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Does Convergence Exist?

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June 2013

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DOES CONVERGENCE EXIST?



By

SUMBUL JAHAN

Submitted to the

Faculty of Business Administration,

Institute of Business Administration

in partial fulfillment of the requirements for

the Masters of Science (Economics)

July, 2013

DOES CONVERGENCE EXIST?

A Research Project submitted in partial fulfillment of the requirements for the degree of Masters of Science (Economics) at Institute of Business Administration (IBA)

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Spring Semester 2013

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Dedication

I dedicate my project to my parents.

Acknowledgments

I would like to express my sincere gratitude to my supervisors Dr. Farooq Pasha and Dr. Heman D. Lohano for the continuous support of my Masters Study and research, for their patience, motivation, enthusiasm and immense knowledge. Their guidance helped me in all the time of research and writing of this report.

I would like to express my sincere gratitude to all professors who have shared their valuable knowledge about the subject and encouraged me to progress throughout.

I would like to thank my parents, who spent their lives to educate me in right way, and to whom I dedicate this project. I would also like to thanks my brother and my husband for their love, support and encouragement throughout my life.

Table of Contents

List of Tables.....	vii
List of Figures.....	viii
Abstract.....	ix
Chapter 1.....	01
Chapter 2.....	04
Chapter 3.....	07
Chapter 4.....	09
Chapter 5.....	20
Appendices.....	22
References.....	43

List of Tables

Table	Page
4.1.....	11
4.2.....	12
4.3.....	15
4.4.....	18
4.5.....	19

List of Figures

Figure	Page
4.1.....	10
4.2.....	11
4.3.....	13
4.4.....	14
4.5.....	15
4.6.....	16
4.7.....	31
4.8.....	32
4.9.....	33
4.10.....	34
4.11.....	35
4.12.....	36
4.13.....	37
4.14.....	38
4.15.....	39
4.16.....	40
4.17.....	41
4.18.....	42

Abstract

DOES CONVERGENCE EXIST?

Sumbul Jahan

Institute of Business Administration (IBA), 2013

Research Project Supervisor: Dr. Farooq Pasha & Dr. Heman D. Lohano

The idea of convergence in economics is the hypothesis that poorer economies income will tend to grow at faster rates than richer economies. As a result, all economies should eventually converge; Developing countries have the potential to grow at a faster rate than the developed countries because of availability of better health facilities and technological advancements adopted from developed countries. Convergence can have two meanings: firstly, absolute (σ) convergence refers to a reduction in the dispersion of levels of income across economies; beta (β) convergence occurs when poor economies grow faster than rich ones.

This research estimates absolute and beta convergence using natural log of GDP per capita and natural log of GDP per person employed, highlighting the differences in results achieved using two income parameters. This research estimates absolute and beta convergence firstly for all countries of the world; then for all developed countries and all developing countries, which have been classified as per income groups; and lastly, all developing countries have been subdivided into three regional groups and absolute and beta convergence in those three groups namely: Europe & Asia, North & Sub Saharan Africa, and Latin America & the Caribbean for a time period of 31 years from 1980 – 2011.

A pattern in results can be observed in this research, especially in three regional groups of developing countries. The differences in results in natural log of GDP per capita and natural log of GDP per person employed can be due to difference in literacy rate, standard of living, technological advancements, attitude towards work and many other structural variables.

Chapter 1

Introduction

According to income convergence hypothesis, developed and developing economies would converge in the long run in terms of economic growth rate, in spite of the distinctions in their initial income (Jones, 2008). With the ongoing pace of development in different countries, the phenomenon of convergence is growing more in importance as the gap between the rich and poor seems to be increasing even though theory says poor countries tend to grow at a faster rate than the rich countries but the question arises are these economies really growing the way now developed countries grew in the past. Still in the 21st century there are economies where average income is below \$1 per day and where still people are slaves. The question being imposed is that is the economic growth just being more burdened by aid and debt taken from the rich.

The convergence process can be classified into two broad categories or views. One is the 'catching up' view which emphasizes the convergence in per capita output across countries through the diffusion of technical knowledge from the high-tech economies to the ones lagging in terms of technology. This spread of expertise across countries is mainly supposed to be driven by trade openness. The other view states that if countries have different capital-labor ratios, due to diminishing returns to capital, their growth paths will eventually converge to a steady-state growth path. Convergence can also be classified into two types as per the neo-classical theory: unconditional and conditional. When all countries converge to the same steady-state level the convergence is unconditional. In such a case, the economies do not differ significantly in terms of structural variables, which influence their GDP, like the investment level. In contrast, when

the economies have different structures, they are thought to converge to a different steady state point; in this case convergence is conditional and the structural variables are to be incorporated in the model. Further, the phenomena of convergence can be observed in two forms: inter-country convergence where different economies converge either to a single steady state income level or converge to the income level of some developed economy; or intra-country convergence where different regions of a particular country converge to a steady state income level.

Numerous studies have been done in past on the topic of convergence whether it be inter country, intra country, inter regional and intra-regional like the studies done by Chowdhury (2005) where he attributed to low volume of intra-country trade, sluggish growth of exports and imports, and low per capita income growth by the individual ASEAN (Association of Southeast Asian Nations) countries for reasons of non-convergence; by Jian et al. (1996) shows that even as there is no demonstration of convergence before the economic reforms and there is considerable divergence during the Cultural Revolution (1966 -1977) in China; study by Barro and Sala-I-Martin (1991) across states of USA. All these studies have either selected one region or a group of countries there is a gap in study of inter-regional convergence.

1.1 Objective

The objective of this study is to test the absolute and beta convergence in all countries of the world, all developed countries, all developing countries, and all developing countries of the world sub divided into 3 regional groups: Europe & Asia, North & Sub Saharan Africa, and Latin America & Caribbean.

1.2 Organization of Report

Chapter 2 reviews literature on convergence. Chapter 3 discusses methodology adopted, data used in this research, model and the estimation method used. Chapter 4 presents and discusses the results of the study. Finally, a summary of these results and concluding remarks are presented in Chapter 5.

Chapter 2

Literature Review

Several studies have been done on the convergence of income per capita in the past, and analytically there are two broad methodological views that can explain the convergence process across economies. First is technological hypothesis where technology flows from Developed countries to Developing countries causing convergence in per capita output levels; this view is quite dominant in the writings of the classical economists like Adam Smith, David Ricardo, David Hume and Alfred Marshal. The second view is derived from the transitional dynamics of the neoclassical growth models. Neoclassical growth models predict that if countries have different capital-labor ratios, their growth paths will eventually converge to a steady-state growth path because of diminishing returns to capital. However, basic assumption remains same convergence depends on the simplifying assumptions that markets are perfectly competitive, technical change is exogenous and the level of technology is the same throughout. Thus, any failure of convergence can be attributed to the breakdown of these assumptions.

To discover the evidence of convergence in EU (European Union) countries, Liviu-Stelian et al. (2010) has used OLS (ordinary least square) method to find out two concepts of convergence across ASEAN members. σ Convergence occurs if the dispersion (inequality) of per capita GDP (Gross domestic product) across the countries declines over time. β convergence occurs if poor economies tend to grow faster than rich ones. It is obtained by estimating the growth of GDP per capita over a certain period of time in relation to its initial level. Negative β indicates that GDP per capita of countries with lower initial GDP per capita grow more rapidly than that of countries

with higher initial GDP per capita. It is argued that β convergence tends to cause σ convergence. There is also a third concept, conditional beta (β_c) convergence, which accounts for differences in investment, saving, population, and openness across countries.

Jarita Duasa (2010) investigates the existence of income convergence or income divergence on ten selected OIC (Organization of Islamic Conference) economies. By analyzing the degree of globalization in these economies, it is found that the results support the endogenous theory and depending approach which predict that globalization is likely to cause income divergence rather than convergence.

A paper by (SeSiano & D'Uva, 2007) says β convergence is there if there is an inverse relationship between per capita growth rates and its initial level. They followed a new approach proposed by Vogelsang and Tomljanovich (2002) to test the presence of β -convergence among Italian regions, in the period 1980 – 2003, in the presence of a trend break in the series. The benefits of this methodology are the overall validity both for general serial correlation in the data and persistent correlation in the error terms without requiring unit root pre-tests.

Chowdhury has done two studies on ASEAN (2005) and on SAARC (South Asian Association for Regional Cooperation) (2004). This study analyzes the issue of per capita GDP convergence using OLS based sigma and beta convergence. Empirical results failed to find evidence of sigma convergence, beta convergence and conditional beta convergence and thus any evidence of per capita income convergence in South Asia.

Webber and White (2004) have used the idea of concordance to test the convergence hypothesis across 97 countries for the period 1960-2000. While analyzing the convergence pattern across countries, the usual sigma and beta convergence results identify just the existence of convergence or divergence whether or not the respective countries have switched their position during the given time period.

Barro and Sala-I-Martin (1991) use the neoclassical growth model as a framework to study convergence across the forty-eight U.S. states. They exploit data on personal income since 1840 and on gross state product since 1963 to find out conditional beta convergence. This paper finds evidence in support of unconditional beta convergence for states by introducing regional and sectorial dummy variables to capture the origin of the heterogeneous characteristics across states.

Romer (1986) cites three important reasons for the convergence process. First, the neo-classical growth models predict countries converge to their balanced growth paths. Thus to the extent that differences in output per worker arise from countries being at different points relative to their balanced growth paths, one would expect the poorer countries to catch up to the richer. Second, the Solow model implies that the return on capital is lower in countries with more capital per worker. Thus, capital flow from rich to poor countries will eventuate leading to convergence. Lastly, when there are lags in the diffusion of knowledge, income differences can arise since some countries are lacking in production techniques. These differences can disappear once poorer countries gain access to the cutting edge technology.

Chapter 3

Methodology

This chapter describes the data used in the study and presents the model used for estimation of absolute and beta convergence and the estimation methods used in the study.

3.1 Theoretical Model

Capital accumulation equation of Solow model, $s\bar{Y} = \Delta K_t + \bar{d}k$ shows, when $s\bar{Y} > 0$ capital stock is rising which indicates economic growth, as economy reaches steady state, ΔK_t becomes constant and the savings rate is explained by the rate of depreciation which can be used to explain σ convergence; similarly using transitional dynamics a reduced form of the Solow model relates the growth rate in income to the initial level of income; $Ln\left(\frac{y_t}{y_0}\right) = \alpha - (1 - e^{-\beta T}) \cdot lny_0$; in this regression model the parameter β indicates speed of convergence.

3.2 Empirical Model

In this paper Absolute (σ) convergence and Beta (β) convergence has been estimated. Absolute (σ) convergence is tested by estimating the following model:

$$\sigma_t = \gamma + \rho_t + u_t \quad (3.1)$$

where, σ_t is the standard deviation of all countries at time t, γ and ρ are parameters and u_t is the stochastic error term. A significant negative value for ρ implies absolute convergence, while $\rho \geq 0$ implies non-convergence.

Beta (β) convergence can be tested by running the following regression of growth of per capita GDP across economies:

$$(y_{it} - y_{i,t-T}) = \alpha + \beta y_{i,t-T} + \mu_t \quad (3.2)$$

where, y is natural log of GDP per capita and natural log of GDP per person employed, t indicates the end of the time interval and $(t-T)$ is the beginning (initial) of the time interval and μ_t is the stochastic error term. In terms of above equation a significant negative value for β implies beta (β) convergence, while $\beta \geq 0$ implies non-convergence.

3.3 Data

The time period of study is 31 years i.e. 1980 – 2011. Panel data have been obtained from World Bank's World Development Indicators for all countries; some countries have been omitted from the analysis due to lack of availability of data. The yearly data have been used for the analysis due to the lack of access to the data of higher frequency.

3.4 Estimation Method

Absolute (σ) convergence is estimated using equation 3.1, where the standard deviation of all countries in one time is estimated and then it is regressed to estimate σ convergence from 1980 – 2011. Beta (β) convergence uses cross sectional data from 1980 – 2011 where growth rate of natural log of GDP per capita is regressed over natural log of GDP per capita in 1980, which is the initial time period, given in equation 3.2. Also, this method is used for the case of natural log of GDP per person employed. These models are estimated using the software STATA 11.0.

Chapter 4

Results and Discussion

This chapter discusses results of absolute and beta convergence first in all countries of the world, then in all developed countries of the world, followed by all developing countries of the world and lastly all developing countries subdivided into 3 regional groups.

4.1 Convergence in World

In order to test convergence this research was started by initially checking absolute and beta convergence for all countries of the world for both natural log of GDP per capita and natural log of GDP per person employed where we failed to find absolute convergence results have been summarized in Table 4.1; while beta convergence was only seen in natural log of GDP per person employed as shown in Figure 4.2, whereas no beta convergence was seen in natural log of GDP per capita as shown in Figure 4.1.

Figure 4.1 Scatter plot of natural log of GDP per capita in 1980 and growth in natural log of GDP per capita 1980 – 2011 for world.

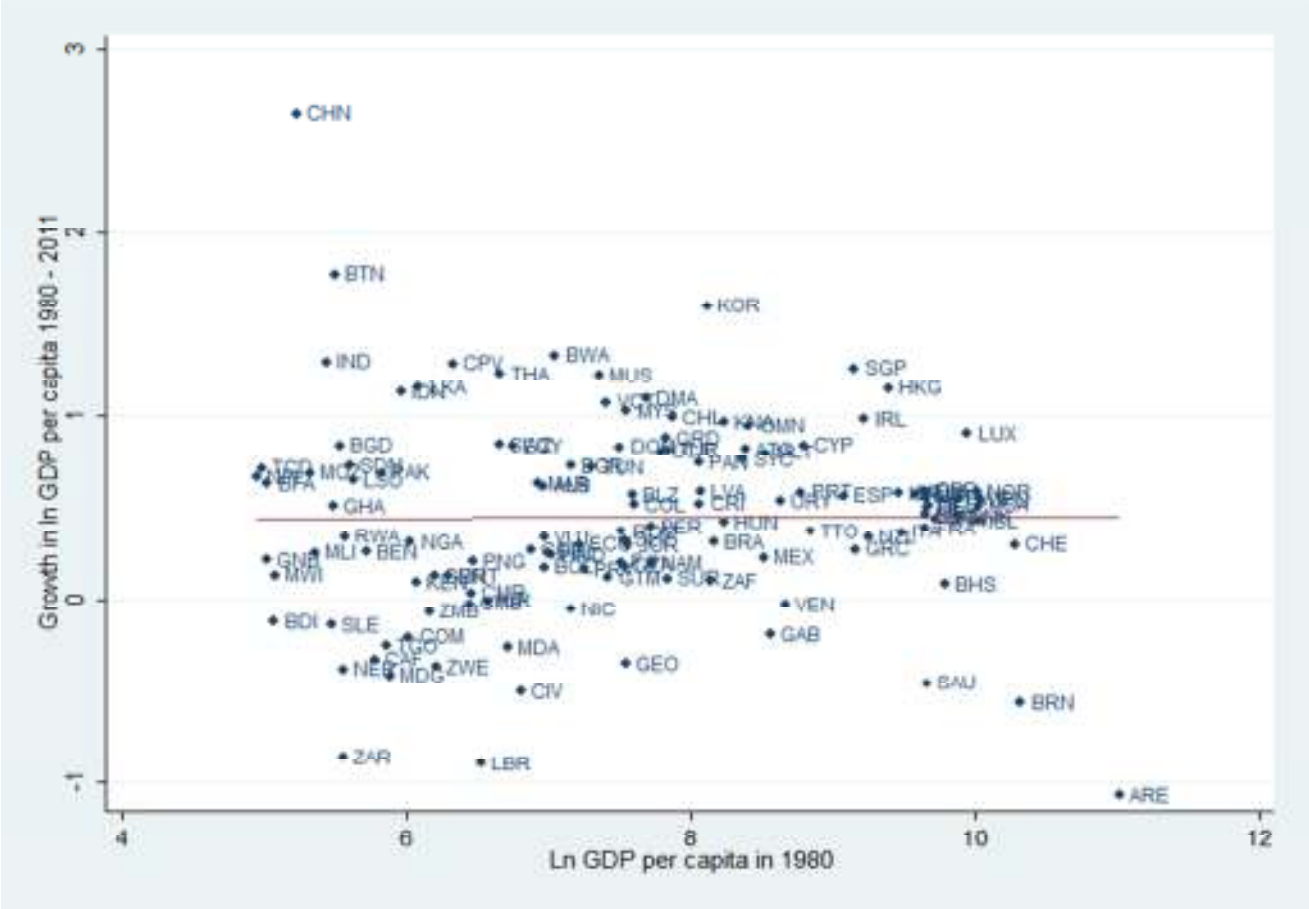


Figure 4.2 Scatter plot of natural log of GDP per person employed in 1980 and growth in natural log of GDP per person employed 1980 – 2011 for world.

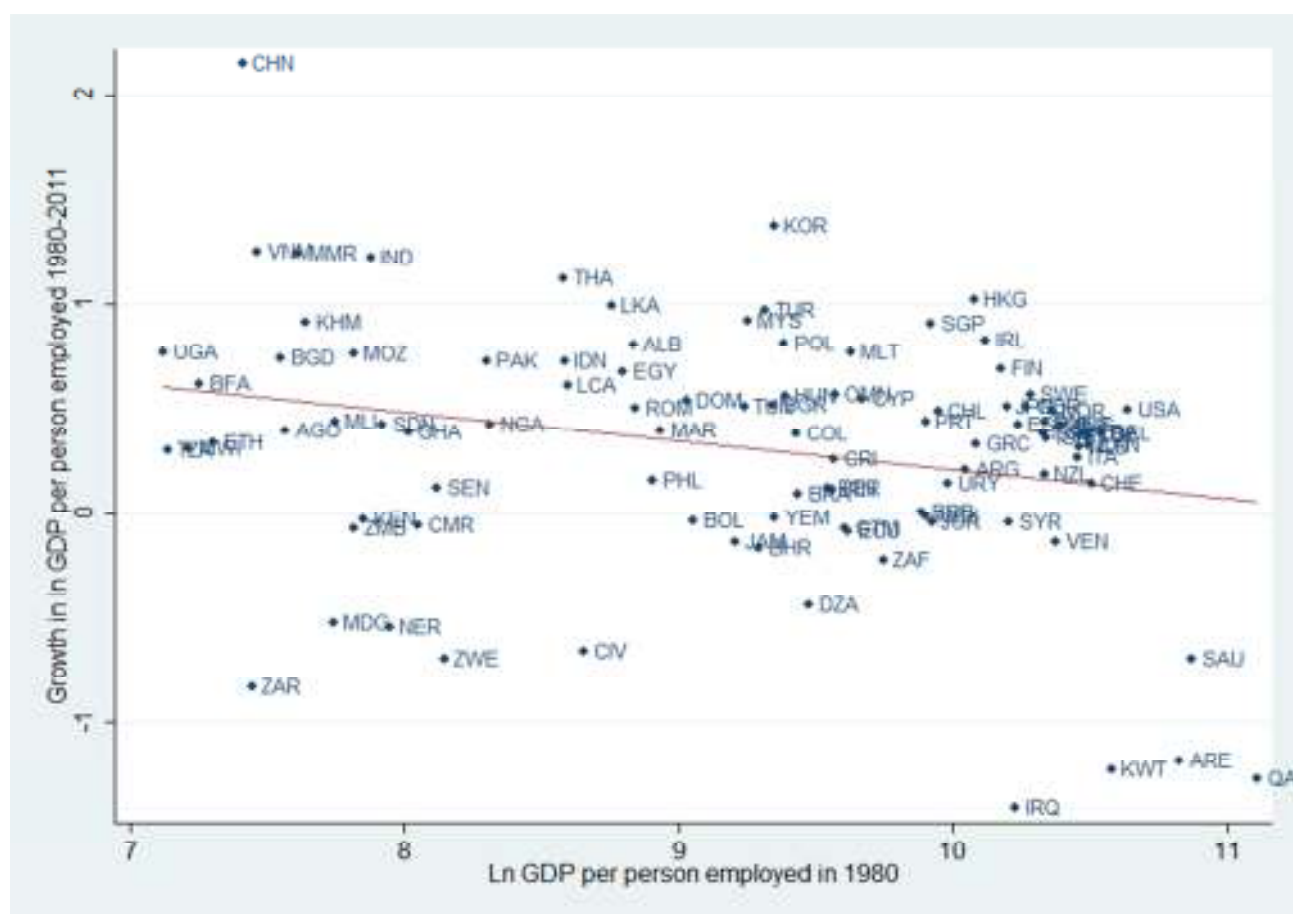


Table 4.1 Results of absolute and beta convergence for all countries of the world.

Natural log of	Absolute Convergence			Beta Convergence		
	ρ	p-value	Convergence	β	p-value	Convergence
GDP per capita	0.0049	0.000	no	0.0017	0.958	no
GDP per person employed	0.0015	0.003	no	-0.1362	0.010	yes

4.2 Convergence in Developed Countries

Developed countries consist of countries with high income and upper middle income group as categorized by the World Bank. Absolute and Beta convergence is seen in group of developed countries in both natural log of GDP per capita and natural log of GDP per person employed as summarized by Table 4.2 and shown in Figure 4.3 and 4.4 for natural log of GDP per capita and natural log of GDP per person employed respectively.

Table 4.2 Results of absolute and beta convergence for all developed countries

Natural log of	Absolute Convergence			Beta Convergence		
	ρ	p-value	Convergence	β	p-value	Convergence
GDP per capita	-0.0035	0.000	yes	-0.2449	0.000	yes
GDP per person employed	-0.0009	0.053	yes	-0.3918	0.000	yes

Figure 4.3 Scatter plot of natural log of GDP per capita in 1980 and growth in natural log of GDP per capita 1980 – 2011 for developed countries.

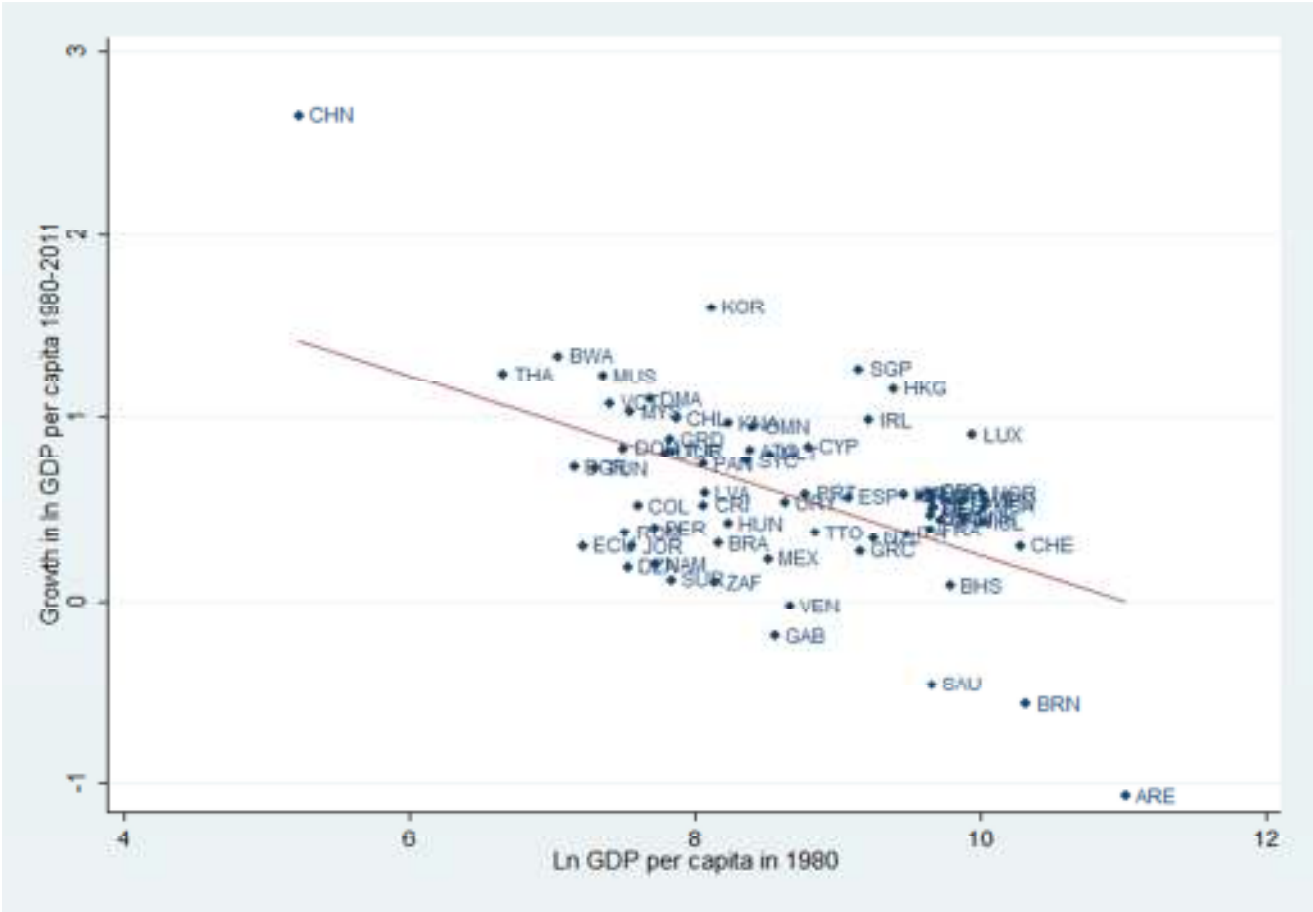
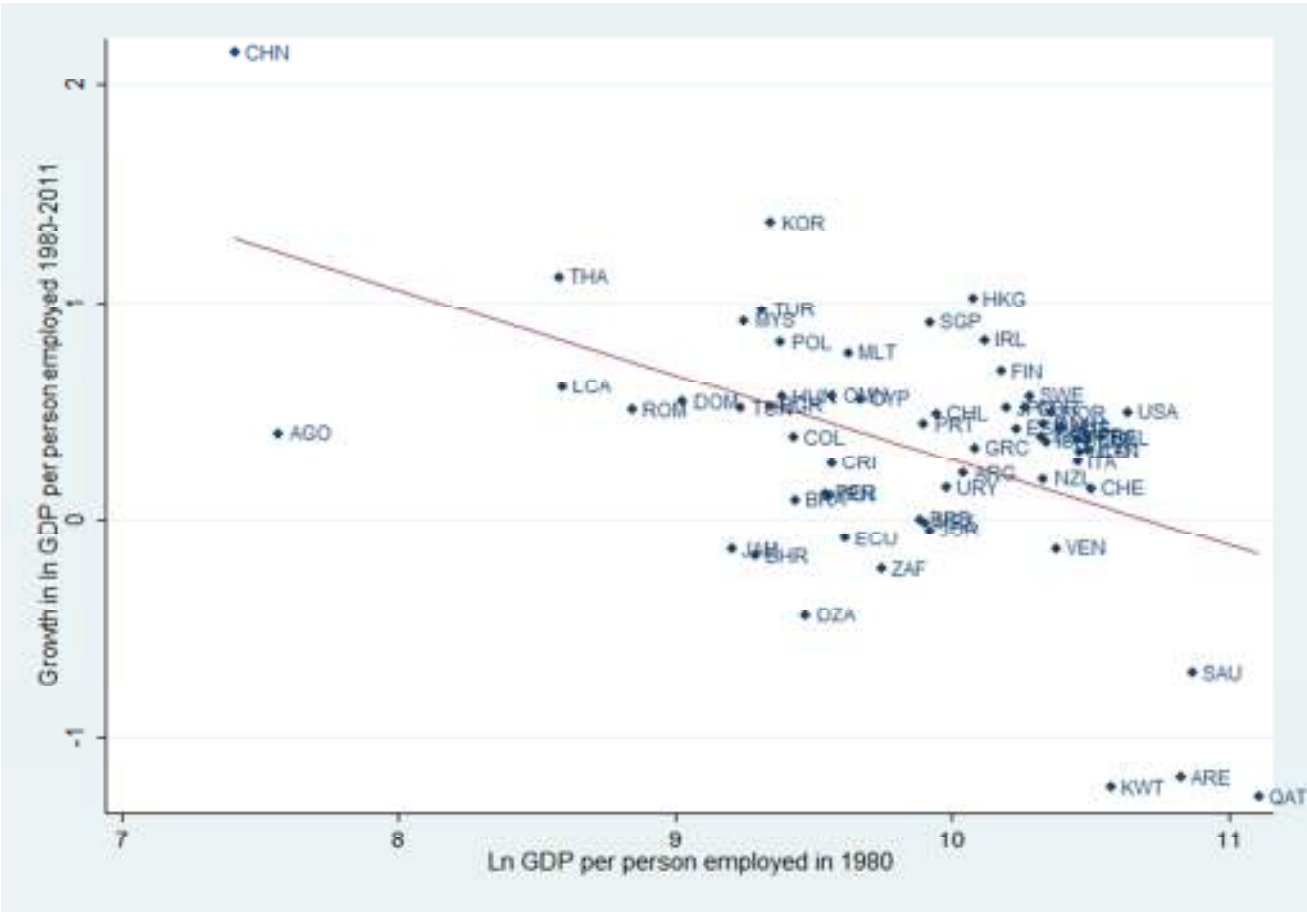


Figure 4.4 Scatter plot of natural log of GDP per person employed in 1980 and growth in natural log of GDP per person employed 1980 – 2011 for developed countries.



4.3 Convergence in Developing Countries

Developing countries consists of countries with lower middle income and low income group. Absolute convergence is not seen in group of developing countries for both natural log of GDP per capita and natural log of GDP per person employed same is case of beta convergence for natural log of GDP per capita shown in Figure 4.5 but beta convergence is only seen in natural log of GDP per person employed as shown in Figure 4.6 this may be due to difference in income level, geographical location, cultural difference, technological adoption, literacy rate, standard of living and so on. Results have been summarized in Table 4.3.

Table 4.3 Results of absolute and beta convergence for all developing countries.

Natural log of	Absolute Convergence			Beta Convergence		
	ρ	p-value	Convergence	β	p-value	Convergence
GDP per capita	0.0041	0.000	no	-0.1137	0.230	no
GDP per person employed	0.0017	0.000	no	-0.2688	0.036	yes

Figure 4.5 Scatter plot of natural log of GDP per capita in 1980 and growth in natural log of GDP per capita 1980 – 2011 for developing countries.

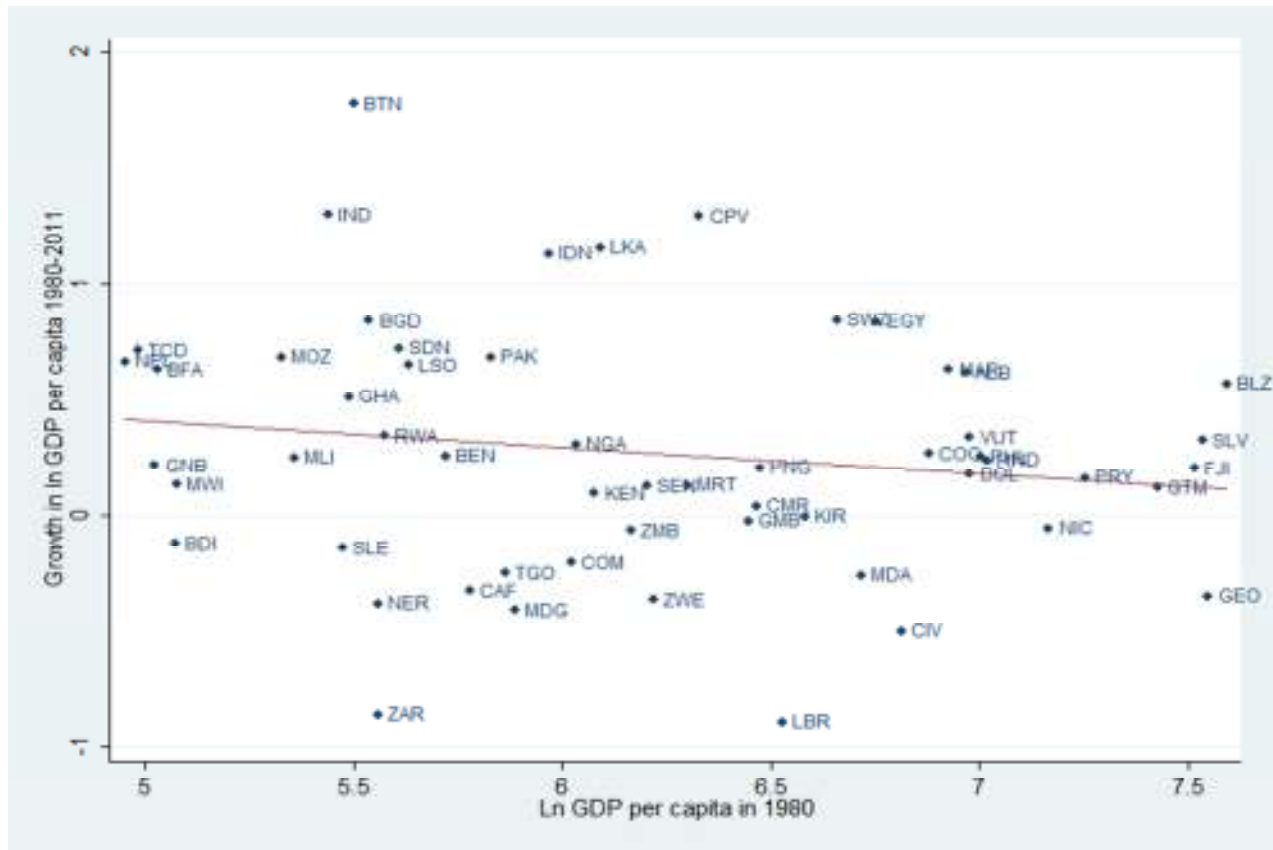
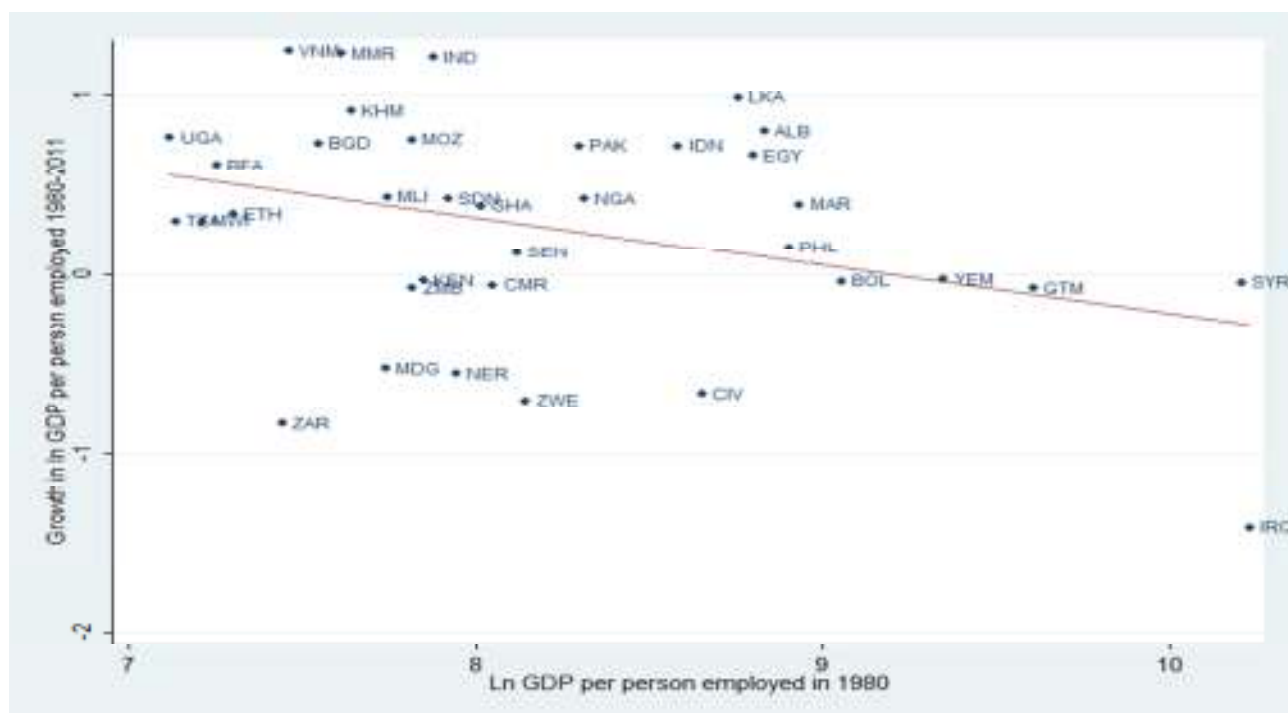


Figure 4.6 Scatter plot of natural log of GDP per person employed in 1980 and growth in natural log of GDP per person employed 1980 – 2011 for developing countries.



4.4 Convergence in Regional Groups of Developing Countries

Due to differences in result in group of developing countries and for no known and accounted for reason of the convergence in developing countries, this research also focuses on sub groups of developing countries as literature suggests many reasons but no specific reason has been determined yet due to differences in culture, geographic location, language and so on in all countries of the world and these differences are also present within a country as well. Thus, all developing countries which consist of low income group and middle income group were further sub divided into 3 categories based on geographical location in order to minimize impact of climatic and cultural differences which may hamper our results. Analysis is done for same time

period from 1980 – 2011 using STATA, list of all countries is attached in appendix. The groups of developing countries are:

Groups	No. of Countries	Population
Europe & Asia	23	4.038 billion
North & Sub Saharan Africa	42	1.211 billion
Latin America & Caribbean	24	589.0 million

Source: "World databank," 2013

With log of the data Absolute convergence is observed in natural log of GDP per capita and in natural log of GDP per person employed in Europe and Asia also shown in Figure 4.7 on page 31 and 4.8 on page 32 as the value of ρ is negative and is significant as p-value is less than 0.05. Absolute convergence is not observed in North and Sub Saharan Africa in both natural log of GDP per capita shown in Figure 4.9 on page 33 and in natural log of GDP per person employed shown in Figure 4.10 on page 34 as the value of ρ is positive. However, in Latin America & Caribbean no absolute convergence is seen in natural log of GDP per capita shown in Figure 4.11 on page 35 and in natural log of GDP per person employed shown in Figure 4.12 on page 36. Table 4.4 summarizes the results, this variation in result may be due to difference in population and number of people employed in that region since not entire population be a part of labor force.

Table 4.4 Results of absolute convergence for regional groups of developing countries.

Group	Natural log of GDP per capita			Natural log of GDP per person employed		
	ρ	p-value	Convergence	ρ	p-value	Convergence
Europe & Asia	-0.0041	0.000	yes	-0.0100	0.000	yes
North & Sub Saharan Africa	0.0074	0.000	no	0.0014	0.000	no
Latin America & Caribbean	0.0053	0.000	no	-0.0004	0.268	no

With log of the data Beta convergence is observed in Europe and Asia in both natural log of GDP per capita as well as natural log of GDP per person employed as the value of beta is negative and is significant as p-value is less than 0.05 as shown by Figure 4.13 on page 37 and 4.14 on page 38. Results are summarized in Table 4.5 below; which shows, no beta convergence is present in natural log of GDP per capita and in natural log of GDP per person employed in North and Sub Saharan Africa shown in Figure 4.15 on page 39 and in Figure 4.16 respectively, on page 40. Similarly, no beta convergence is seen in Latin America and the Caribbean shown in Figure 4.17 for natural log of GDP per capita on page 41 and Figure 4.18 for natural log of GDP per person employed on page 42.

Table 4.5 Results of beta convergence for regional groups of developing countries.

Group	Natural log of GDP per capita			Natural log of GDP per person employed		
	β	p-value	Convergence	β	p-value	Convergence
Europe & Asia	-0.3983	0.007	yes	-0.6492	0.000	yes
North & Sub Saharan Africa	0.0805	0.371	no	-0.1209	0.356	no
Latin America & Caribbean	0.0909	0.556	no	-0.2107	0.153	no

Chapter 5

Conclusions

This study investigates the absolute and beta convergence for all countries of the world, for all developed countries, all developing countries, which have been classified as per income groups, and all developing countries, which have been subdivided into three regional group: Europe & Asia, North & Sub Saharan Africa, and Latin America & the Caribbean for a time period of 31 years from 1980 – 2011.

According to the findings of this research, convergence is not present in all countries of the world whether its natural log of GDP per capita or natural log of GDP per person employed from 1980 – 2011. When all countries of the world were divided into developed and developing countries as per income level, convergence is seen in all developed countries for both natural log of GDP per capita and natural log of GDP per person employed from 1980 – 2011. However, beta convergence is seen in natural log of GDP per person employed in group of developing countries while neither absolute nor beta convergence is seen in natural log of GDP per capita in developing countries and no absolute convergence is seen in natural log of GDP per person employed from 1980 – 2011. These findings support the theory that convergence does exist in developed countries even today and not in developing countries.

Since no convergence was seen in group of developing countries so this group was sub divided into three regional groups namely Europe & Asia, North & Sub Saharan Africa, and Latin America & the Caribbean. Where convergence was only seen in Europe & Asia in both natural

log of GDP per capita and natural log of GDP per person employed for same time period while no convergence was seen in North & Sub Saharan Africa and in Latin America & the Caribbean in both natural log of GDP per capita and natural log of GDP per person employed for same time period.

There is a pattern of results; convergence is present in Europe & Asia while no convergence is seen in North & Sub Saharan Africa and in Latin America & the Caribbean since 1980 – 2011, this difference can be due to difference in literacy rate, standard of living, technological advancements, attitude towards work, density of population and many other structural variables which leaves a slope for future research.

Appendix A

Country names with abbreviations

Afghanistan	AFG	China	CHN
Albania	ALB	Colombia	COL
Algeria	DZA	Comoros	COM
American Samoa	ASM	Congo, Dem. Rep.	ZAR
Andorra	ADO	Congo, Rep.	COG
Angola	AGO	Costa Rica	CRI
Antigua and Barbuda	ATG	Cote d'Ivoire	CIV
Argentina	ARG	Croatia	HRV
Armenia	ARM	Cuba	CUB
Aruba	ABW	Curacao	CUW
Australia	AUS	Cyprus	CYP
Austria	AUT	Czech Republic	CZE
Azerbaijan	AZE	Denmark	DNK
Bahamas, The	BHS	Djibouti	DJI
Bahrain	BHR	Dominica	DMA
Bangladesh	BGD	Dominican Republic	DOM
Barbados	BRB	Ecuador	ECU
Belarus	BLR	Egypt, Arab Rep.	EGY
Belgium	BEL	El Salvador	SLV

Belize	BLZ	Equatorial Guinea	GNQ
Benin	BEN	Eritrea	ERI
Bermuda	BMU	Estonia	EST
Bhutan	BTN	Ethiopia	ETH
Bolivia	BOL	Faeroe Islands	FRO
Bosnia and Herzegovina	BIH	Fiji	FJI
Botswana	BWA	Finland	FIN
Brazil	BRA	France	FRA
Brunei Darussalam	BRN	French Polynesia	PYF
Bulgaria	BGR	Gabon	GAB
Burkina Faso	BFA	Gambia, The	GMB
Burundi	BDI	Georgia	GEO
Cambodia	KHM	Germany	DEU
Cameroon	CMR	Ghana	GHA
Canada	CAN	Greece	GRC
Cape Verde	CPV	Greenland	GRL
Cayman Islands	CYM	Grenada	GRD
Central African Republic	CAF	Guam	GUM
Chad	TCD	Guatemala	GTM
Channel Islands	CHI	Guinea	GIN
Chile	CHL	Guinea-Bissau	GNB
Guyana	GUY	Mexico	MEX
Haiti	HTI	Micronesia, Fed. Sts.	FSM

Honduras	HND	Moldova	MDA
Hong Kong SAR, China	HKG	Monaco	MCO
Hungary	HUN	Mongolia	MNG
Iceland	ISL	Montenegro	MNE
India	IND	Morocco	MAR
Indonesia	IDN	Mozambique	MOZ
Iran, Islamic Rep.	IRN	Myanmar	MMR
Iraq	IRQ	Namibia	NAM
Ireland	IRL	Nepal	NPL
Isle of Man	IMY	Netherlands	NLD
Israel	ISR	New Caledonia	NCL
Italy	ITA	New Zealand	NZL
Jamaica	JAM	Nicaragua	NIC
Japan	JPN	Niger	NER
Jordan	JOR	Nigeria	NGA
Kazakhstan	KAZ	Northern Mariana Islands	MNP
Kenya	KEN	Norway	NOR
Kiribati	KIR	Oman	OMN
Korea, Dem. Rep.	PRK	Pakistan	PAK
Korea, Rep.	KOR	Palau	PLW
Kosovo	KSV	Panama	PAN
Kuwait	KWT	Papua New Guinea	PNG
Kyrgyz Republic	KGZ	Paraguay	PRY

Lao PDR	LAO	Peru	PER
Latvia	LVA	Philippines	PHL
Lebanon	LBN	Poland	POL
Lesotho	LSO	Portugal	PRT
Liberia	LBR	Puerto Rico	PRI
Libya	LBY	Qatar	QAT
Liechtenstein	LIE	Romania	ROM
Lithuania	LTU	Russian Federation	RUS
Luxembourg	LUX	Rwanda	RWA
Macao SAR, China	MAC	Samoa	WSM
Macedonia, FYR	MKD	San Marino	SMR
Madagascar	MDG	Sao Tome and Principe	STP
Malawi	MWI	Saudi Arabia	SAU
Malaysia	MYS	Senegal	SEN
Maldives	MDV	Serbia	SRB
Mali	MLI	Seychelles	SYC
Malta	MLT	Sierra Leone	SLE
Marshall Islands	MHL	Singapore	SGP
Mauritania	MRT	Sint Maarten (Dutch part)	SXM
Mauritius	MUS	Slovak Republic	SVK
Slovenia	SVN	Tonga	TON
Solomon Islands	SLB	Trinidad and Tobago	TTO
Somalia	SOM	Tunisia	TUN

South Africa	ZAF	Turkey	TUR
South Sudan	SSD	Turkmenistan	TKM
Spain	ESP	Turks and Caicos Islands	TCA
Sri Lanka	LKA	Tuvalu	TUV
St. Kitts and Nevis	KNA	Uganda	UGA
St. Lucia	LCA	Ukraine	UKR
St. Martin (French part)	MAF	United Arab Emirates	ARE
St. Vincent and the Grenadines	VCT	United Kingdom	GBR
Sudan	SDN	United States	USA
Suriname	SUR	Uruguay	URY
Swaziland	SWZ	Uzbekistan	UZB
Sweden	SWE	Vanuatu	VUT
Switzerland	CHE	Venezuela, RB	VEN
Syrian Arab Republic	SYR	Vietnam	VNM
Tajikistan	TJK	Virgin Islands (U.S.)	VIR
Tanzania	TZA	West Bank and Gaza	WBG
Thailand	THA	Yemen, Rep.	YEM
Timor-Leste	TMP	Zambia	ZMB
Togo	TGO	Zimbabwe	ZWE

List of Countries in Groups:

Europe & Asia:

1. Albania
2. Bangladesh
3. Bhutan
4. Bulgaria
5. China
6. Fiji
7. Georgia
8. India
9. Indonesia
10. Jordan
11. Kiribati
12. Latvia
13. Malaysia
14. Moldova
15. Nepal
16. Pakistan
17. Papua New Guinea
18. Philippines
19. Romania
20. Sri Lanka
21. Thailand
22. Turkey
23. Vanuatu

Latin America & the Caribbean:

1. Antigua & Barbuda
2. Belize
3. Bolivia
4. Brazil
5. Chile
6. Colombia
7. Costa Rica
8. Dominica
9. Dominican Republic
10. Ecuador
11. El Salvador
12. Grenada
13. Guatemala
14. Honduras
15. Mexico
16. Nicaragua
17. Panama
18. Paraguay
19. Peru
20. St Lucia
21. St Vincent & the Grenadines
22. Suriname
23. Uruguay
24. Venezuela, RB

North & Sub Saharan Africa:

1. Algeria
2. Benin
3. Botswana
4. Burkina Faso
5. Burundi
6. Cameroon
7. Cape Verde
8. Central African Republic
9. Chad
10. Comoros
11. Congo, Dem. Rep.
12. Congo, Rep.
13. Cote d'Ivoire
14. Egypt, Arab Rep.
15. Gabon
16. Gambia
17. Ghana
18. Guinea – Bissau
19. Kenya
20. Lesotho
21. Liberia
22. Madagascar
23. Malawi
24. Mali
25. Mauritania
26. Mauritius
27. Morocco
28. Mozambique
29. Namibia

30. Niger
31. Nigeria
32. Rwanda
33. Senegal
34. Seychelles
35. Sierra Leone
36. South Africa
37. Sudan
38. Swaziland
39. Togo
40. Tunisia
41. Zambia
42. Zimbabwe

Appendix B

Growth in GDP per Capita

Europe & Asia:

Figure 4.7 Growth in natural log of GDP per capita in Europe & Asia from 1980 – 2011.

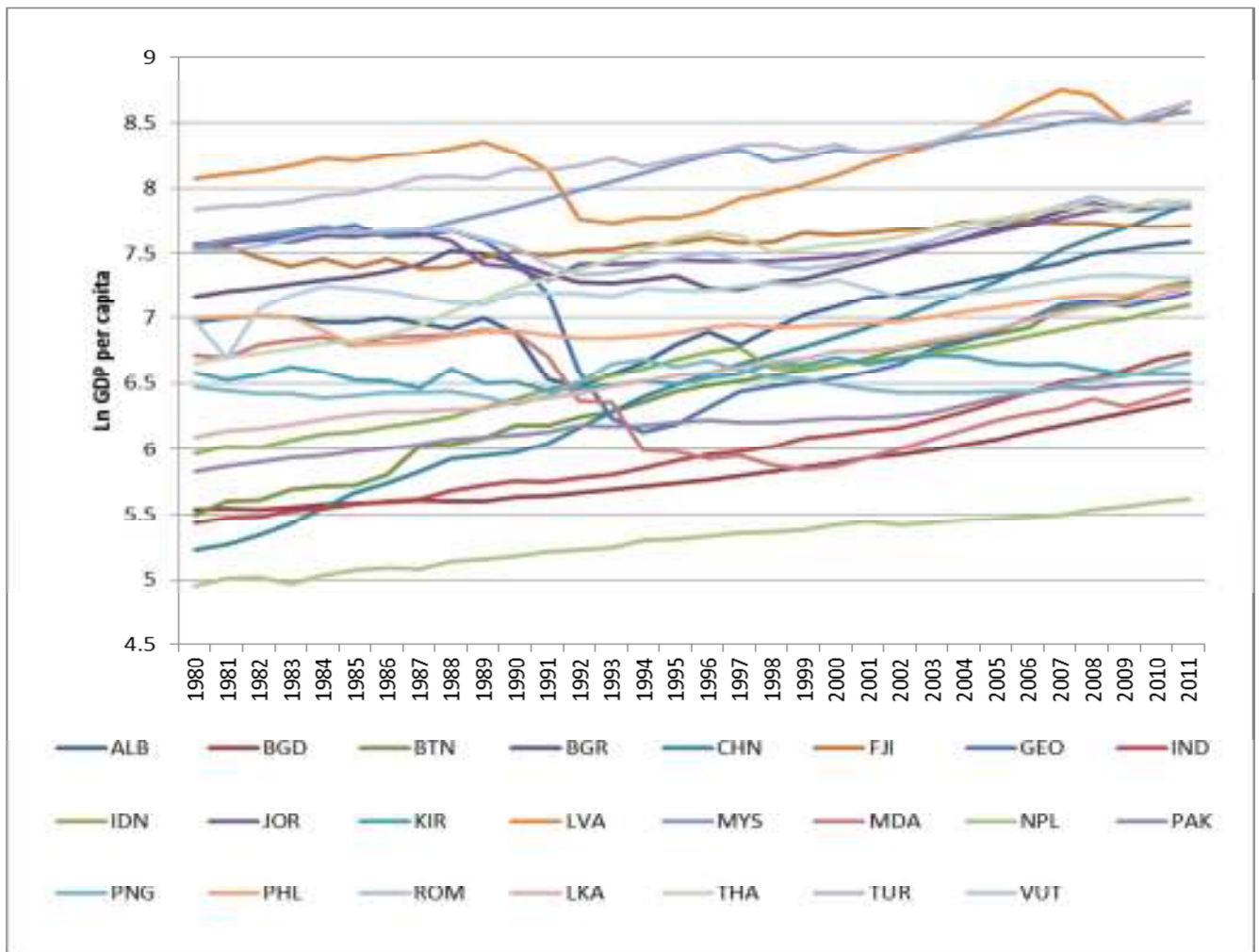
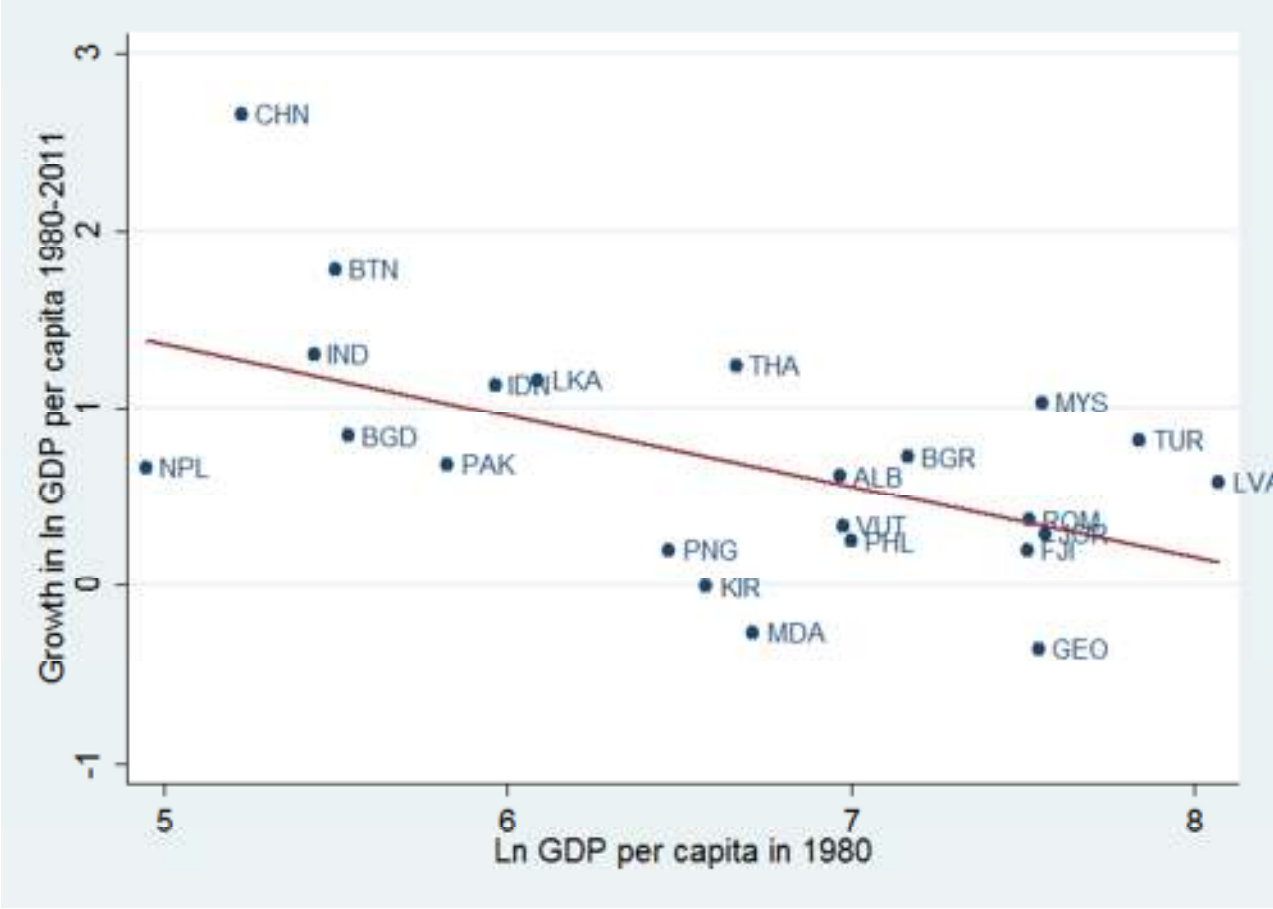


Figure 4.8 Scatter plot of natural log of GDP per capita in 1980 and Growth in natural log of GDP per capita from 1980 to 2011 in Europe & Asia.



North & Sub Saharan Africa:

Figure 4.9 Growth in natural log of GDP per capita in North & Sub Saharan Africa from 1980 – 2011

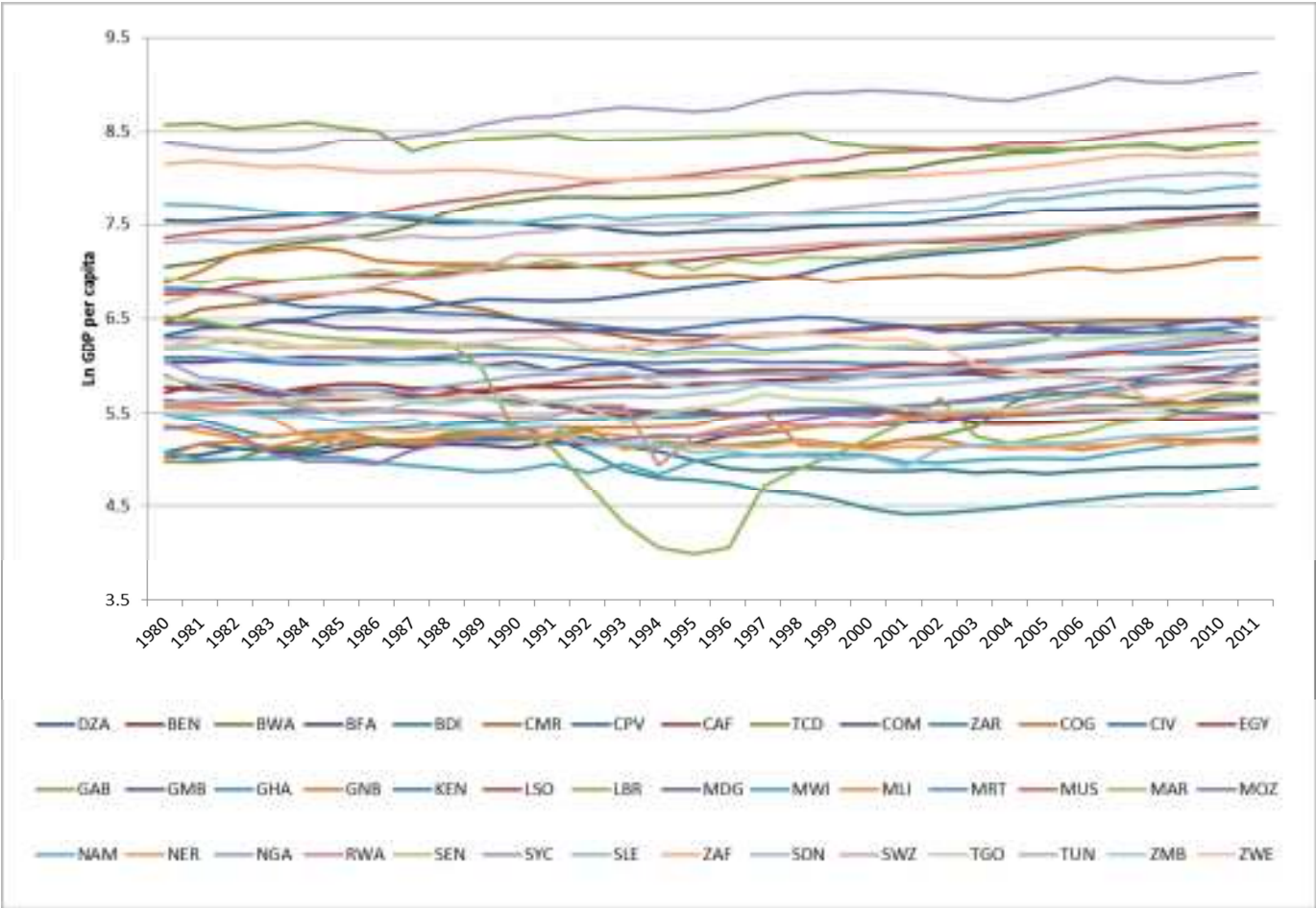
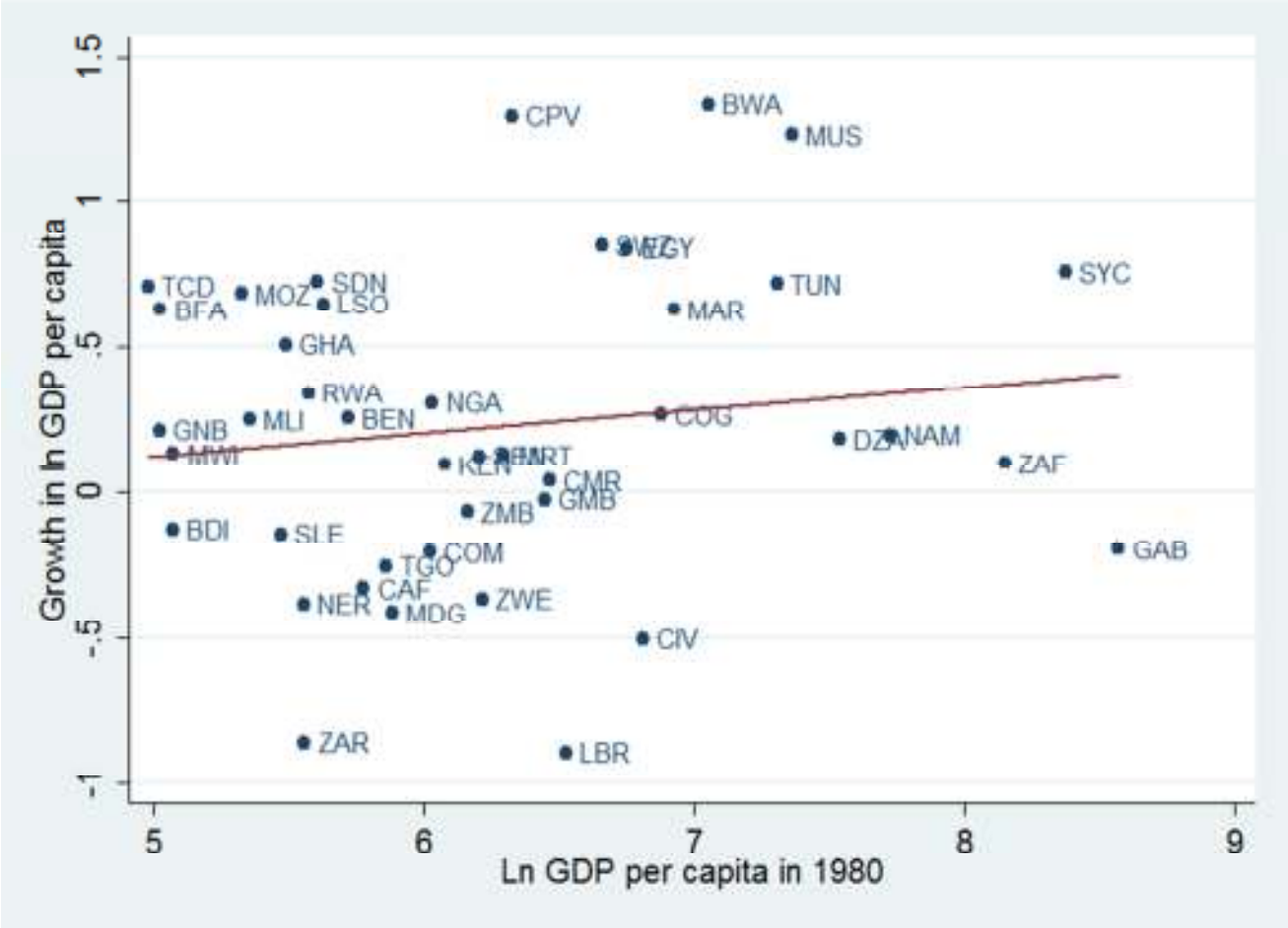


Figure 4.10 Scatter plot of natural log of GDP per capita in 1980 and Growth in natural log of GDP per capita from 1980 to 2011 in North & Sub Saharan Africa.



Latin America & the Caribbean:

Figure 4.11 Growth in natural log of GDP per capita in Latin America & the Caribbean from 1980 – 2011.

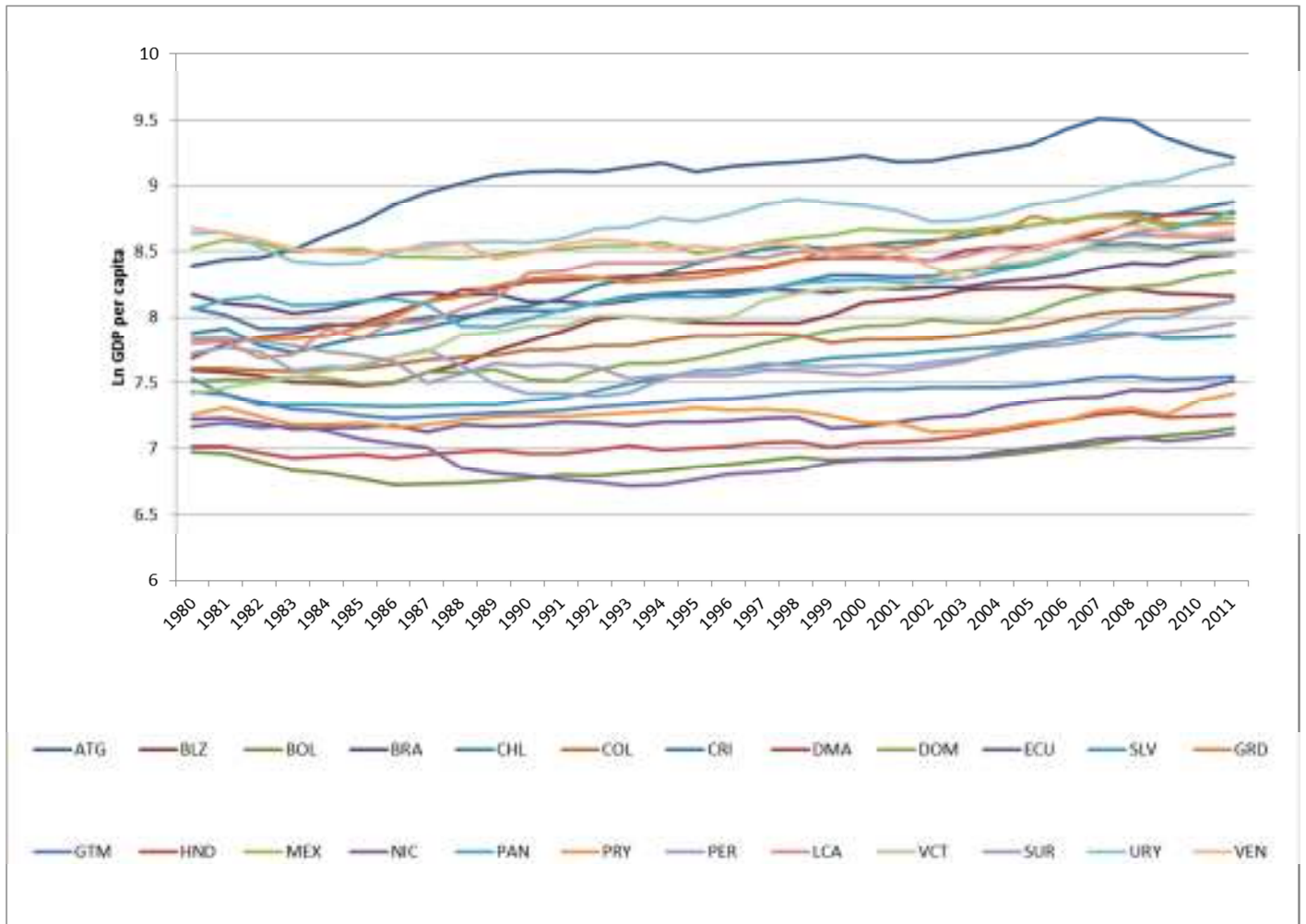
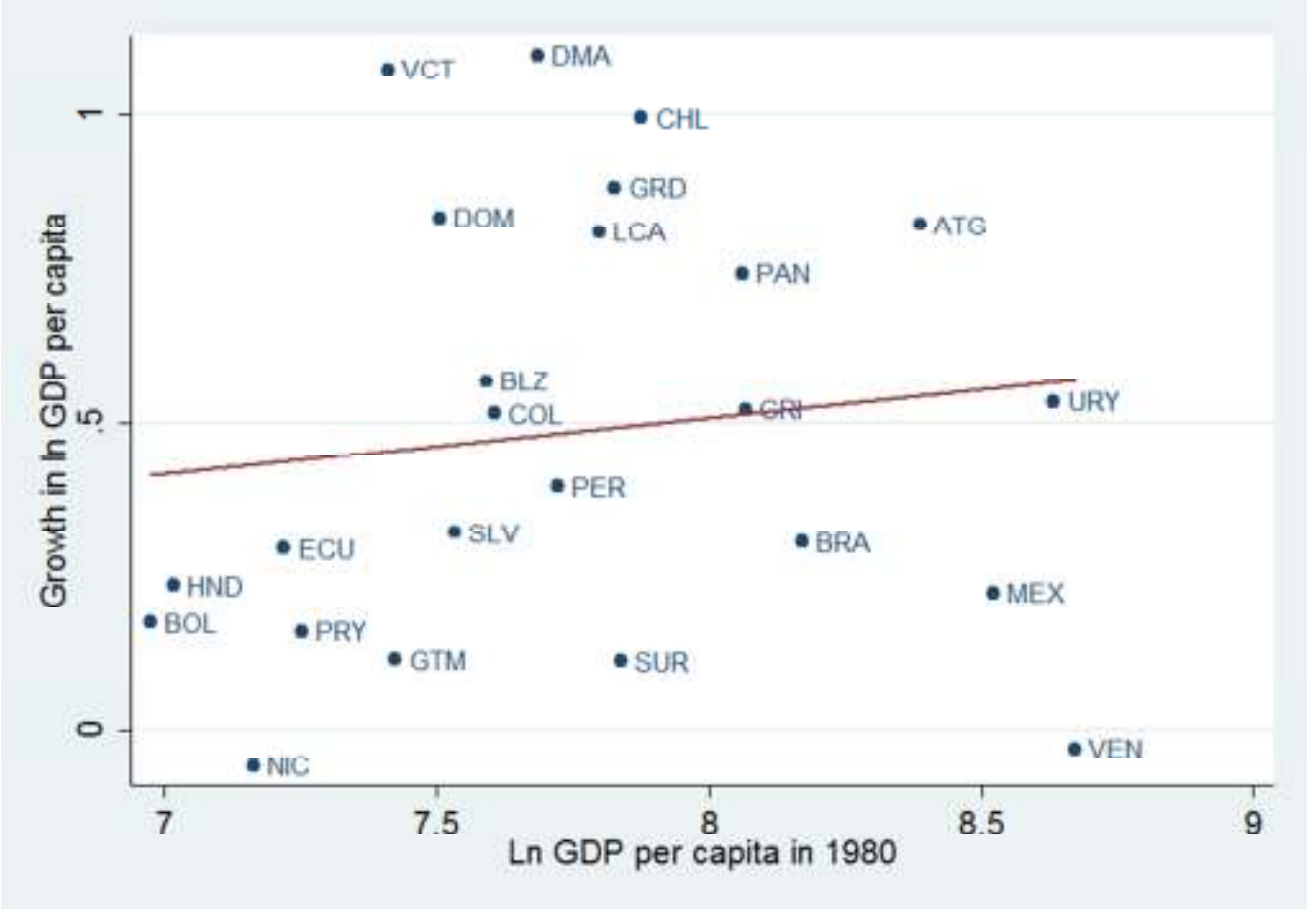


Figure 4.12 Scatter plot of natural log of GDP per capita in 1980 and Growth in natural log of GDP per capita from 1980 to 2011 in Latin America & the Caribbean.



Appendix C

Growth in GDP per Person Employed

Europe & Asia:

Figure 4.13 Growth in natural log of GDP per person employed in Europe & Asia from 1980 – 2011.

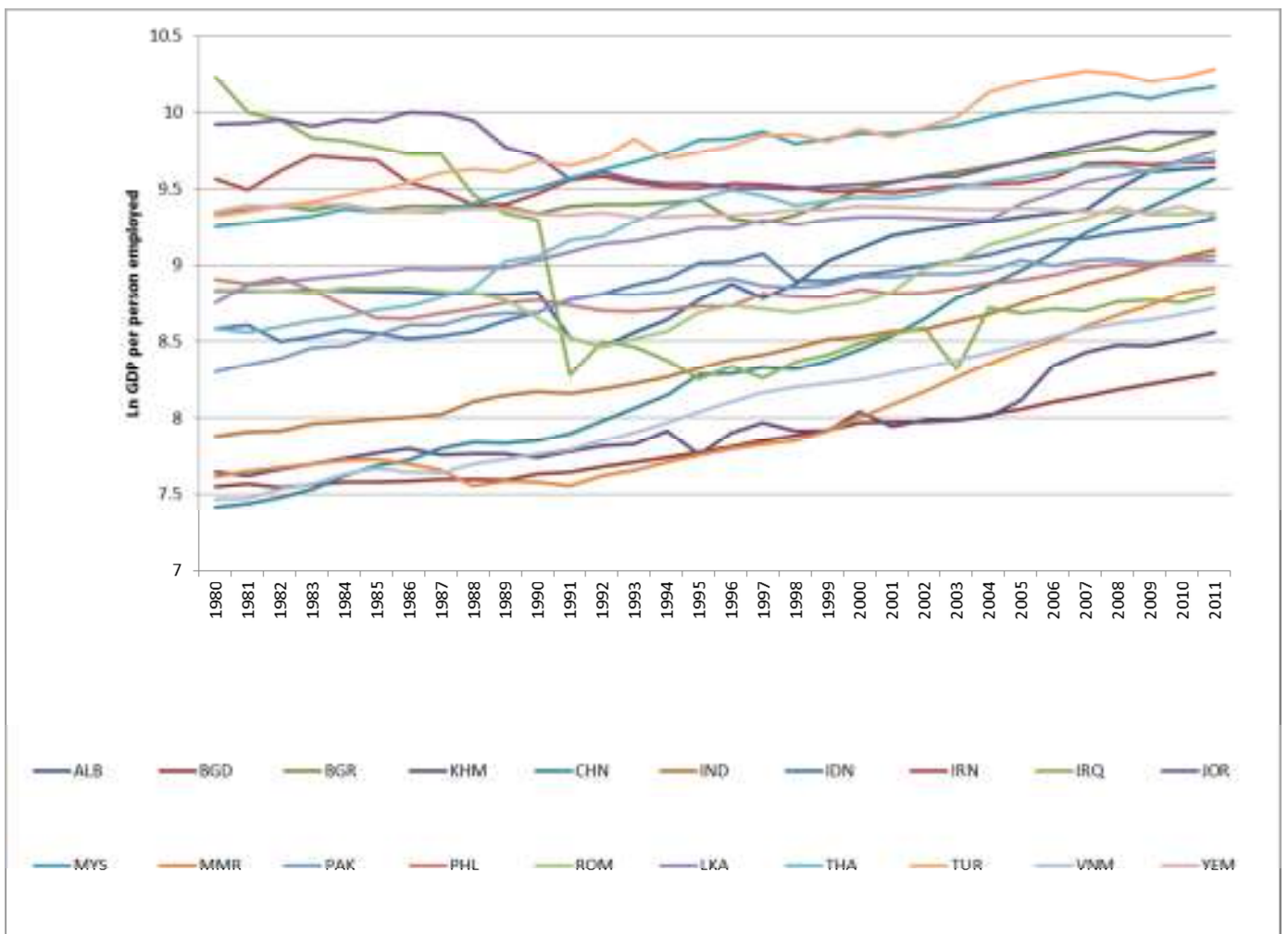
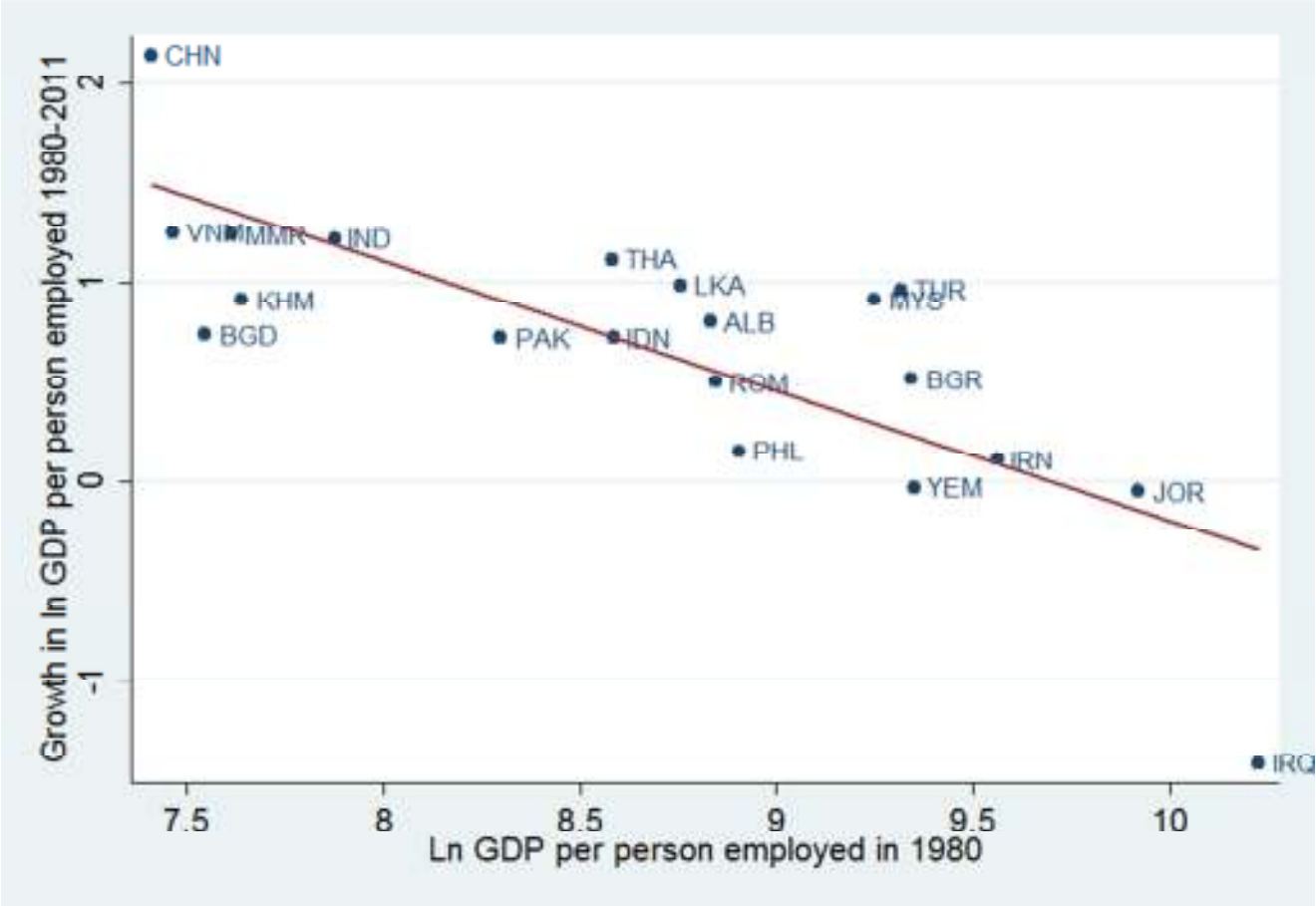


Figure 4.14 Scatter plot of natural log of GDP per person employed in 1980 and Growth in natural log of GDP per person employed from 1980 to 2011 in Europe & Asia.



North & Sub Saharan Africa:

Figure 4.15 Growth in natural log of GDP per person employed in North & Sub Saharan Africa from 1980 – 2011.

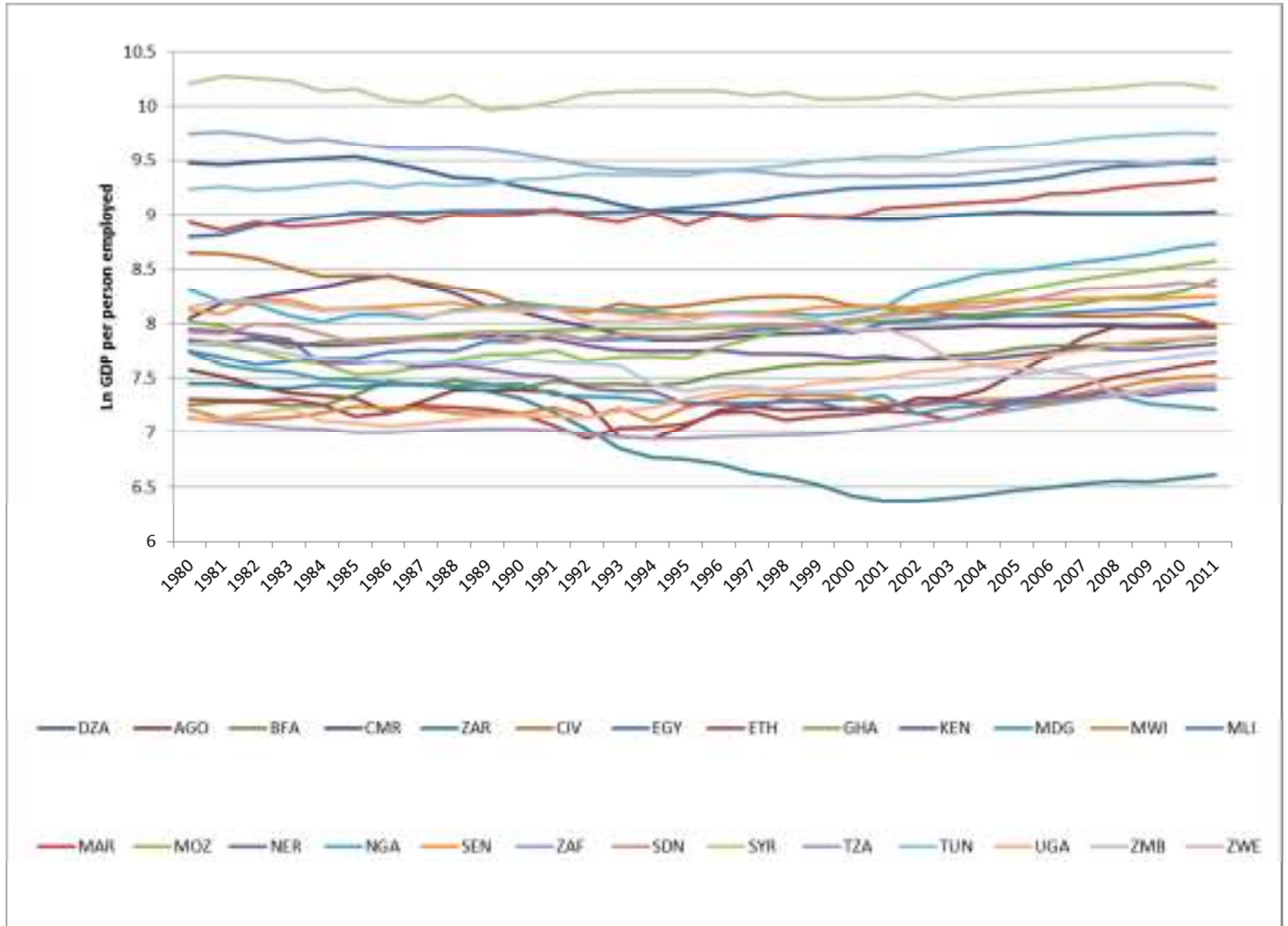
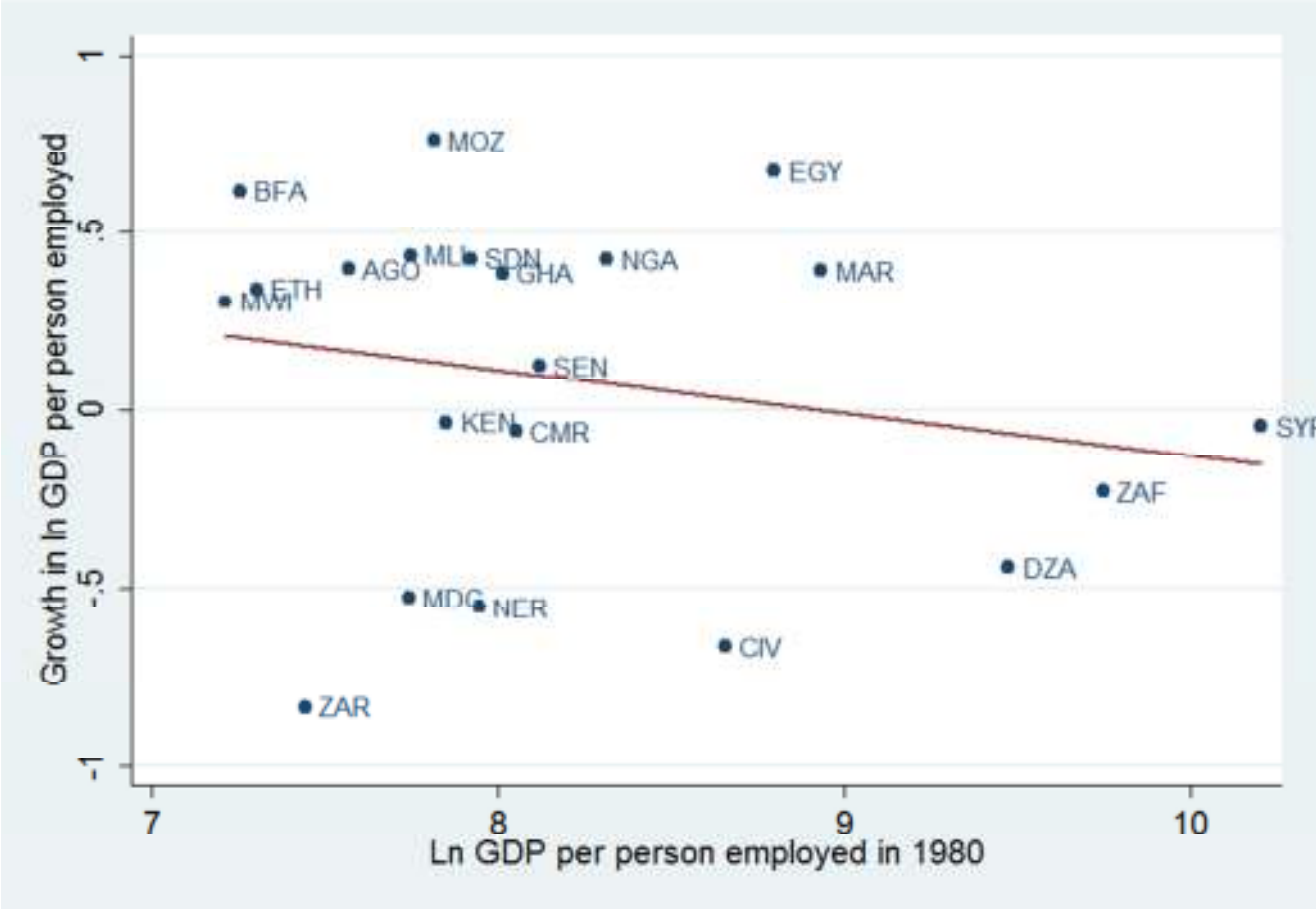


Figure 4.16 Scatter plot of natural log of GDP per person employed in 1980 and Growth in natural log of GDP per person employed from 1980 to 2011 in North & Sub Saharan Africa.



Latin America & the Caribbean:

Figure 4.17 Growth in natural log of GDP per person employed in Latin America & the Caribbean from 1980 – 2011.

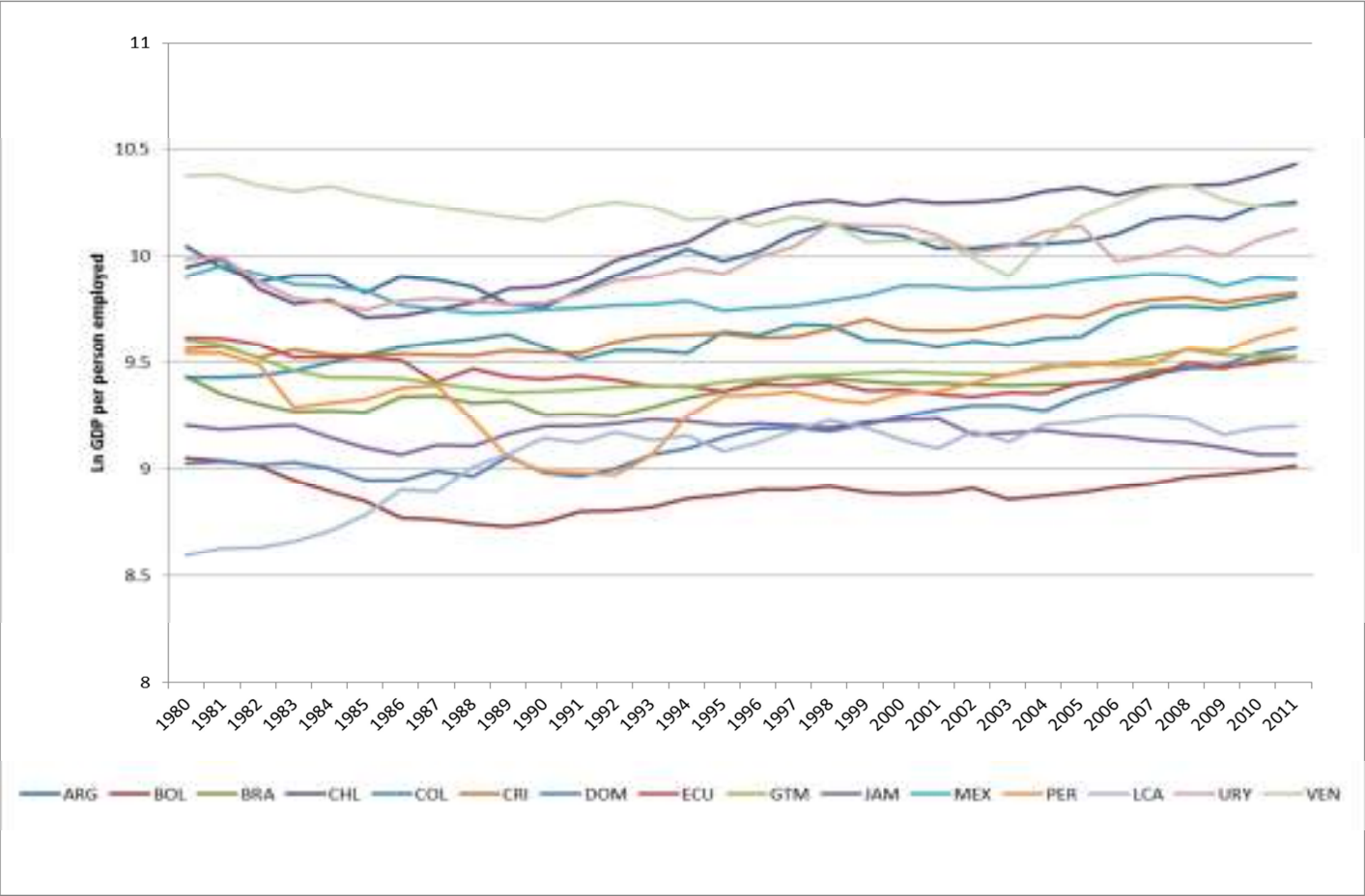
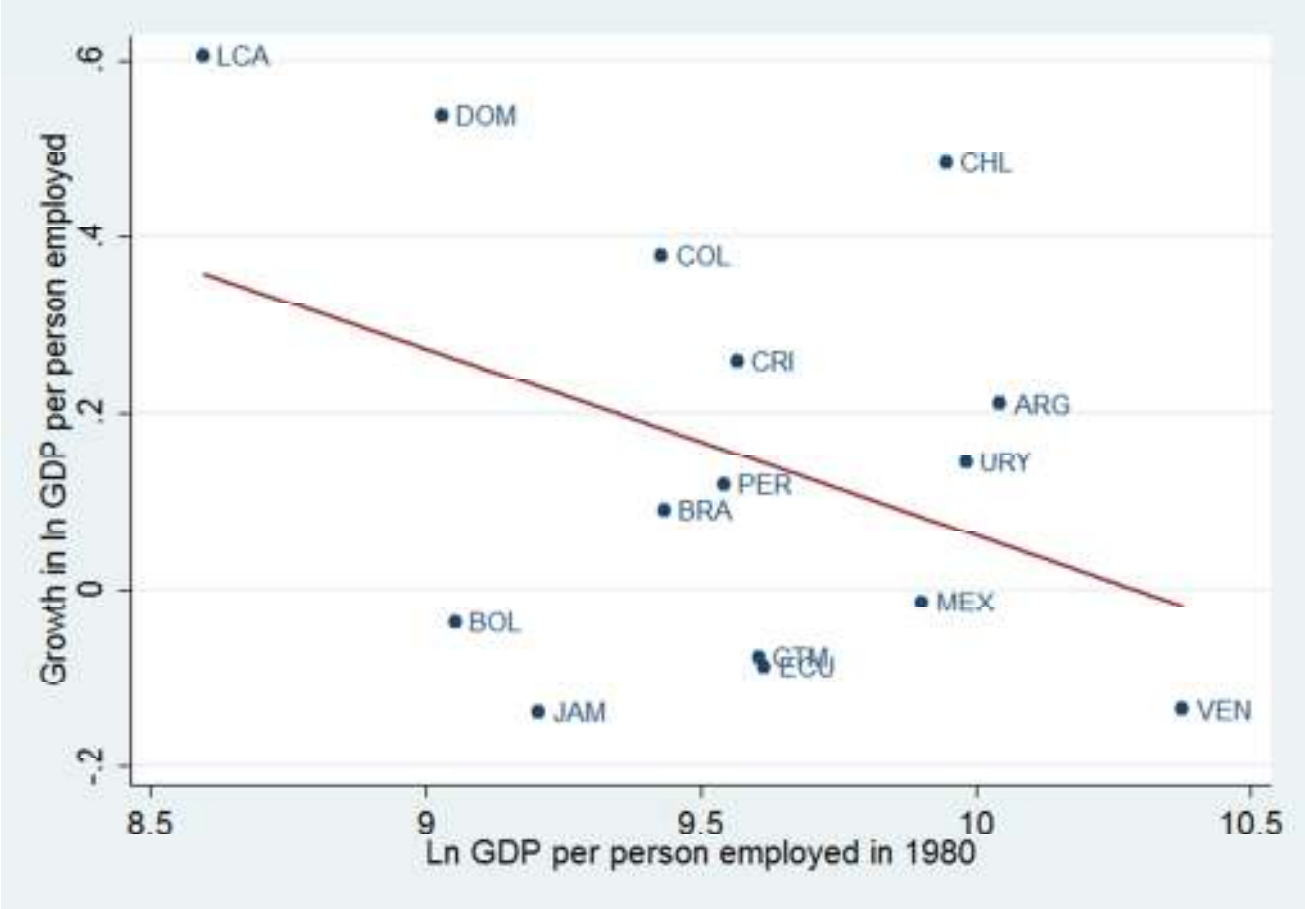


Figure 4.18 Scatter plot of natural log of GDP per person employed in 1980 and Growth in natural log of GDP per person employed from 1980 to 2011 in Latin America & the Caribbean.



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