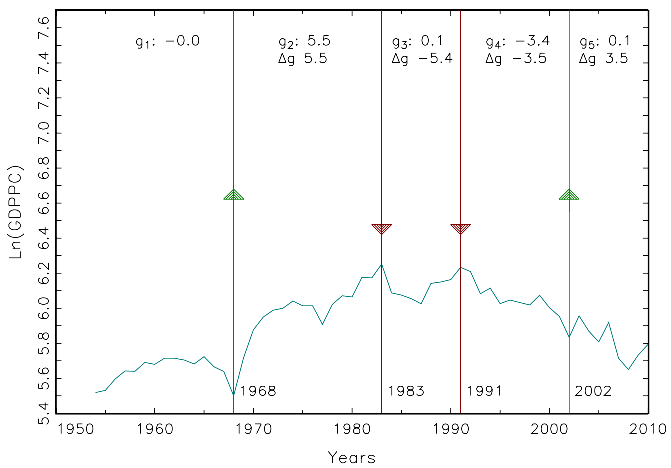


Figure 7: Bai–Perron Identified Break(s) for Zimbabwe

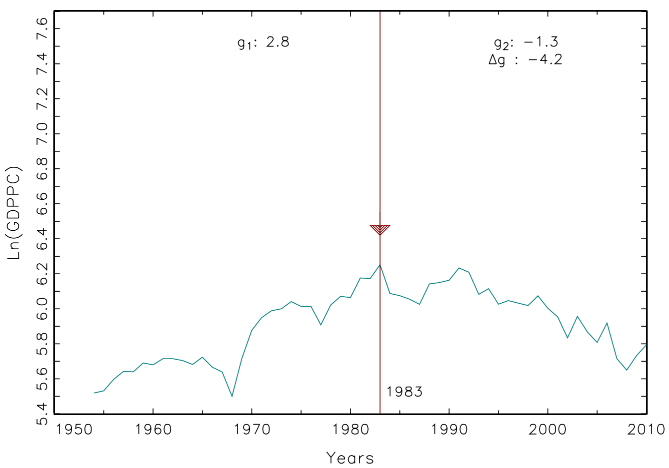


Figure 8: Cumulative change in LGDPPC from start to end of episode compared to regression prediction over episode period: Zimbabwe

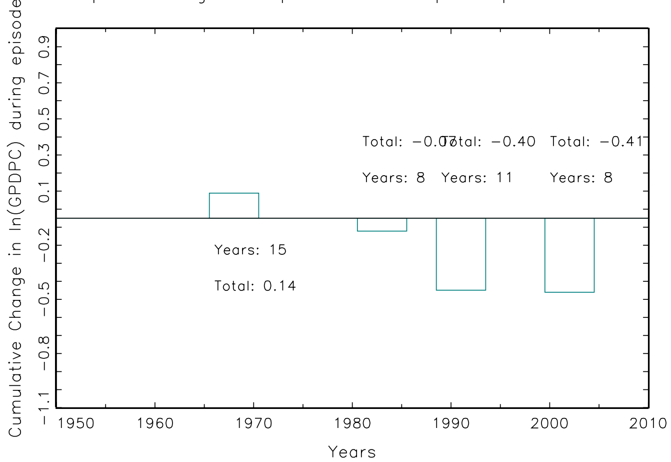


Figure 9: Surface Plot of Transition Probability Function

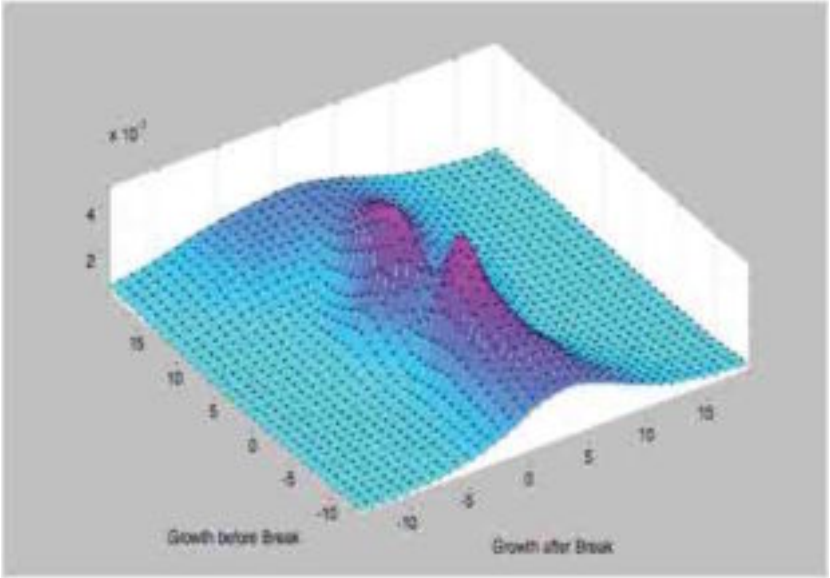
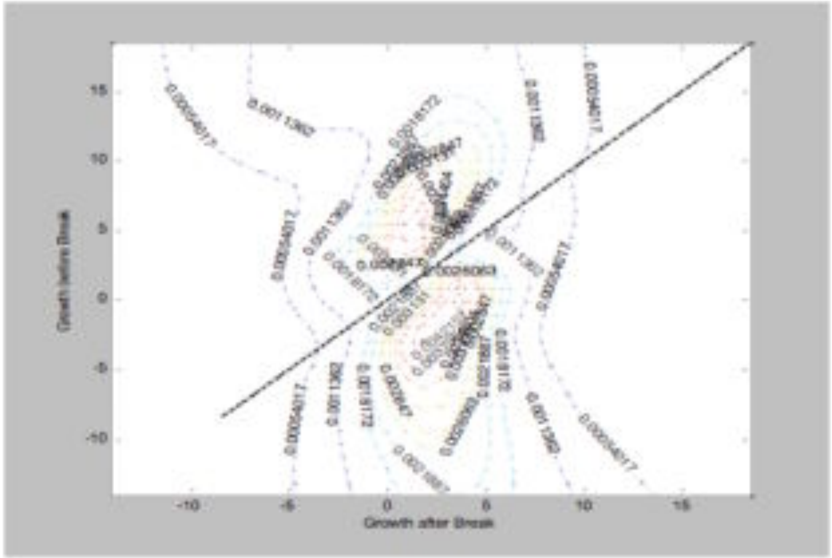
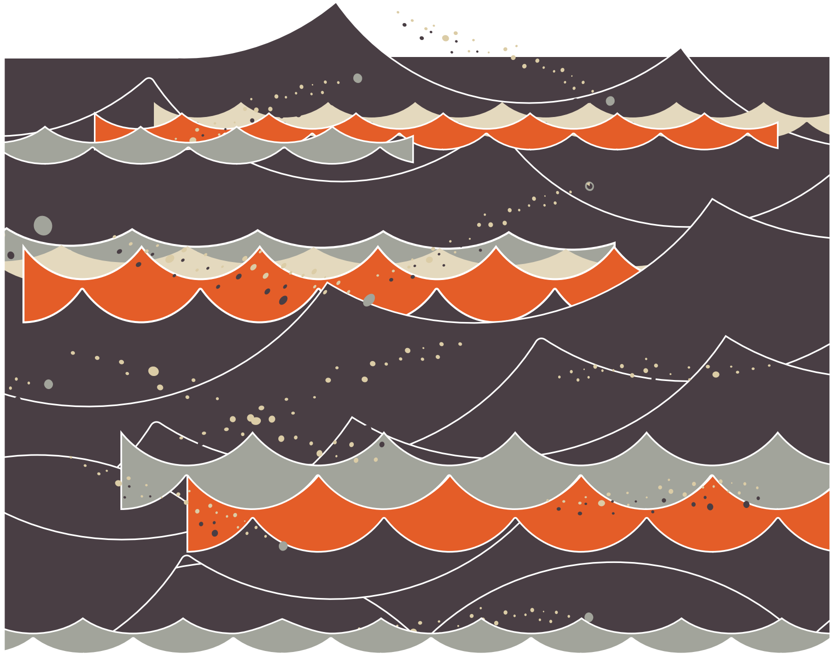


Figure 10: Contour Plot of Transition Probability Function





Part IV

Conclusions

Part IV: Conclusions

All happy families are alike, every unhappy family is unhappy in its own way.

TOLSTOY, ANNA KARENINA

What would "growth theory" be a theory of? As we see graphically, in the "happy" families of the rich industrial countries the traditional decomposition of the evolution of output per capita into "trend" and "cycle" makes lots of sense. Their growth rates are moderate, volatility is low and growth transitions are within a small range (no busts, no huge booms). The distinction between a "growth theory" (and empirics) that explains "the" growth rate (in either "exogenous" or "endogenous" variants) and a theory (and empirics) that explains the "cyclical" variations around that trend (macroeconomics) again makes sense.

However, almost no developing countries' growth experiences fit that pattern. Our primary goal for this "visual handbook" is to make it easy for people to *look* at the country growth experiences.

Part II summarizes each country's growth experience in a series of *exactly comparable* graphs that illustrate the different dimensions of growth from the simplest overall trend (Figure 1) to relative long-run performance (Figure 2) to growth volatility (Figure 3) to distribution across "growth regimes" (Figure 4).

Part III also produces new comparable graphs focused on documenting the timing and magnitude of "breaks" or "episodes" or "regime transitions" from the application of the standard statistical procedure (Figure 6) to a classification of growth breaks based on the *magnitude* of growth shifts (Figure 7) to estimates of the *cumulative* magnitude of growth episodes (Figure 8).

Unlike most papers that propose and defend a particular causal model (or add a new variable to an existing model) or propose an explanation of some phenomenon, our goal is to illustrate that there is an interesting phenomenon to be explained. There is nothing about the *dynamics* of economic growth – the apparent shifts across growth regimes – that is well-explained by either "growth theory" or "business cycle macroeconomics" of the first or second generation varieties. But these *dynamics* are empirically important – indeed in some instances "staggering" in magnitude.

References

Acemoglu, D., S. Johnson and J. Robinson (2001) 'The Colonial Origins of Comparative Development: An Empirical Investigation', *American Economic Review* **91**(5):1369-1401.

Acemoglu, D., S. Johnson and J. Robinson (2002) 'Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution', *Quarterly Journal of Economics* **117**(4):1231-1294.

Acemoglu, D., S. Johnson and J. Robinson (2004) 'Institutions as the Fundamental Cause of Long-run Growth.' National Bureau of Economic Research Working Paper No.10481.

Acemoglu, D., S. Johnson, J. Robinson and Y. Thaicharoen (2003) 'Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth.' *Journal of Monetary Economics* **50**(1):49-123.

Aghion, P and P. Howitt (2009) *The Economics of Growth*. Cambridge, MA, USA: MIT Press

Aghion, P. and P. Howitt P (1992) 'A Model of Growth through Creative Destruction'. *Econometrica* **60**(2): 323-351

Aguiar, M and G. Gopinath (2007) 'Emerging Market Business Cycles: The Cycle Is the Trend'. *Journal of Political Economy*, University of Chicago Press **115:** 69-102.

Aizenman, J. and M. Spiegel (2010) 'Takeoffs.' *Review of Development Economics* **14**: 177-196.

Bai, J. and P. Perron (1998) 'Estimating and Testing Linear Models with Multiple Structural Change'. *Econometrica* **66:** 47-78.

Bai, J. and P. Perron (2003a) 'Computation and Analysis of Multiple Structural Change Models'. *Journal of Applied Econometrics* **18:** 1-22.

Bai, J. and P. Perron (2003b) 'Critical Values for Multiple Structural Change Tests'. *Econometrics Journal*. **6**: 72-78.

Bai, J. and P. Perron (2006) 'Multiple Structural Change Models: A Simulation Analysis', in *Econometric Theory and Practice: Frontiers of Analysis and Applied Research*, D. Corbea, S. Durlauf and B. E. Hansen (eds.), pp. 212-237. Cambridge, UK: Cambridge University Press.

Barro, R. (1991) 'Economic Growth in a Cross-Section of Countries.' *Quarterly Journal of Economics* **106**(2): 407-443.

Barro, R. (1996) 'Democracy and Growth'. *Journal of Economic Growth* **1**(1):1-27.

Barro, R. (1997) *Determinants of Economic Growth*. Cambridge, MA, USA: MIT Press.

Barro, R. and R. McCleary (2003) 'Religion and Economic Growth Across Countries'. *American Sociological Review* **68**(5):760-781.

Barro, R. and X. Sala-i-Martin (1992) 'Convergence'. *Journal of Political Economy* **100**: 223-251.

Barro, R. and X. Sala-i-Martin (1995) *Economic Growth*. New York, USA: McGraw-Hill.

Barro, R. and X. Sala-i-Martin (1997) 'Technological Diffusion, Convergence, and Growth'. *Journal of Economic Growth* **2**:1-26.

Barro, R., N. G. Mankiw and X. Sala-i-Martin (1995) 'Capital Mobility in Neoclassical Models of Growth'. *American Economic Review* **85**(1): 103-115.

Ben-David, D. and D. H. Papell (1998). 'Slowdowns and Meltdowns: Postwar Growth Evidences from 74 Countries.' *Review of Economics and Statistics* **80**(4): 561-571.

Berg, A., J. Ostry and J. Zettelmeyer (2012) 'What Makes Growth Sustained?' *Journal of Development Economics* **98**(2):149-166.

Commission for Growth and Development (2008) *The Growth Report: Strategies for Sustained Growth and Inclusive Development*, Washington DC, USA: The World Bank.

Easterly, W. and R. Levine (1997) 'Africa's Growth Tragedy: Policies and Ethnic Divisions'. *Quarterly Journal of Economics* **112**:1203–1250.

Easterly, W., M. Kremer, L. Pritchett and L. Summers (1993) 'Good Policy or Good Luck? Country Growth Performance and Temporary Shocks'. *Journal of Monetary Economics* **32**:459-483.

Edwards, S. (1993) 'Openness, Trade Liberalization, and Growth in Developing Countries'. *Journal of Economic Literature* **31**:1358-1393.

Hall, R., and C. Jones (1999) 'Why Do Some Countries Produce So Much More Output Per Worker Than Others?' *Quarterly Journal of Economics* **114**(1):83-116.

Hausmann, R., F. Rodriguez, and R.Wagner (2006). 'Growth Collapses'. Kennedy School of Government Working Paper RWP06-046.

Hausmann, R., L. Pritchett and D. Rodrik (2005) 'Growth Accelerations', *Journal of Economic Growth* **10**:303-329.

Hausmann, R, J. Hwang and D. Rodrik (2007) 'What you export matters'. *Journal of Economic Growth* **12**(1): 1-25.

Helpman, E. (2004) *The Mystery of Economic Growth* Cambridge, MA, USA: Harvard University Press.

Hicks, J. R. (1965) *Capital and Growth* Oxford, UK: Oxford University Press.

Hidalgo, C. A, B. Klinger, A. L Barabási and R. Hausmann (2007) 'The Product Space Conditions the Development of Nations'. *Science* **317**(5837): 482-487.

Islam, N. (1995) 'Growth Empirics: A Panel Data Approach'. *Quarterly Journal of Economics* **110**:1127-1170.

Jerzmanowski, M. (2006) 'Empirics of Hills, Plateaus, Mountains and Plains: A Markov-switching Approach to Growth'. *Journal of Development Economics* **81**: 357-385.

Jones, B. F., and B. A. Olken (2008) 'The Anatomy of Start-Stop Growth'. *Review of Economics and Statistics* **90**(3):582-587.

Jones, B. F., and B. A. Olken (2005) 'Do Leaders Matter? National Leadership and Growth since World War II'. *Quarterly Journal of Economics* **120:** 835-864.

Jones, C. (1995) 'Time Series Tests of Endogenous Growth Models'. *Quarterly Journal of Economics* **110**(2):495-525.

Jones, C. (1997) 'Convergence Revisited'. *Journal of Economic Growth* **2**(2): 131-53.

Kar, S., L. Pritchett, S. Raihan and K. Sen (2013) 'Identifying Transitions in Growth Regimes'. Mimeo.

Kerekes, M. (2011) 'Analyzing Patterns of Economic Growth: a Production Frontier Approach', Mimeo.

Kerekes, M. (2012) 'Growth Miracles and Failures in a Markov Switching Classification Model of Growth'. *Journal of Development Economics* **98**(2): 167-177.

Levine, R. (1997) 'Financial Development and Economic Growth: Views and Agenda'. *Journal of Economic Literature*. **35**:688-726.

Levine, R. and D. Renelt (1992) 'A Sensitivity Analysis of Cross-Country Growth Regressions'. *American Economic Review* **82**, 942-963.

Lucas, R. (1988) 'On the Mechanics of Economic Development'. *Journal of Monetary Economics* **22**(1):3-42.

Mankiw, N. G., D. Romer and D. Weil (1992) 'A Contribution to the Empirics of Economic Growth'. *Quarterly Journal of Economics* **107**(2):407-437.

North, D. N., J. J. Wallis and B. R. Weingast (2009) *Violence and Social Orders*. Cambridge, UK: Cambridge University Press.

Penn World Tables, 7.1 version, Center for International Comparisons of Production, Income and Prices (CIC), University of Pennsylvania, available online: *https://pwt.sas.upenn.edu/php_site/pwt71/pwt71_form.php*

Pritchett, L. (1997) 'Divergence, Big Time'. *Journal of Economic Perspectives* **11**(3): 3-17.

Pritchett, L. (2000) 'Understanding Patterns of Economic Growth: Searching for Hills among Plateaus, Mountains and Plains'. *World Bank Economic Review* **14**(2):221-250.

Pritchett, L. and E. Werker (2012) 'Developing the guts of GUT (Grand Unified Theory): Elite Commitment and Inclusive Growth'. ESID Working Paper No. 16/12, Manchester, UK: University of Manchester. *www.effective-states.org*.

Pritchett, L., S. Kar, S. Raihan and K. Sen (2013) 'How Big?: Estimating the Total Output Gains and Losses from Accelerations and Decelerations in Economic Growth'. Mimeo.

Rodriguez, F. and D. Rodrik (2001) 'Trade Policy and Economic Growth: A User's Guide', in: B. Bernanke and K. Rogoff, eds., *Macroeonomics Annual 2000*. Cambridge, MA, USA: MIT Press.

Rodrik, D. (1999) 'Where Did All the Growth Go? External Shocks, Social Conflict, and Growth Collapses'. *Journal of Economic Growth* **4**(4):385-412.

Rodrik, D. (ed.) (2003) *In Search of Prosperity: Analytic Narratives on Economic Growth*. Princeton, NJ, USA: Princeton University Press.

Rodrik, D., A. Subramanian, and F. Trebbi (2004) 'Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development'. *Journal of Economic Growth* **9**(2):131-165.

Romer, P. (1986) 'Increasing Returns and Long-run Growth'. *Journal of Political Economy* **94**(5):1002-1037.

Romer, P. (1990) 'Human Capital and Growth: Theory and Evidence.' *Carnegie-Rochester Series on Public Policy* **32**:251-286.

Romer, P. (1993) 'Idea Gaps and Object Gaps in Economic Development'. *Journal of Monetary Economics* **32**(3):543-573.

Sala-i-Martin, X. (1996a) 'The Classical Approach to Convergence Analysis'. *Economic Journal* **106**:1019-1036.

Sala-i-Martin, X. (1996b) 'Regional Cohesion: Evidence and Theories of Regional Growth and Convergence'. *European Economic Review* **40**:1325-1352.

Sala-i-Martin, X. (1997) 'I Just Ran 2 Million Regressions'. *American Economic Review* **87**(2):178-183.

Solow, R. M. (1956) 'A Contribution to the Theory of Economic Growth'. *Quarterly Journal of Economics* **70**(1):65-94

Appendix 1: Methods to Identify Growth Breaks

A methodology used to identify growth breaks in the literature can be classified as either one of two distinct approaches, namely, the "filter-based" approach and the "statistical break test-based" approach. The "filter" approach identifies growth changes as "breaks" on the basis of statistical tests plus the *magnitude* of the change in growth before and after a break against a subjectively defined threshold (e.g. Hausmann *et al.*, 2005).[14] The "statistical" approach uses estimation and testing procedures that identify growth breaks in terms of statistically significant changes in (average) growth rates (e.g. Jones and Olken, 2008; Berg *et al.*, 2012; Kerekes, 2011).

All of the essential differences between "filter based" and "statistical" approaches come in the second stage of deciding which of the "candidate" break years identified by choosing years that maximize a test statistic (or, equivalently, minimizing the Sum of Squared Errors (SSE) under constraints) represents a "true" break.

The strongest criticism of the BP methodology is that it has low statistical power, leading to rejection of structural breaks even when they are "true" breaks. Moreover, since the statistical power of the test is dependent on the underlying volatility of the GDPPC series, the BP procedure may "reject" the null and identify as a "true" break a shift in growth rates with an acceleration from $g=1$ to $g=3.5$, $\Delta g=2.5$ in one country and "fail to reject" a break of the *exact same magnitude* in another country with higher volatility.

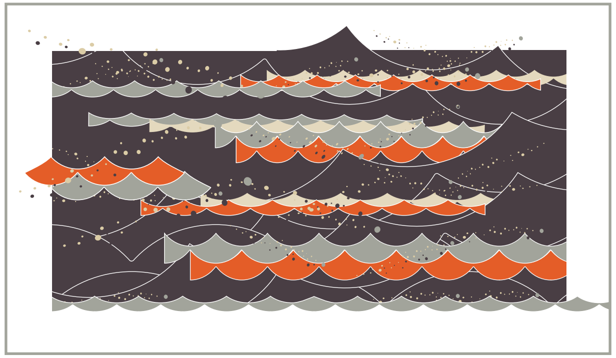
The literature has tried to deal with this problem in two ways. One set of papers (Jones and Olken, 2008; Kerekes, 2011) have accepted this shortcoming and stressed that although the set of breaks identified in their studies are a subset of the complete set of "true" breaks, the breaks that are identified are very large in magnitude and analysis of these breaks can throw light on growth transitions, even if others are excluded. Jones and Olken allow the minimum length of the growth regimes to vary depending on the length of the data available (which differs from country to country in the Penn World Tables). Kerekes (2011) fixes the shortest growth at eight years for all countries.

A second approach (Berg *et al.,* 2012) makes methodological changes to the BP tests in order to increase the power of these tests. One important outcome of the methodological differences in these studies is that, as contributions using a common framework, they fail to identify a largely common set of breaks, even for the historical data (Kar *et al.*, 2013). This clearly leads to serious concerns about the cohesiveness of the literature on growth breaks.

In Figure 6, for each country, we provide the year of the growth break if we

14 Hausmann *et al.* only calculate up breaks using a filter-break approach, and so is not strictly comparable with other studies, including ours, all of which use a statistical approach or a combination of a statistical plus filter approach.

only used BP to identify breaks in growth. Generally speaking, the timings of our breaks coincide with Berg *et al.* (2012). We find more breaks than Jones-Olken and Kerekes, both of which use a pure statistical approach. We also find more breaks with our "BP plus filter" approach as compared with using BP only, which, as we noted, with its low power, tends to accept the null hypothesis of no break more often than may be justified by the time-series data of GDPPC for several countries.



18481 – www.studio.crevado.com