

GROWTH AND EXPORT PERFORMANCE
OF DEVELOPING COUNTRIES: IS
LANDLOCKEDNESS DESTINY ?

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A THESIS SUBMITTED FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY IN ECONOMICS

THE AUSTRALIAN NATIONAL UNIVERSITY
CANBERRA, AUSTRALIA
JULY 2013

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GROWTH AND EXPORT PERFORMANCE OF DEVELOPING COUNTRIES: IS
LANDLOCKEDNESS DESTINY ?
DOCTORAL DISSERTATION IN ECONOMICS
THE AUSTRALIAN NATIONAL UNIVERSITY, CANBERRA, AUSTRALIA

DECLARATION

I certify that this is my own original work except where otherwise indicated or acknowledged in the thesis.

The first two research papers are under review in the journals in my sole authorship.

Ramesh Chandra Paudel

29 July 2013

DEDICATION

Dedicated to my late Grandparents and to my late Father Showakhar Paudel

ACKNOWLEDGMENTS

I became familiar with the term “landlockedness” in my high school geography class, when my teacher said “. . . unfortunately Nepal is a landlocked country, even though 70 percent of the Earth is covered by water”. At that time I was not able to understand why this was unfortunate for Nepal. When I became interested in pursuing doctoral research in the area of economic development and trade, my geography teacher’s remark about Nepal’s misfortune came to my mind, but I never thought it would make a good PhD topic. I was surprised when my principal supervisor, Professor Prema-chandra Athukorala suggested me that this was a good area for research. His suggestion gave me the confidence to select this subject for my thesis. I thank Professor Athukorala for his excellent guidance, encouragement, and academic guardianship throughout my study at the Australian National University (ANU). I have greatly benefited from his in-depth knowledge of the literature and his personal kindness; it was indeed a pleasant experience to work with him.

I am immensely grateful to the other two members of my supervisory panel, primarily Dr. Paul Burke, who always pushed me to do something better in the next version of the paper. He has read all my research papers thoroughly and made extensive comments. This has not only improved my research ability, but his line-by-line comments have taught me to go more deeply into topics and focus on my written expression. Professor Peter Warr always motivated me not only to view a broader picture of the research but also suggested I take care of the minor elements. As an advisor, his comments and guidance on my presentations in the departmental PhD seminar have contributed significantly to improving the quality of this thesis. I feel very fortunate to have had this combination in the supervisory panel for my PhD journey.

I have also benefited from discussion and comments from many people outside of ANU. Professor Max Corden and Professor Ronald Findlay have commented on two chapters of the thesis. Professor Romain Wacziarg from UCLA Anderson School of Management provided me his data file to update the Sachs-Warner index of trade liberalisation. Professor Yongcheol Shin from York University provided his STATA-do file commands that increased my confidence in the methodology. Dr.

Yubaraj Khatiwada, the Governor of the Central Bank of Nepal, gave me advice on some issues relating to Chapter 4. Jessica Pielow from findport.com provided access to port distance data. José de Sousa from International Economics Data and Programs provided the updated data for regional trade agreements. My sincere thanks and appreciation go to all of them.

I also express my profound thanks to Professor Trevor Breusch for increasing my confidence in research methodology; his teaching in his econometric course made it a memorable class for me. My sincere thanks go to Professor Kaliappa Kalirajan, who commented on my papers, and also guided me in his teaching throughout the “Pinnacle Teaching Program-2012”. In addition to this, he provided me with the opportunity to deliver several guest lectures for Quantitative International Economics course. I also thank Professor Shaun Vahey, Professor Rodney Strachan, Dr. Scott McCracken and Dr. Swarnim Wagle for their helpful discussions and comments on various aspects of the research.

The Arndt Corden Department of Economics (ACDE) in ANU provided me with an inspiring intellectual environment, which contributed to my research in many ways. I have benefited from comments on my papers and seminar presentations by Professor Hal Hill, Professor Raghendra Jha, Professor David Stern, Associate Professor Ross McLeod, Associate Professor Chris Manning, Associate Professor Budy Resosudarmo, and faculty members Dr. Robert Sparrow, Dr. Daniel Suryadarma, Dr. Sommarat Chantarat, and Dr. Creina Day.

I also benefited from the helpful discussions with many colleagues in ACDE and the Crawford School of Public Policy of ANU. My thanks go to Dr. Nitin Gupta, Rajan Panta and Matthew McKay, the discussants of my papers in departmental seminars, and Dung Doan and Manoj Pandey, the discussants on my papers in the PhD Conferences at the Crawford School of Public Policy. I thank Dr. Moekti Soejachmoen, Dr. Hemantha Ekanayake, Razib Tuhin, Fahad Khan, Marcel Schroder, Patrick Carvalho, Yixiao Zhou, Jasmine Zheng, Dr. Shahbaz Nasir, Raymond Prasad, Delwar Hossain, Dr. Shuhei Nishitaten, Kien Nguyen, Fadliya, Rahman Abdurohman, Michale Cabalfin, Duc Truong Nguyen, Sitthiroth Rasphone, Acram Latiph, Sita Rosdaniah, Dr. Titik Anas, Ariun-Erder Bayarjargal, Lwin Lwin Aung and Omer Majeed for helpful discussion on various occasions and good friendship. My special thanks to all ACDE staffs: Dr. Heeok Kyung, Karen Nulty, Sandra Zec, Jane Farrell, Glen Luttrell, and CAP IT desk. I also thank Tas Luttrell and Dr. Susanne Holzknrecht for their careful editing of this thesis. I would like to thank all the staffs of Nepalese Embassy in Canberra, particularly to Mr. Lok Bahadur Thapa and Mr. Paras Pandit for

their help and cooperation in many respects. My special thanks also go to Dr. Hom Pant, Dr. Krishna Hamal, Dr. Prem Thapa, Maniram Banjade, Binod Chapagain, and Ramesh Sunam from the Nepalese community also deserve special thanks for discussions during the Australia Nepal Friendship Society's seminar series at ANU.

I am grateful to the Australian Government for funding my doctoral studies. I would like to thank Professor Prema-chandra Athukorala, Professor Peter Warr, and Professor Michael Wesley for involving me to work as a research assistant in different projects. I acknowledge grants from the ANU Vice Chancellor's office and ACDE to attend different conferences. I also thank Dr. Trevor Vickers for granting me the Pinnacle scholarship and mentoring me throughout the Pinnacle teacher training program. I thank Karina Pelling of CartoGIS in the College of Asia and the Pacific, for the map of the world.

Finally, and most importantly, none of my achievements would have been possible without the support of my big family. My mother, Tulasha Paudel, parents-in-law Rukmangat Koirala and Netra Koirala have supported me emotionally. My wife Sulochana, son Arshutosh, and daughter Bidushi have sacrificed a lot throughout this tough time. I am deeply indebted to them.

ABSTRACT

This thesis investigates determinants of economic growth and export performance of landlocked developing countries (LLDCs). It consists of three research papers enveloped in a stage-setting introductory chapter and a concluding chapter which summarises the key findings and draws policy inferences. The three research papers are written in the form of self-contained essays, but taken together the findings indicate that even though landlockedness hampers a country's economic growth in many ways, economic policy has the potential to minimise these adverse effects: landlockedness is not destiny.

The first paper examines the impact of landlockedness on economic growth using a panel dataset covering 214 countries, including 34 landlocked developing countries, over the period 1980 – 2009. The key focus of the analysis is on the role of openness to foreign trade in determining differences in growth performance between landlocked developing countries as a group and other developing countries, and among landlocked countries themselves. The results indicate that generally landlockedness hampers economic growth, but landlocked countries have the potential to grow faster through greater openness to foreign trade, and through carrying out institutional reforms to improve the quality of governance, which help reducing trade costs.

The second paper examines the determinants of export performance of developing countries, with emphasis on the implications of landlockedness, using a panel dataset covering the period from 1995 to 2010. The analysis is conducted within the standard gravity modelling framework. The results indicate that although

landlockedness has a significant negative impact on export performance, landlocked countries which have embarked on trade policy reforms perform significantly better than their non-reforming counterparts. There is also evidence that African LLDCs have maintained relatively higher export performance compared to other LLDCs.

The third paper is a case study of export performance of a selected landlocked country, Nepal. Following an analytical narrative of export performance over the past three decades against the backdrop of policy reforms and the changing political climate, the paper examines the determinants of export performance within the gravity modelling framework using a product-level (at the three digit level of the Standard International Trade classification) panel dataset covering Nepal's export to the top 20 trading partners over the period from 1980 to 2010. The analysis distinguishes between Nepalese exports to India and to third country markets, in order to identify a possible 'big-neighbour' effect (Gulliver-effect) on export performance of a landlocked country. The results support the hypothesis that exports of high-value-to-weight products generally grow faster, because trade costs resulting from landlockedness has a fewer adverse effects on these products. Real exchange rate appreciation resulting from the fixed parity of the Nepalese rupee with the Indian rupee adversely affects Nepalese exports to third-country markets. The relatively faster growth of exports to India is partly due to the re-direction of imports by Indian companies via Nepal in order to benefit from significant tariff differences between Nepal and India relating to some products.

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List of Acronyms

ADB	Asian Development Bank
AFC	Asian Financial Crisis
CA Republic	Central African Republic
CBS	Central Bureau of Statistics
CEPII	Centre d'Etudes Prospectives et d'Informations Internationales
COMTRADE	Commodity Trade Statistics Database
CPN	Communist Party of Nepal
DCs	Developing Countries
EAM	East Asian Miracle
EAP	East Asia and Pacific
ECA	Eastern Europe and Central Asia
ECB	European Central Bank
ECN	Election Commission of Nepal
Exp.	Export
exp.	Exponential
FDI	Foreign Direct Investment
FE	Fixed Effect
FGLS	Feasible Generalized Least Squares
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GDPPC	Gross Domestic Product per capita
GFC	Global Financial Crisis
GNI	Gross National Income

Gov	Governance
GPML	Gamma Pseudo Maximum Likelihood
HDI	Human Development Indicator
HS	Harmonized Commodity Description and Coding System
HT	Hauseman Taylor
ICD	Inland Clearance Depot
IMF	International Monetary Fund
IRe	Indian Rupee
IV	Instrumental Variables
Kg.	Kilogram
LAC	Latin America and Caribbean
LLDCs	Landlocked Developing Countries
MA	Market Access
MFA	Multifibre Agreement
MSN	Market Size in Neighbor
NBER	National Bureau of Economic Research
NC	Nepali Congress
NIEs	Newly Industrialized Economies
NLS	Non-linear Least Squares
NRe	Nepalese Rupee
NTB	Non-tariff Barrier
OLS	Ordinary Least Squares
POLS	Pooled Ordinary Least Squares
PPML	Poisson Pseudo Maximum Likelihood
RCA	Revealed Comparative Advantage
RE	Random Effect
RTA	Regional Trade Agreement
SA	South Asia

SGMM	System Generalized Method of Moments
SITC	Standard International Trade Classification
SSA	Sub-Saharan Africa
SWI	Sachs-Warner Index
UML	Unified Marxist and Leninist
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
US	United States
US\$	United States Dollar
USSR	Union of Soviet Socialist Republics
WB	World Bank
WDI	World Development Indicators
WGI	World Governance Indicators
WITS	World Integrated Trade Solution
WTO	World Trade Organisation
WWI	Wacziarg-Welch Index
LPI	Logistic Performance Index

Introduction

“The gains from trade depend on the transport costs between a national economy and the rest of the world being low enough to permit an extensive interaction between the economy and world markets. If the economy is geographically isolated—for example, landlocked in the high Andes or the Himalayas or Central Africa, as in the cases of Bolivia, Nepal, and Rwanda—the chances for extensive trade are extremely limited.”

-Jeffrey Sachs (Sachs 1998, P. 101)

1.1 Context

This thesis was motivated by the casual observation that there is something peculiar about the common fate of landlocked developing countries when it comes to their growth and trade performance. It is hypothesised that the landlockedness, the geographical situation of a country without direct access to the sea, imposes exogenous costs resulting in poor economic and trade outcomes.¹ The history of economic growth also suggests that landlocked countries have grown much more slowly than countries with access to the sea or navigable rivers. There is also a big difference be-

¹The term ‘landlockedness’ refers to the state of being landlocked, and is widely used in development studies.

tween per capita GDP of landlocked developing countries and the rest of developing countries.²

Among the 214 countries and territories in the world, 44 are landlocked. The landlocked countries comprise about eight percent of the world's population, but account for less than one and a half percent of world GDP. Only nine of the 44 landlocked countries are high income countries (these are defined as landlocked developed countries in this study). The remaining landlocked countries belong to low income, lower middle income and upper middle income categories: these are defined as landlocked developing countries (LLDCs) in this study. The LLDCs account for less than one half of one percent of the world's GDP, but contain about three and a half percent of the world's population. The figures show that these countries are among the poorest of the poor and a high proportion of the bottom billion, live in these countries with a low living standard (Collier 2007). Two specific features of LLDCs commonly referred to in the literature as being a reason for their poor economic performance are: comparatively higher trade costs resulting from landlockedness, and they are surrounded by other poor countries depriving them of positive neighbourhood benefits (such as growth spill over or decent infrastructure and poor transits). Against this background, United Nations (2006), Arvis et al. (2007) and World Bank (2013) suggest promoting an efficient transit system to lower the transaction costs in landlocked countries. However, there are notable differences of economic growth and trade performance records among these countries.

In the literature on economic growth and development, landlockedness is commonly treated as a constraint specific to developing countries. If a country is surrounded by rich countries, the impact of landlockedness is minimal, in fact, it can

²World Bank classification based on 2009 GNI per capita measured in US\$; low income countries \$995 or less (17 landlocked countries); lower middle income \$996 - \$3,945 (10 landlocked countries); upper middle income, \$3,946 - \$12,195 (7 landlocked countries); and high income above \$12,195 (9 landlocked countries).

even be an advantage to be located within a rich neighbourhood (Collier & Gunning 1999*b*, Collier & Gunning 1999*a*, Gallup et al. 1999, MacKellar et al. 2000, Dollar & Kraay 2003, Arvis et al. 2007, Grigoriou (2007). Sachs 2008, Friberg & Tinn 2009). However, so far no systematic attempt has been made to examine determinants of differences in growth performance among landlocked countries.

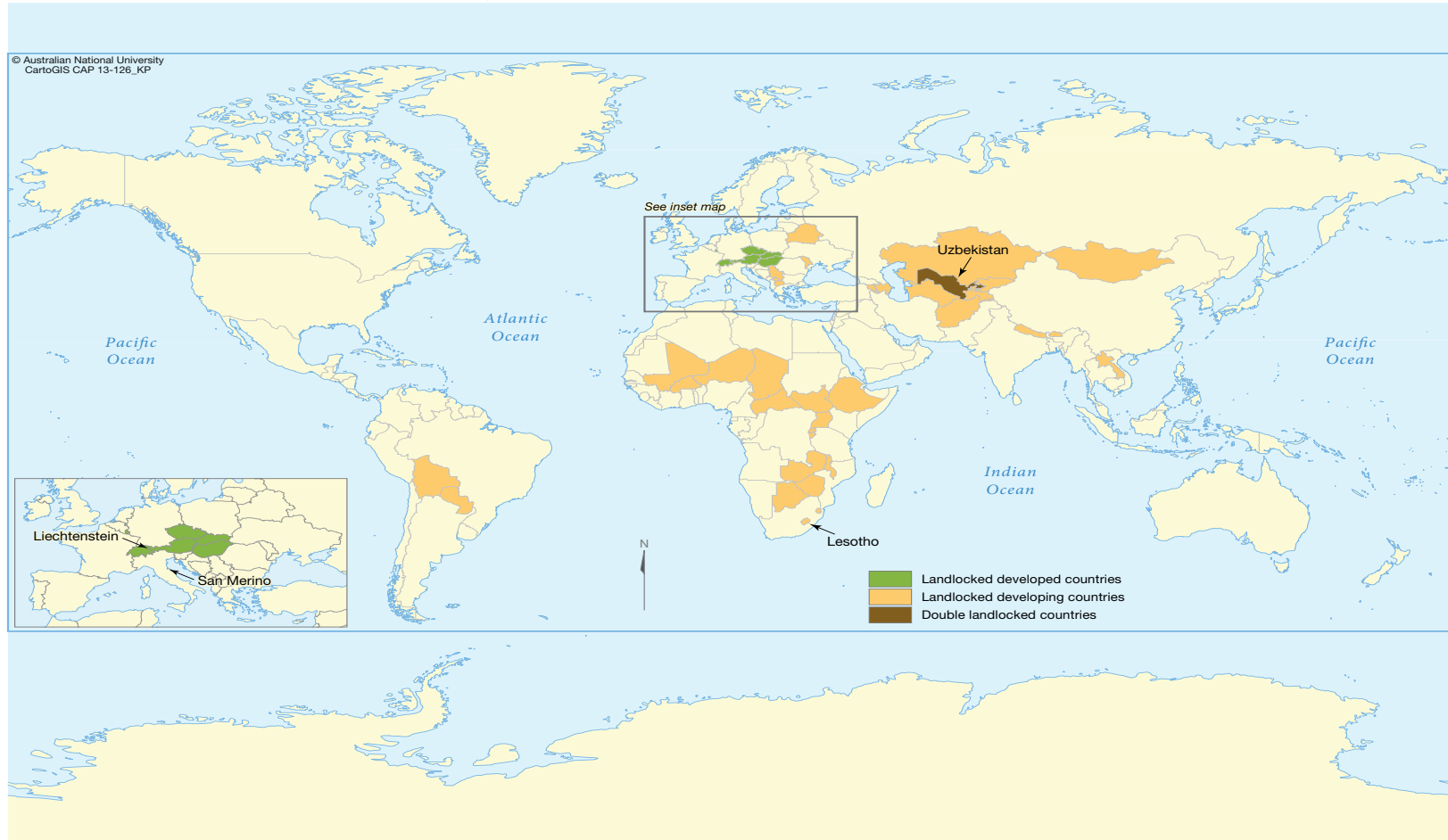
This thesis is focused only on landlocked developing countries because the nine landlocked developed countries are surrounded by other developed countries in Western Europe with access to one of the best trade networks in the world. Their challenges, therefore, are quite distinct from those faced by LLDCs in terms of geography and stage of economic advancement.³ The process of economic transformation triggered by the Industrial Revolution spread to these landlocked developed countries before the present political boundaries came into existence. Well before the time when economic development of ‘less-developed’ (subsequently renamed ‘developing’) countries became a key policy emphasis both at national and international levels in the post-war era, these nine countries had gained the status of ‘developed’ countries. Thus, the contemporary policy debate on landlockedness as a constraint on economic development is specifically related to the landlocked developing countries (LLDCs).

The LLDCs are scattered in different regions: two in East Asia and the Pacific (EAP), 12 in Eastern Europe and Central Asia (ECA), two in Latin America and the Caribbean (LAC), three in South Asia (SA), and 15 in Sub-Saharan Africa (SSA). Figure 1.1 shows the map of the landlocked countries in the World with some special differences among the landlocked countries (two countries, Uzbekistan and Liechtenstein are double landlocked, that is, locked by other landlocked countries; and two countries, Lesotho and San Marino each are locked by a country, that is,

³These nine countries are: Andorra, Austria, Switzerland, Czech Republic, Hungary, Liechtenstein, Luxembourg, San Marino and Slovak Republic World Bank (2010)

by Italy and South Africa, respectively). Table 1.1 presents a summary of the major economic and historical indicators of all landlocked developing countries. The number of landlocked countries has grown since the Second World War. Some were formed in the 1990s after the dissolution of the Union of Soviet Socialist Republics (USSR). South Sudan is the youngest landlocked country formed after the division of Sudan. Most of the landlocked developing countries have very low level incomes, a noticeably high population, low trade to GDP ratio and are often locked by more than one country. Curiously, one landlocked developing country, Uzbekistan, is even surrounded by other landlocked countries.

Figure 1.1: LANDLOCKED COUNTRIES IN THE WORLD



Sources: CartoGIS (2013)

Table 1.1: KEY INDICATORS OF LANDLOCKED COUNTRIES IN 2007

Country	Indpdc. Date	Area Sq.Km.	Population (‘000)	Nbrs.	GDP (US\$ Bln.)	RGDPPC	Trade / GDP %
Afghanistan	19 Aug. 1919	652,230	28,259	7	9.7	NA	77
Armenia	23 Sep. 1991	28,480	3,072	5	9.2	1425	58
Azerbaijan	30 Aug.1991	82,620	8,581	6	33	1946	96
Belarus	25 Aug. 1991	202,900	9,702	5	45.3	2255	128
Bhutan	8 Aug. 1949	38,390	676	2	1.2	1178	103
Bolivia	6 Aug. 1825	1,083,300	9,524	5	13.1	1125	76
Botswana	30 Sep. 1966	566,730	1,892	4	12.4	4233	83
Burkina Faso	5 Aug. 1960	273,600	14,721	6	6.8	260	NA
Burundi	1 July 1962	25,680	7,837	3	1	110	NA
CA Republic	13 Aug. 1960	622,980	4,257	5	1.7	231	37
Chad	11 Aug. 1960	1,259,200	10,622	6	7	285	107
Ethiopia	2000 years	1,000,000	78,646	6	19.2	176	45
Hungary	1001	89,610	10,055	7	139	6168	159
Kazakhstan	16 Dec. 1991	2,699,700	15,484	5	105	2332	92
Kosovo	10 June 1999	10,887	1,785	4	4.7	1594	69
Kyrgyz Republic	31 Aug. 1991	191,800	5,234	4	3.8	353	133
Lao PDR	19 July 1949	230,800	6,092	5	4.3	451	87
Lesotho	4 Oct.1966	30,360	2,031	1	1.6	455	164
Macedonia, FYR	17 Sep. 1991	25,230	2,039	5	7.9	2077	126
Malawi	6 July 1964	94,080	14,439	3	3.5	152	62
Mali	22 Sep. 1960	1,220,190	12,408	7	7.2	292	62
Moldova	27 Aug. 1991	32,890	3,667	3	4.4	548	145

Table 1.1 Continue

Mongolia	13 March 1921	1,553,560	2,611	2	3.9	683	130
Nepal	1768	147,181	28,286	2	10.3	245	44
Niger	3 Aug. 1960	1,266,700	14,139	7	4.2	169	NA
Paraguay	14 May 1811	397,300	6,126	3	12.2	1459	105
Rwanda	1 July 1962	24,670	9,454	4	3.7	306	36
Serbia	1918	88,360	7,381	9	39.4	1191	84
Swaziland	6 Sep. 1968	17,200	1,151	2	3	1542	158
Tajikistan	9 Sept. 1991	139,960	6,727	4	3.7	231	89
Turkmenistan	27 Oct. 1991	469,930	4,977	5	12.7	1572	114
Uganda	9 Oct. 1962	197,100	30,637	5	11.9	336	47
Uzbekistan	1 Sep. 1991	425,400	26,867	5	22.3	783	76
Zambia	24 Oct. 1964	743,390	12,313	7	11.4	374	78
Zimbabwe	18 April 1980	386,850	12,449	4	5	332	89

Note: *Indpdc.* Date refers to Independence date/ country foundation date where applicable taken from McLachlan (1998), *Nbrs.* refers to number of neighbouring countries, *RGDPPC* is real per capita GDP measured in US\$ base year 2000, *GDP* also has the same base year, Lesotho is locked by South Africa.

Sources: Based on data compiled from World Bank (2010) and other sources as in the footnotes.

1.2 Purpose and Scope

It has become common practice to include a landlockedness dummy in cross-country growth regressions to capture the costs imposed by geography on trade. Most, if not all, studies find the coefficient of this variable to be negative and statistically significant. However, to the best of my knowledge, so far no systematic research has been undertaken to examine the determinants of inter-country differences in growth

among LLDCs that goes beyond inferring “average” results for all landlocked countries. This is an important gap in the growth literature because there is great heterogeneity in development experiences among landlocked developing countries. This thesis seeks to fill this gap. Understanding the divergences in economic performance among these countries and the underlying causes can greatly enrich the policy discourse in these countries and in the international development community.

The purpose of this thesis is three-fold. Each of these is addressed in the three core chapters: first, to examine empirically the impact of landlockedness on economic growth through analysing the difference between LLDCs and non-landlocked developing countries; second, to examine the impact of landlockedness on export performance of developing countries by identifying the differences between LLDCs and non-landlocked developing countries group; and third, to examine the determinants of export performance of one LLDC, Nepal, as a case study.

This thesis thus has five chapters, including this introductory chapter. Chapters 2-4 present the core research material. Chapter 2 examines the impacts of landlockedness on economic growth with an emphasis on LLDCs. Chapter 3 investigates the determinants of export performance of LLDCs and other developing countries, paying particular attention to the role of trade liberalisation. Chapter 4 is a case study of export performance of a selected landlocked country, Nepal. The key findings are summarised and policy implications are discussed in Chapter 5. The methodology used in and the key findings of each of the three core chapters (2-4) are briefly discussed in the next section.

1.3 Overview

Chapter 2, the first paper, makes a number of contributions. The primary contribution of this chapter is the new strategies employed to identify the differences among LLDCs and other developing countries from country-level panel data. The estimations control for country-specific fixed and random effects follows the instrumental variable based technique as developed in Hausman & Taylor (1981) [HT]. As part of the empirical analysis of the chapter, I also updated the trade liberalisation index, originally developed by Sachs & Warner (1995), up to 2009 following Wacziarg & Welch (2008), thereby extending the number of countries covered from 141 to 197.

The results from this chapter confirm the findings of previous studies that landlockedness hampers economic growth, although the magnitude of the negative impact is sensitive to alternative estimation methods. In addition, there is evidence that a good governance system and sound policy initiatives can help lower the negative impact of the constraints imposed by landlockedness. Openness is positively associated with economic growth in landlocked countries, suggesting that the more open a country is to foreign trade, the higher its growth prospects are. In addition, the economic development of neighbouring countries is one of the major determinants of economic growth in LLDCs. It appears that coordinating the development tasks with neighbours' infrastructure may be a useful means of improving the development prospects of LLDCs. There is also strong evidence that, in terms of economic growth performance, landlocked developing countries in Africa are not different from other LLDCs.

Chapter 3 analyses the export performance of LLDCs and other developing countries by using a panel data set of bilateral export trade covering the period 1995 to 2010. The estimated equation is formulated within the standard gravity modelling framework. The principal estimation technique used in this chapter is Poisson

Pseudo Maximum Likelihood (PPML) which was found to be superior to pooled ordinary least square (POLS), Random Effect (RE), Fixed Effect (FE) and Hausman-Taylor (HT) estimations in terms of the standard tests.

The results suggest that, while landlockedness remains a specific constraint on export performance, LLDCs have opportunities to improve their export performance by creating a more trade-friendly environment through lowering tariffs, reforming exchange rates and involving themselves in regional trade agreements. The results for the relative factor endowment variable confirm the Linder hypothesis, which suggests that trade links are much stronger among countries with similar income levels. Distance-related trade costs restrict export performance more in landlocked developing countries than in other developing countries. Having a common border with an influential trading partner is more important than having a common language with them for export performance in LLDCs. There is evidence to suggest that African landlocked countries' export levels are at least 30 percent higher than the average level for other LLDCs.

Chapter 4 undertakes an in-depth case study of the export performance of Nepal against a backdrop of the overall development record of the country, with a specific focus on the impact of landlockedness. The analysis of trade patterns is undertaken within the standard gravity modelling framework using product-level data on Nepalese exports to its top 20 partner countries over the period 1980 to 2010 compiled at the three digit level of the Standard International Trade Classification (SITC, Revision 3). The main novelty of the chapter lies in testing, for the first time in the literature on landlocked economies, the importance of 'value-to-weight' ratio of products in determining the export performance of landlocked countries. It also examines the implications for export performance of two vital aspects of Nepal's economic relationship with its big neighbour, India (the 'Gulliver effect'): the fixed exchange rate of the Nepalese Rupee with the Indian Rupee which has implications

for export competitiveness with third countries; and the differences in import tariffs between the two countries which create trade deflection in Nepal. The principal estimation technique used in this chapter is random effect (RE) which was found to be superior to pooled ordinary least square (POLS), Fixed Effect (FE) and Hausman-Taylor (HT) and Poisson Pseudo Maximum Likelihood (PPML) estimations in terms of the standard tests.

The results demonstrate that the high land transport costs, which are beyond the control of the country given its landlockedness, exert a significant constraint on Nepal's export performance. Therefore, identification of specific product types that accelerate export growth is an important policy issue. Related to this, a major finding of this chapter is that value-to-weight ratio has a strong positive relationship with inter-product differences in export performance. This implies that Nepal has the potential to promote exports of high-value-to-weight products such as tea, coffee, spices, and apparel.

There is also evidence that the pegging of the Nepalese Rupee to the Indian Rupee adversely affects Nepal's exports to third countries. The bilateral real exchange rate with India has remained more or less stable given that domestic price levels in the two countries have behaved in tandem, but the bilateral real exchange rates with other countries (mostly developed countries) have appreciated because Nepal's domestic price level has increased at a faster rate compared to that of these countries. This scenario needs to be taken into account in formulating an appropriate exchange rate policy for Nepal. Differences in import tariff levels between Nepal and India seem to distort Nepal's trade patterns. The 'recorded' exports to India are artificially increased because some of the products have a lower tariff in Nepal compared to India, motivating Indian companies to import via Nepal, with only limited (or no) processing activities undertaken in Nepal.

In sum, this thesis finds that landlockedness has adverse impact on both growth and export performance of the LLDCs. However, there is also evidence that the adverse impact of landlockedness on growth and export performance can be minimised by improving the quality of the governance, coordinating the developmental task with their neighbours, adopting appropriate trade policies and strategies, and maintaining good trade agreements in the region.

Landlockedness and Economic Growth: New Evidence

Summary

This chapter examines the determinants of economic growth, with emphasis on the experience of landlocked developing countries. When landlocked countries are treated as a group within the standard growth regression framework, the results confirm the findings of previous studies that landlockedness hampers economic growth, although the magnitude of the negative impact is sensitive to alternative estimation methods. However, the country level analysis suggests that good governance and openness to foreign trade can explain a significant aspect of the inter-country differences among LLDCs. Contrary to the 'resource curse' hypothesis, the results suggest that natural resources contribute significantly to the economic growth of landlocked countries. It appears that coordinating the development tasks with neighbours' infrastructure may be a useful means to improve the development prospects of landlocked developing countries.

2.1 Introduction

This chapter examines the determinants of economic growth in developing countries, with special attention being paid to the experience of landlocked countries (LLCs). Landlockedness has been widely identified as a constraint on economic growth in the empirical growth literature (Bowen 1986, Srinivasan 1986, Collier & Gunning 1999*b*, Collier & Gunning 1999*a*, Gallup et al. 1999, MacKellar et al. 2000, Dollar & Kraay 2003, Arvis et al. 2007, Sachs 2008 and Friberg & Tinn 2009). Most of these studies have examined the impact of landlockedness on growth within the multi-country growth regression framework using a binary dummy (1 if country is landlocked and 0 if a country is not landlocked) and found that when controlled for the other relevant determinants, on average the growth rate of landlocked countries is three and a half percentage points lower than that of other countries.

This chapter aims to broaden the understanding of the above issue in two ways. First, it examines the robustness of the findings of the previous studies on landlockedness to alternative estimation methods. Second, and more importantly, it probes the determinants of inter-country growth differentials among landlocked developing countries. The focus of the analysis is to address the questions of whether or not the landlockedness is a root cause of economic backwardness, and whether appropriate economic policies can help to achieve faster growth within the constraints set by landlockedness. In order to address these questions, this chapter aims to delineates policy-related factors from other factors that explain differences in economic growth among landlocked countries.

Landlockedness refers to the geographical situation of a country without direct access to the sea (Glassner 1970). According to this definition, there are 44 landlocked countries in the world. Of these, nine are high income countries based on the World Bank country classification (henceforth referred to as landlocked developed

countries) and the rest are low income and middle income countries (landlocked developing countries, LLDCs) *World Bank (2010)*.¹ The majority of these countries are in the “bottom billion” as defined by Collier (2007). In 2009, the average real per-capita gross domestic product of LLDCs was US\$974, compared to US\$2,392, the GDP of non-landlocked developing countries.² The LLDCs’ share of world trade was a mere one percent compared to 27 percent for non-landlocked developing countries, and notably, both per capita trade and GDP are low in LLDCs. These data partly reflect the strong positive nexus of trade and growth in these countries. Not all landlocked developing countries are in a similar phase of economic development, some countries have upper middle income levels and some are in the low income category. Noting this gap in the literature, this study examines how the main determinants of growth identified in the empirical growth literature play different a role in landlocked developing countries. To my knowledge, this is the first study to examine the determinants of inter-country differences in growth rates of landlocked countries. This study also updates the Sachs-Warner index of liberalisation, extending both the number of countries and time period covered in the index. The numbers of countries were extended from 141 to 197; and the time coverage from 1999 to 2009. (see Table 2A.1 for details).

The empirical analysis is based on an unbalanced panel data set, for the period 1980 to 2009 for the “all developing countries” group (143 countries) and for the period 1996 to 2009 for the “landlocked developing countries” (34 countries). After testing alternative panel estimation techniques, the Hausman-Taylor estimator is the preferred method. The results confirm the findings of previous studies, that landlockedness hampers economic growth, but also reveal that the magnitude of the

¹World Bank classification based on 2009 GNI per-capita measured in US\$; low income countries \$995 or less (17 LLDCs); lower middle income \$996 - \$3,945 (10 LLDCs); upper middle income, \$3,946 - \$12,195 (7 LLDCs); and high income above \$12,195 (9 LLDCs) *World Bank (2010)*.

²Data reported in this chapter, unless otherwise stated, are from the World Development Indicators database, World Bank (2010)

negative impact is much larger than in the literature. Good governance and openness to foreign trade seem to explain inter-country differences in growth rates among LLDCs, suggesting that landlockedness is not destiny. The results also suggest that the African landlocked countries are not different to other landlocked developing countries in terms of economic growth. There is also evidence that the level of development of the neighbouring countries has a significant impact on the economic growth of a given landlocked country. Therefore, coordinating development tasks with the neighbouring countries' infrastructure may be a useful means of improving the development prospects of landlocked developing countries. Contrary to the "resource curse" hypothesis, the results suggest that natural resources rents seem to contribute significantly to economic growth in landlocked developing countries.

The chapter is structured in six sections. Section 2.2 presents a brief literature survey of landlockedness and economic growth. Section 2.3 provides an overview of landlocked economies to set the context for the ensuing analysis. Section 2.4 takes a closer look at neighbourhood impact on landlocked countries. Section 2.5 discusses model specification, data sources and variable construction, and the estimation method. Section 2.6 presents and interprets the results. The final section summarizes the key findings and draws policy inferences.

2.2 Brief Literature Review

There is a vast literature on the determinants of economic growth.³ This section undertakes a selective survey of this literature. The selection is guided by the direct relevance for the model specification and variable construction in the ensuing

³Sala-I-Martin (1997), Barro (1999), and Acemoglu (2009)-Chapter 1 for detail surveys of his literature.

empirical analysis.

Some studies have attempted to identify and analyse the impacts of landlockedness. The cross country studies include Srinivasan (1986), Gallup et al. (1999), Collier & Gunning (1999*a*), MacKellar et al. (2000), Carrere & Grigoriou (2008) and Friberg & Tinn (2009). Hailou (2007) investigated the spatial constraints; however, more attention is given to the role of geographic conditions such as regional and tropical constraints on economic growth. These studies examine some aspects of the economic performance of landlocked countries using multi-country cross-sectional data. In the aggregate-level studies, most landlocked developing countries are not included and the methodology and data need to be updated. Many of the studies use a landlockedness dummy in the empirical literature, and conclude that this dummy variable has a statistically significant negative impact on economic growth.

So far only few country level studies are in the context of the economic growth of landlocked developing countries, for example: Paudel & Shrestha (2006) studies on the role played of external debt, total trade and labour force in Nepal, a landlocked country, and found that trade openness is an important contributor to the economic performance of the country. Bird & Hill (2010) studies on Laos to evaluate reform's impacts on economic development and concluded that neighbourhood effects have a favourable impact on Laos economy. But this not always the case, a cautious approach should therefore be taken. Allaro (2012) studies on the export-led growth strategy of another landlocked country, Ethiopia. Menon & Warr (2013) studied on another landlocked country, the Lao PDR, analysing on how the exports of the natural resources can be linked to improve the living standard of its people. However, these studies have simply presented a historical narrative and do not attempt a systematic empirical analysis to identify the impacts of landlockedness.

The perception conveyed by most of the literature is that landlockedness

slows the growth process. However, none of the studies have covered all the landlocked countries in the sample to obtain more concrete results. In addition, these studies have not disaggregated the landlocked countries into developed and developing countries, and many if not most of them use narratives rather than the quantitative research methods. This chapter aims to bridge this gap in the literature by disaggregating the developing countries into landlocked and non-landlocked developing countries so that the real impacts of landlockedness on poor countries can be identified.

The existing literature shows that the determinants of economic growth are not the same in all countries. The theory of economic growth has been developed through the contributions of many scholars. Solow (1956) contributed to the theory of economic growth emphasising the role of investment, saving and employment in the economy. A large number of studies attempted to identify the determinants of economic growth in different countries. The studies in the literature analyzed the determinants of economic growth with different focuses; Barro (1999) analyzed the determinants of economic growth and concluded that better maintenance of the rule of law, lower inflation, smaller government consumption, initial level of GDP, and the initial level political right influence growth but growth tends to become retarded after a moderate level of democracy is obtained.

Weiss (1999) suggested that the greater the magnitude of trade liberalisation, the better the performance of the export performance indicators. This reveals the comparative advantage measure of net trade balance, efficiency wage estimates of unit labour cost, total factor growth and export growth. Rodriguez & Rodrik (1999) concluded that open trade policies in the sense of lower tariff and non-tariff barriers to trade are significantly associated with economic growth. Foreman-Peck (1995) and Vamvakidis (2002) emphasised that trade openness and economic growth had a negative relationship a century ago. Contrary to this, Bhagwati (1996), Clemens

& Williamson (2004), Kalirajan & Singh (2008), Awokuse (2008), Paudel & Perera (2009) and Dufrenot et al. (2010) concluded that trade has contributed substantially to economic growth in recent decades in many ways. The data show that the role of trade 50 years ago was not as important as it is today. Athukorala (2011) suggests that network trade helps towards faster integration and economic interdependence within the region, which is an important process benefitting from trade by creating employment and extending output in this era.

The price of investment goods, distances to major world cities, growth promoting policy strategies, quality of access to international markets, and institutional reforms are the determinants of economic growth as pointed by Moral-Benito (2009). The role of institutional quality is doubtlessly important to manage the resources in a meaningful way as argued by North (1987), Acemoglu et al. (2001), Glaeser et al. (2004), and recently Brunnschweiler (2008). Many scholars have further focused on the growth process; Temple (1998) attempted to identify the adverse effects of bad policy outcomes in African countries, considering initial conditions that account for more than half of the variation in developing countries' growth rates, using the least trimmed squares method for cross country data. Temple concluded that developing countries with relatively low social capital have poor policy outcomes, resulting in low investment and growth.

Sachs (2005) explored the notion that the poverty trap and physical geography cause poor economic growth performance, Hausmann et al. (2007) suggested that the combination of the products of a country significantly impacts on the economic growth. The process of transforming countries is different depending on their growth level and economic status. Sachs (2008) explained the process of economic transformation of a country by highlighting some of the determinants of economic growth: adequate domestic saving for proper investment; a competitive export sector that can earn foreign exchange to pay for imported technology; financially strong

government to invest in infrastructure; and the ability to adapt international technology to local ecological conditions; macroeconomic stability; and the quality of governance are the key elements of economic development identified by Sachs.

Another area of focus in the growth literature is the role played by natural resources. A hypothesis called the “natural resource curse hypothesis” has been developed, although opinions are divided about its validity (see Sachs & Warner 1999, Gylfason 2001, Sala-i-Martin & Subramanian 2003 and Brunnschweiler 2008). The consensus on this issue is that institutions make the difference in the role played by natural resources in economic growth. Table 2.1 presents a summary of studies selected from the literature classifying the focus of the studies about economic growth.

Table 2.1: SUMMARY OF LITERATURE SURVEY

Landlockedness and Economic Growth		
Author (Year). Title	Methodology /Data	Findings/Conclusions
Friberg & Tinn (2009). “Land-locked Countries and Holdup”	GE modeling and gravity equation using the trade data of land-locked countries from 1950 to 2000.	Potential for holdup (the problem caused by the landlockedness) reduces trade by more than 50 percent and free trade agreements with transit countries have only a weak effect on trade.
Arvis et al. (2007). “The Cost of being land-locked: Logistics Cost and Supply Chain Reliability”	Microeconomic quantitative description of logistic cost	Land-locked countries are affected by high costs of freight services, high degree of unpredictability of transport system.
MacKellar et al. (2000). “Economic Development Problems of land-locked Countries”	Regression Analysis for 92 developing countries from 1980 to 1996.	Land-locked countries experience slower economic growth.

<p>Gallup et al. (1999). "Geography and Economic Development"</p>	<p>Empirical Analysis (AK Model-Harrod Domar Model) using some comparative data from different points in time from 1950 to 1990.</p>	<p>Location and climate have significant impacts on income levels via transport costs, disease burdens and agriculture productivity. Those regions located far from coasts and ocean-navigable rivers have to bear heavy transport costs of international trade. Tropical regions are also disadvantaged because of disease burden. Geographically disadvantaged regions will have higher population growth over the next three decades. Coastal countries have higher incomes than land-locked countries.</p>
<p>Srinivasan (1986). "The Costs and Benefits of Being a Small, Remote, Island, Land-locked, or Mini state Economy"</p>	<p>Qualitative Analysis</p>	<p>Absence of economies of scale, vulnerability, remoteness, reduced access of capital markets, macroeconomic policy dependence are the major problems in small economies.</p>

Determinants of Economic Growth (Selected Studies)

<p>Dufrenot et al. (2010). "The Trade-growth Nexus in the Developing Countries: a Quantile Regression Approach"</p>	<p>Quantile regression analysis of cross-section annual data from 75 developing countries for the duration of 1980-2006.</p>	<p>Heterogeneous trade growth nexus for both short and long-run growth such as the impact of openness on growth is more in the countries with low growth rates than in high growth achievers.</p>
---------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p>Singh (2010). "Does International Trade Cause Economic Growth? A Survey"</p>	<p>Literature Survey of the trade-growth relationship and the role of GATT/WTO to promote free trade.</p>	<p>The contribution of trade to growth depends on the volume of economic activity; and it is one of many determinants of economic growth.</p>
<p>Arora & Vamvakidis (2005). "How Much Do Trading Partners Matter for Economic Growth?"</p>	<p>Panel estimation for 101 industrial and developing countries from 1960 to 1999.</p>	<p>Trading partners' economic growth plays a significant role in the economic growth of a country.</p>
<p>Rodrik et al. (2004). "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development"</p>	<p>Instrumental variable (IV) estimation for institution and trade in income level in 79 and 137 countries for the year 1995.</p>	<p>Institution quality of a country is the most significant variable for its income level. If institutional quality of a country is controlled, geography and trade have less role to play in growth.</p>
<p>Dollar & Kraay (2003). "Institutions, Trade and Growth"</p>	<p>Ordinary Least Squares (OLS) and IV estimation on large cross-section data for different periods from 1970s to late 1990s.</p>	<p>Trade, institutions and growth run together that is better institution with more trade will result in fast economic growth in a country. Both trade and institutions have a joint role to play to accelerate economic growth.</p>

<p>Acemoglu et al. (2001). "The Colonial Origins of Comparative Development: An Empirical Investigation"</p>	<p>Descriptive statistics and OLS estimation for 64 countries.</p>	<p>The colonial experience is one of the determinants of institutions that exogeneously impact a country's economic performance.</p>
<p>Collier & Gunning (1999b). "Why Has Africa Grown Slowly ?"</p>	<p>Qualitative analysis.</p>	<p>Africa's slow growth during 1970s-1990s is due to policies which reduced the region's openness to foreign trade. Poor delivery of public services is the main hurdle of economic growth in the region, an investment-friendly environment needs to be initiated.</p>
<p>Frankel & Romer (1996). "Trade and Growth: An Empirical Investigation"</p>	<p>IV estimation with measure of geographic component of countries' trade (OLS with IV estimation) using trade data for 63 countries.</p>	<p>Countries' geographic characteristics have significant effects on their trade, and significant and robust effects on income.</p>
<p>Levine & Renelt (1992). "A Sensitivity Analysis of Cross-Country Growth Regressions"</p>	<p>Sensitivity Analysis for 119 countries covering the period 1960-1989 depending on data availability.</p>	<p>Positive, robust correlation between growth and share of investment in GDP.</p>

<p>Mankiw et al. (1992). "A contribution to the Empirics of Economic Growth"</p>	<p>Covering 121 countries' data using regression analysis.</p>	<p>Tested the Solow growth model for cross country analysis and found support for the convergence hypothesis, in line with Solow growth model.</p>
<p>Barro (1991). "Economic Growth in a Cross section of Countries"</p>	<p>Used Regression Analysis of data on 98 countries covering annual data from 1960 to 1985.</p>	<p>Positive association between initial level of education and political stability, and growth. Negative relationship of government consumption, initial GDP level, and market distortions with economic growth.</p>

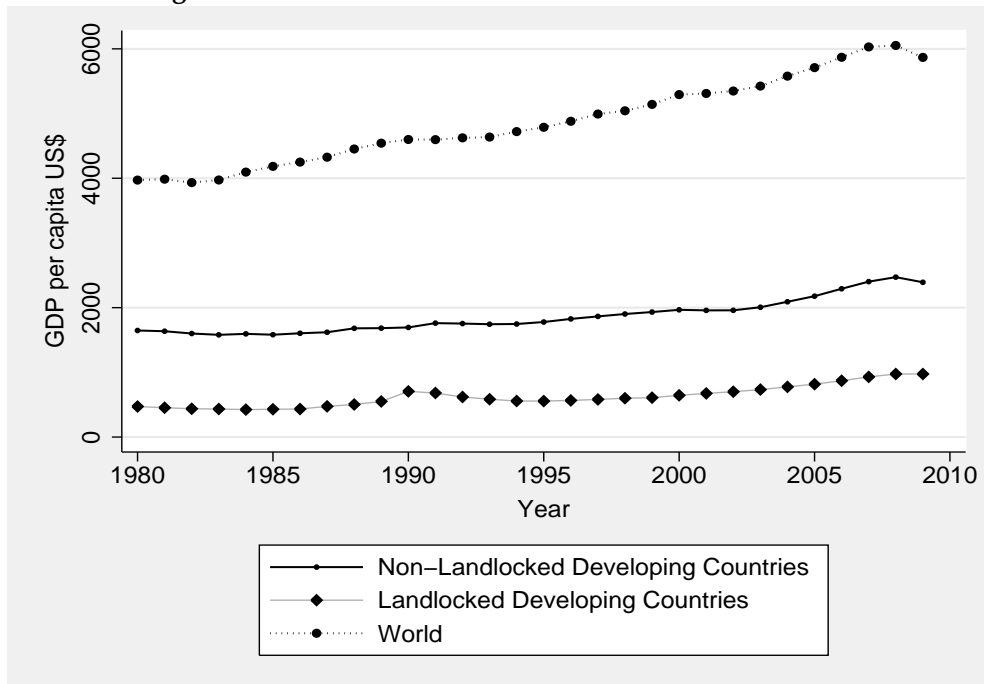
2.3 Landlocked Economies: An Overview

In terms of land area, Kazakhstan is the largest landlocked country, and Ethiopia has the largest population (almost 78 million) (Table 1.1 , Chapter 1). Different trends of population growth are seen, Niger has almost four percent annual population growth, while Belarus, Moldova, Serbia and Zimbabwe have negative population growth . Presumably because of high trade costs, LLDCs are not well integrated with the rest of the world to benefit from globalization. Most LLDCs have very low trade to GDP ratios. Azerbaijan has recorded the highest growth in recent decades while Turkmenistan and Afghanistan have an average of more than 10 percent growth; in contrast, Zimbabwe has had an average of negative six percentage growth rate for the same period. Afghanistan, Azerbaijan, Burkina Faso, Chad, Ethiopia, Mali, Niger, Serbia and Zambia are surrounded by more than five countries each, and Serbia has the maximum number (nine) of neighbours.

The differences in per capita GDP between landlocked and non-landlocked developing countries are illustrated in Figure 2.1. The average per capita GDP of the former in 2009 was less than US\$1000, compared to well above US\$2000 in the latter. The average per capita GDP of non-landlocked developing countries remained consistently higher over the period from 1980 to 2009.

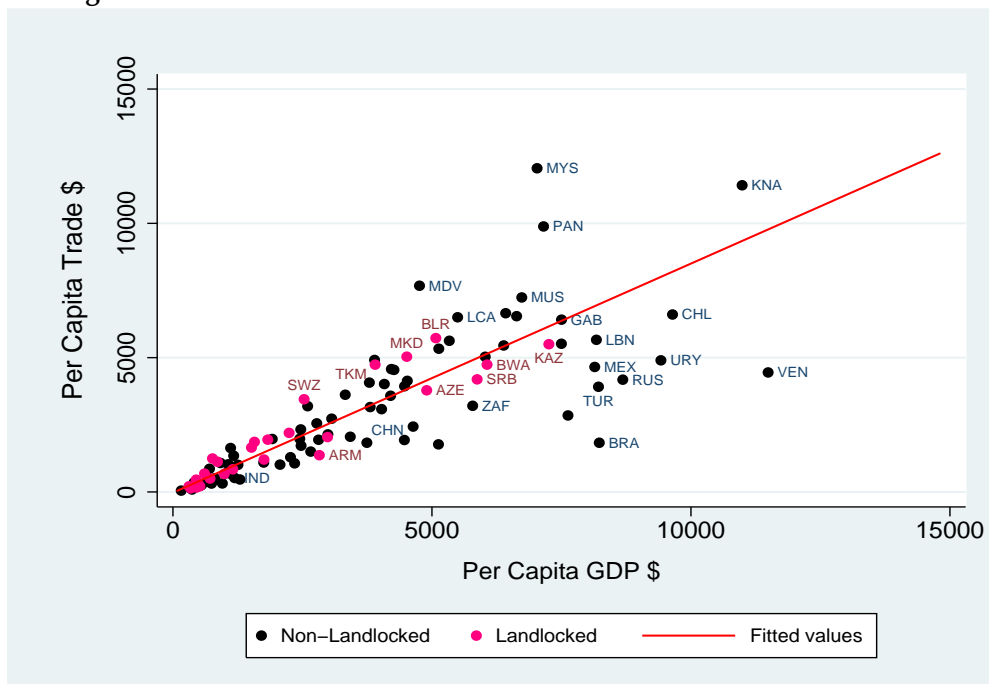
The relationship between per capita trade and per capita GDP of LLDCs is clustered in the region of US\$2000 (Figure 2.2). Only seven landlocked developing countries have more than \$4000 per capita trade and GDP, substantially lower than that of non-landlocked developing countries. None of the landlocked developing countries has more than US\$7500 per capita trade and per capita GDP. The relationship between trade and growth is found to be positive in both groups of developing countries.

Figure 2.1: REAL PER-CAPITA GDP- DEVELOPING COUNTRIES



Source: Based on data compiled from WDI, World Bank (2010).

Figure 2.2: TRADE-GROWTH RELATIONSHIP-DEVELOPING COUNTRIES IN 2009



Source: Based on data compiled from WDI, World Bank (2010).

2.4 Neighbourhood Impact on Landlocked Economies

The 'neighborhood effect', defined as the spillover effect of neighboring countries' economic performance on a given country, has been used in some recent studies as a determinant of inter-country differences in economic growth (Easterly & Levine (1998), Arora & Vamvakidis (2005), Collier & O'Connell (2007) and Roberts & Deichmann (2011)). Presumably this variable is much more important for the determination of growth performance of landlocked countries compared to the other developing countries for two reasons. First, trade cost faced by a landlocked country depends crucially on the quality of trade-related infrastructure of the neighbouring country through which it conducts international trade. Secondly, given this excessive trade cost, the geographic profile of trade of a landlocked country is likely to have a neighbourhood bias.

In a recent study, Roberts & Deichmann (2011) constructed an index of the spill-over effects from neighbouring countries, showing the weighted average growth rate of neighbours. However, neighbours' average growth rate itself does not capture the quality of the neighbours' infrastructure that plays a significant role in a landlocked country's economic growth. Taking an average of growth rates in the neighbourhood indicates the performance of neighbouring economies only and creates a size bias in the empirical analysis. For example, taking two landlocked countries: country X with two small neighbouring countries A and B, both growing fast; and country Y with four neighbouring countries including A and B plus two big countries such as W and Z, both growing slowly. In this study, two alternative indices are used to capture the neighbourhood effect. The first index captures the market size of the neighbouring country/countries, and the second index is a proxy measure of the cost of accessing the thirty-country markets.

2.4.1 Market Size

$$MSN_{i,t} = \left[\sum_{j=1}^n \beta_j X_{j,t} \right] \quad (2.1)$$

where,

MSN refers to market size in the neighbours of a landlocked developing country i ,

β refers to the weight of neighbour country's trade to world trade,

X is the GDP of the neighbour country,

t is time period, and

j is the number of neighbours.

To remove the country size bias arising from neighbouring countries, I weighted the neighbouring countries GDP by their shares in total world trade. This index appropriately captures the market size of the neighbouring countries, as it takes into account the trading significance of each neighbouring country in addition to its economic size.

2.4.2 Market Access

Considering the role of international trade on economic growth, it is assumed that poor economic performance of landlocked countries is due to the distance from their nearest commercial port to the business capital city of the country. For this infrastructure quality adjusted distance to port is constructed as follows:

$$MA_i = PD_i / \left[\left(\sum_{j=1}^n GDPPCR_j \right) / \text{Years} \right] \quad (2.2)$$

where,

MA refers to market access and is an index,

PD stands for distance to the nearest commercial port from the business capital city of landlocked country,

j refers to the number of neighbours of the landlocked country;

GDPPCR refers to the real per capita GDP of neighbours, a proxy for infrastructure quality and the phase of economic development, and

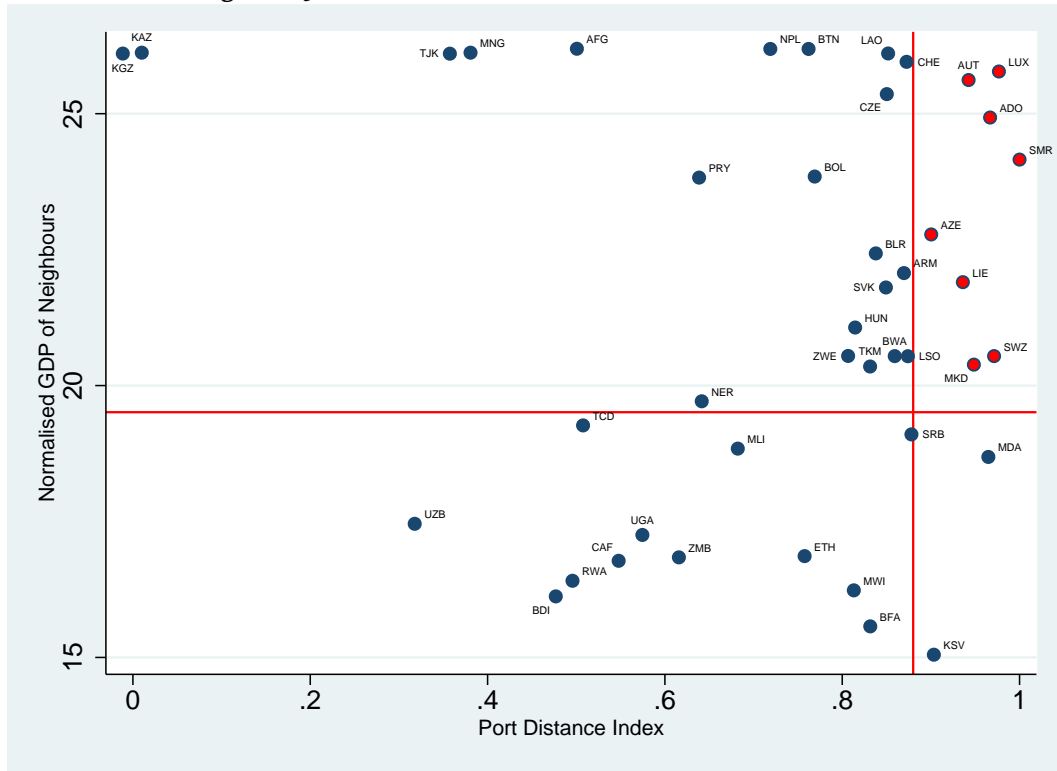
Years refers to the total number of years, which is 14 (this variable is used only for the landlocked countries group for 1996-2009).

The relationship between port distance and neighbours' economic development for landlocked countries is depicted in Figure 2.3. In this figure, X axis measures the distance index constructed as $pdistance = 1 - (Distance\ to\ port - Minimum\ distance\ from\ port\ in\ the\ group) / (Maximum\ distance\ from\ port\ in\ sample - Minimum\ distance\ to\ port\ in\ the\ group)$; the Y axis measures the log of neighbours' GDP in log form as calculated in equation 2.1 above. The right top corner countries benefit most because they have very short distances to the nearest port and their neighbours have big size economies, that is, they are developed such as Andora, Czech Republic, Austria, which have very favourable positions and benefits (for reference, however, these countries are not the concern of this study). Most of the LLDCs are scattered on the other quartile. Azerbaijan is attached to a landlocked sea (Caspian Sea) and hence has more neighbours including Russia.

The countries in the lower right corner such as Kosovo, Malawi and Burkina Faso benefit from short distance to a port but are situated among poor neighbours. The countries in the lower left corner, Rwanda, Zambia and Uganda, suffer due to both long distances to the port and poor neighbours; and countries in the top left cor-

ner suffer due to the long distance to the nearest port even though they are situated among rich neighbours such as Kyrgyz Republic, Kazakhstan, and Afghanistan.

Figure 2.3: PORT DISTANCE AND NEIGHBOURS ECONOMIES



Source: Based on data compiled from WDI, World Bank (2010) and <http://www.findaport.com/>

2.5 Methodology

2.5.1 Model

Over the past three decades, efforts have been made to model economic growth by expanding the Slow-Swan growth model by scholars such as Kormendi & Meguire (1985), Grier & Tullock (1989), Barro (1991), Arellano & Bond (1991), Levine & Renelt (1992), Mankiw et al. (1992), Sachs & Warner (1995), Islam (1995) and Greenaway et al. (2002). These studies have derived the growth equation from the basic Solow-

Swan model as specified in (2.3):

$$Y_t = K(t)^\alpha (A(t)L(t))^{1-\alpha} \quad (2.3)$$

where,

Y is output,

K is capital, and

L is labor

L and A are assumed to grow exogenously at rates n (population growth) and g (growth).

In the literature, the variables used to estimate the growth model are very diverse. Sala-I-Martin (1997) has estimated 62 explanatory variables, and identify variables (which he dubs ‘the fixed variables’) which are most relevant for growth model. I expanded the basic model (2.3) by adding these fixed variables. The full model, with the conventional notation for panel structure, takes the form:

$$G_{i,t} = \gamma_1 y_{t-1} + \gamma_2 Cap_t + \gamma_3 Open_t + \gamma_4 Edu_t + \gamma_5 Llock + \gamma_6 Nres_t + \eta_t + \mu_i + v_{i,t} \quad (2.4)$$

where,

(G) = growth of rate of per-capita GDP, the dependent variable

y_{t-1} = initial income, real per capita GDP in $t-1$ to pick up convergence effects (-),

Cap = the ratio of capital formation to GDP (+),

$Open$ = openness measured with trade as a percentage of GDP (+)

Edu = Education, mean years of schooling for the age 25 years or over (+),

$Llock$ = Landlockedness, a binary dummy (-), and

$Nres$ = natural resource rent to as percentage of GDP (+).

The last term $v_{i,t}$ is the error term and is assumed to have a normal distribution; η captures any common period-specific effect, such as general technical progress; and μ represents the time invariant variables. The dependent variable is in percentage, initial income is in natural log, capital formation to GDP, trade to GDP and natural resource rent to GDP ratios are in percentages. Openness is measured with an alternative variable i.e. the updated Sachs & Warner (1995) index. This index was updated following Wacziarg & Welch (2008) [SWWW index], and a binary variable. The signs of γ_1 and γ_5 are expected to be negative, the others positive.

A second stage of analysis looks at growth rate differentials among the group of landlocked developing countries and includes three additional variables: Gov, MSN and MA:

$$G_{i,t} = \gamma_1 y_{t-1} + \gamma_2 Cap_t + \gamma_3 Open_t + \gamma_4 Edu_t + \gamma_5 Nres_t + \gamma_6 Gov_t + \gamma_7 MSN_t + \gamma_8 MA + \eta_t + \mu_i + v_{i,t} \quad (2.5)$$

where,

Gov = the quality of governance (+),

MSN = aggregate market size in neighbouring countries (equation 2.1) (+), and

MA =neighbours' infrastructure-adjusted port distance (-) (equation 2.2) .

Two complementary measures are used to capture the neighbourhood effect: *MSN* in natural log form and *MA* as an index. The signs of γ_1 and γ_8 are expected to be negative, the others positive. In the empirical application of equations (2.1) and (2.2), governance and market access are indexes. The sign given in the parenthesis of the variables detail are expected sign.

2.5.2 Data Sources and Variable Construction

For the econometric analysis, the data for most variables are collected from the World Development Indicators World Bank (2010). The data for port distance used to construct *MA* are accessed from www.findaport.com. The empirical tests for the landlocked countries are conducted only for the period from 1996 to 2009, as 14 landlocked countries were formed in the early 1990s.

Among the explanatory variables, landlockedness is measured with a binary dummy, equal to 1 if a country is landlocked and 0 if a country is non-landlocked. This way, in all countries group, landlockedness (*Llock*) is replaced by the dummy for landlocked developed countries, landlocked developing countries, and non-landlocked developing countries, thus allowing comparison of these three groups of countries with developed countries. In the developing countries group, landlockedness (*Llock*) is used as a variable to identify the differences between landlocked developing countries and non-landlocked developing countries.

Education data that represent work force quality are collected from Barro & Lee (2010) and education statistics of the World Bank. Up to the year 2000, these data

are available for every five years; they have been linearly interpolated into annual figures. Total trade percentage of GDP is the most widely used measure of trade openness in the empirical growth literature, but in its traditional calculation it has a major shortcoming as an indicator of the openness of an economy. Exports and imports are magnitudes measured in terms of production value, whereas GDP is a value added concept. The amount of GDP related to a unit of exports or imports varies between countries with different economic structures. For example, for a primary goods producing country, the cumulated value added per unit of exports is generally much higher compared to that of an industrialized country. The proportion of import content in GDP varies with the economic size of the country. For these reasons, it is preferable to use a direct measure of the openness of the foreign trade regime (see Krugman 1995 and Athukorala & Hill 2010 for more detail). The ideal measure of openness would be the effective rate of protection (ERP) but these data are not available for many countries. Therefore, I use the updated Sachs & Warner (1995) index of trade liberalisation to see the sensitivity of the results.

The original Sachs and Warner binary index of trade liberalisation has been updated by Wacziarg & Welch (2008) for 141 countries for the period up to 1999, based on five major criteria. Thus, a country is liberalised when it has: average tariff rates not more than 40 percent; a black market premium rate not more than 20 percent; non-tariff barriers rates are not more than 40 percent; it does not have a state monopoly on major exports; and does not have a socialist economic system. I have updated the data for 197 countries and extended the period until 2009, using average tariff data from the World Bank. I then calculated the average for the period from 1999 to 2009. Black market premium data for the countries that are not listed in Wacziarg & Welch (2008), have been updated using Edwards et al. (2001) and the data from Global Financial data (GFDatabase 2011).⁴ The membership criteria of the

⁴Global Financial Data, San Juan Capistrano, USA., I found that a black market premium existed in

World Trade Organization (WTO) pave the way to proxy for non-tariff barrier data for the period after 1999. The provision is, if a country wants to become a member of the WTO, it has to virtually reduce its non- tariff barriers to zero, but if a country was a member of the General Agreement on Tariffs and Trade (GATT) prior to joining the WTO (in 1995), it was required to meet the membership conditions within a grace period of five years.⁵ The monopoly in the major export market was not the major determinant in the group. Based on these criteria, this index is a binary variable equal to 1 in each year after the country completes the liberalisation criteria and 0 for the period before that year.

To measure the impact of natural resources rent, natural resources rent as a percentage of GDP is used as an explanatory variable. A negative coefficient of this variable is consistent with the “Dutch Disease” theory, and a positive sign supports the hypothesis of Mehlum et al. (2006) that suggests the resource rent promotes growth.

Kaufmann et al. (2010) have developed six indices of the quality of governance, of these; the rule of law and control of corruption are considered more relevant than the other four as measures of the quality of governance in the process of economic development.⁶ The simple average of these two indicators is the variable used to measure the quality of governance in this paper. The simple average of the two is used instead of using the two indicators separately, because of the potential problem of high colinearity. The original data are for alternate years from 1996 to 2002. They are interpolated linearly to generate an annual series. The data for 2002 onwards are available annually.

only three countries, Afghanistan, Burundi and Zimbabwe, after 1999 in the group.

⁵Using this criterion, Rwanda, Tongo, Ukraine and Vietnam became liberalized after 2005, 2007, 2008 and 2007 respectively.

⁶These six indicators are: Voice and Accountability, Political Stability and Lack of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption

To capture the neighbourhood effect, previous studies used aggregate growth of the neighbouring countries (for example, Easterly & Levine (1998), Collier & O'Connell (2007) and Roberts & Deichmann (2011)). As mentioned earlier in section 2.4, Roberts & Deichmann (2011) constructed an index for the spillover effect, with the weighted average growth rate of neighbours. However, neighbours' average growth rate does not capture the development level of those neighbours, and the development level of the neighbours is more important to the growth of landlocked countries. The developed country with the highest growth rate in the neighborhood would be the best.

The neighbours' infrastructure that matters most to a landlocked country is the access to world markets via neighbours' ports. However, taking the average of growth in landlocked countries in this study creates a size bias in the empirical analysis and does not capture the effect of these two points, as explained in section 2.4. Hence, I calculated the variable to measure the neighbourhood effect as in equation (2.1). In addition, this paper emphasises the role of infrastructure quality in neighbouring countries with a port available for landlocked countries. For this, road and railway quality would be an important measure of infrastructure quality, but the data for road and rail service are not available for this period. Therefore, I have constructed an index of neighbours' infrastructure quality adjusted for port distance, to measure the cost of transportation to access international markets. Equations (2.1) and (2.2), respectively, show the calculations of the two variables related to the neighbourhood effects (see Section 2.4 for details).

2.5.3 Econometrics

The model is estimated using Pooled Ordinary Least Squares (POLS), Random-Effects (RE), Fixed-Effects (FE), and Hausman Taylor (HT) estimators as in Hausman

& Taylor (1981). In this case, the POLS has a major problem as it ignores the panel structure of the data and assumes that the observations are serially uncorrelated (Johnston & DiNardo 1997). The FE estimator is not suitable, as the main explanatory variable “landlockedness” is specified as a time-invariant variable in addition to the Africa dummy and market access. The RE estimator ignores the country-specific effects. The HT estimator is more effective than RE because it eliminates bias related to lack of independence of the explanatory variables from the joint disturbance term. Moreover, the problem of heteroscedasticity is eliminated through the use of the general least squares method. For these reasons, the HT estimator is used as the preferred estimation method and alternative estimates using POLS, RE and FE estimations are reported for the purpose of comparison. The System Generalised Method of Moments (SGMM) developed by Arellano & Bover (1995) and Blundell & Bond (1998) is not suitable because the data set covers more than 15 years for the ‘all countries’ and ‘all developing countries’ group (Roodman 2009). To explain the properties of the HT estimator, consider the following stylized model:

$$y_{it} = X_{1,it}\beta_1 + X_{2,it}\beta_2 + \tau_1\beta_3 + \tau_2\beta_4 + \alpha_i + \varepsilon_{it}$$

where, X_1 and X_2 are time varying regressors; τ_1 and τ_2 are time invariant regressors of the model; α_i is a country-specific effect, and ε_{it} is the error term. All the regressors are assumed to be uncorrelated with ε_{it} . The relationship of regressors with α_i is assumed as $\text{cov.}(\alpha_i, \chi_1 = 0)$ but $\text{cov.}(\alpha_i, \chi_2 \neq 0)$, $\text{cov.}(\alpha_i, \tau_1 = 0)$ and $\text{cov.}(\alpha_i, \tau_2 \neq 0)$. The FE model cannot estimate β_3 and β_4 and the RE ignores the role of country-specific effect α_i .

The HT estimator is an instrumental variable (IV) estimator that enables us to estimate the coefficients of time-invariant regressors by the stronger assumption that some specified regressor is uncorrelated with fixed effects. It combines the strength of both the FE and random-effects estimators and gives estimations that

address the endogeneity issue by setting the instrument as the difference between the regressor and mean of the regressor. i.e. $\chi_{1,it} - \bar{\chi}_{1i}$ (Verbeek 2008, Breusch et al. 1989, Hausman & Taylor 1981). The HT estimator gives more consistent and efficient results when more than one time invariant variables are used in the model (Cameron & Trivedi 2009). In sum, the advantage of employing HT estimation in this study are: first, it is suitable in case of time invariant variables such as landlockedness, second, it deals with endogeneity issue to make more reliable results, and third, it has the combine strength of both FE and RE.

2.6 Results

Descriptive statistics and the correlation matrix of the variables are presented in Table 2A.2 and Table 2A.3 in Appendix 2A, respectively. The regression estimates are presented in Tables 2.2 to 2.12 classified into all countries, developing countries and landlocked developing countries groups. Table 2A.4 and Table 2A.5 in Appendix 2A present the results with POLS, RE, FE and HT for comparison. The post estimation statistics are presented in the lower panel of tables.

For HT estimates, the tests for over-identification of variables are conducted and the Sargan-Hansen statistic and Chi-square P-value are reported in the last rows of the tables. The null hypothesis is that the error term is uncorrelated with instruments, such as the mean of the trade GDP ratio, liberalisation index, and natural resources to GDP cannot be rejected in all estimations. All equations pass the F test for overall statistical significance.

2.6.1 All Countries

Tables 2.2 to 2.4 present the growth equation estimated using the HT method for the all countries group with the base dummy of developed countries. All the estimations in these tables are compared with the developed countries disaggregated into landlocked developed countries, landlocked developing countries and other developing countries. The main objective of doing this is to examine whether the landlocked developing countries are the most disadvantaged group in the sample. The results suggest that the level of growth is lower in all developing countries as a group compared to developed countries, but among the developing countries the subgroup of landlocked countries is the most disadvantaged group. The coefficient of the dummy variable for landlocked developed countries is not statistically significant; this result suggests that these countries are not different from the other developed countries. This supports the argument for focussing specifically on landlocked developing countries in examining the impact of landlockedness on economic growth, as is done in this thesis. The results suggest that landlocked developing countries' growth is lower by about 14 percentage points compared to that of developed countries, holding other variables in the model constant.

Alternative estimates based on POLS, FE, RE and HT estimation techniques are reported in Tables 2A.4 and 2A.5 in the Appendix 2A. When compared with the HT estimates, the results for the dummy variables such as landlockedness and border, based on these estimation are substantially different, in terms of both the magnitude and the statistical significance. The comparisons suggest that using a landlockedness dummy with either POLS, RE or FE results in an underestimation of the negative impact of landlockedness because of the endogenous bias relating to openness, governance, capital formation and natural resources rent. The HT estimator used in this study redresses this bias by taking into account the country-specific effect in the panel data structure and the case of endogeneity taking the mean value

of the potential endogenous variables, such as trade as percentage of GDP, governance, natural resources rent as percentage of GDP, and education.

Table 2.2 presents the results for the period 1980 to 2009. The results for trade openness measured by trade as a percentage of GDP are highly significant suggesting that a ten percent increase in trade to GDP ratio increases the economic growth on average by 0.30 percentage points, holding other variables constant in the model. The coefficient of the Sachs-Warner index (SWWW) is highly statistically significant and suggests that on average the rate of growth of countries with a liberalised trade grow two and a half percentage points faster than those with controlled trade regimes.

The results for education variable suggest that an additional year of schooling results in an increase in the annual per capita growth rate by an average of one and a half percentage points. The coefficient of initial income variable is consistent with the growth convergence hypothesis. The coefficient for the Africa dummy is statistically significant, with the expected negative sign, only while controlled to the Sachs Warner index of trade liberalisation, and the results supports the findings of previous studies that is, on average, the annual growth rate of per capita GDP of an African country is two and a half percentage points slower than that of developed countries. The natural resources rents seem to contribute statistically significantly to growth, supporting Mehlum et al. (2006). The variable “capital formation” is also highly statistically significant, with the expected sign. The results in these tables show that the negative impacts of landlockedness are much bigger in the developing countries.

Table 2.3 presents an estimation for the shorter period, 1996-2009, to see the sensitivity of the results to the choice of time period. The results are consistent with the estimated results for the longer period as in (Table 2.2). The coefficients of trade

openness measured by trade as a percentage of GDP have maintained the same level of significance statistically. The Sachs Warner index coefficients are significant but the magnitudes are smaller than those shown in Table 2.2. The coefficients for education are also smaller. The results suggest that a country in Africa grows more slowly by about five percentage points on average compared to other developed countries, holding other variables constant.

In Table 2.4, I introduce a variable to proxy the quality of governance, which is measured by the average of the rule of law and control of corruption as an additional explanatory variable. The results suggests that a country with a good governing system on average grows faster by a one and half percentage points annually holding other variables constant. This result is consistent with Kis-Katos & Schulze (2013) that suggests that the corruption (the symptom of the poor quality of governance) deters the economic growth. The results for the Africa dummy are consistent with the results in Table 2.3.

Table 2.2: GROWTH DETERMINANTS: ALL COUNTRIES 1980-2009

Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP				
Variables	(1)	(2)	(3)	(4)
Trade Openness (Trade% of GDP)	0.029*** (0.004)	0.029*** (0.004)		
Trade Openness (SWWW)			2.446*** (0.253)	2.445*** (0.253)
Education (Edu)	1.461*** (0.098)	1.461*** (0.098)	1.210*** (0.103)	1.209*** (0.103)
Initial Income (Yt-1) in log	-6.650*** (0.406)	-6.648*** (0.406)	-5.979*** (0.398)	-5.977*** (0.398)
Capital Formation (Cap)% of GDP	0.185*** (0.014)	0.185*** (0.014)	0.195*** (0.014)	0.195*** (0.014)
Natural Resources Rent (Nres) % of GDP	0.056*** (0.013)	0.056*** (0.013)	0.077*** (0.012)	0.077*** (0.012)
Africa (Dummy)	-2.176 (1.333)	-2.179 (1.339)	-2.268* (1.201)	-2.270* (1.204)
Landlocked Developed Economies	-2.481 (2.752)		-1.821 (2.463)	
Landlocked Developing Economies	-15.590*** (1.992)	-15.251*** (1.959)	-14.305*** (1.835)	-14.060*** (1.803)
Non-landlocked Developing Economies	-9.750*** (1.520)	-9.418*** (1.475)	-9.263*** (1.393)	-9.021*** (1.352)
<i>Number of observations</i>	3,790	3,790	3,824	3,824
<i>F Statistic</i>	64.11	72.12	70.78	79.63
<i>Sargan-Hansen statistic</i>	0.12	0.20	0.12	0.17
<i>Sargan-Hansen P- Value</i>	0.94	0.91	0.94	0.92

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.3: GROWTH DETERMINANTS: ALL COUNTRIES 1996-2009

<i>Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP</i>				
Variables	(1)	(2)	(3)	(4)
Trade Openness (Trade% of GDP)	0.044*** (0.007)	0.044*** (0.007)		
Trade Openness (SWWW)			1.421*** (0.485)	1.418*** (0.484)
Education (Edu)	0.609** (0.263)	0.607** (0.263)	0.975*** (0.259)	0.977*** (0.258)
Initial Income (Yt-1) in log	-6.542*** (0.671)	-6.542*** (0.670)	-6.829*** (0.678)	-6.832*** (0.677)
Capital Formation (Cap)% of GDP	0.183*** (0.018)	0.183*** (0.018)	0.207*** (0.018)	0.207*** (0.018)
Natural Resources Rent (Nres) % of GDP	0.089*** (0.013)	0.089*** (0.013)	0.105*** (0.013)	0.105*** (0.013)
Africa (Dummy)	-5.266*** (1.396)	-5.272*** (1.399)	-4.728*** (1.360)	-4.726*** (1.360)
Landlocked Developed Economies	-2.274 (2.584)		-1.201 (2.471)	
Landlocked Developing Economies	-16.208*** (2.346)	-15.918*** (2.312)	-17.046*** (2.321)	-16.900*** (2.284)
Non-landlocked Developing Economies	-11.382*** (1.733)	-11.092*** (1.697)	-11.962*** (1.716)	-11.811*** (1.678)
<i>Number of observations</i>	2,023	2,023	2,033	2,033
<i>F Statistic</i>	35.22	39.66	30.98	34.89
<i>Sargan-Hansen statistic</i>	5.93	5.65	4.52	4.38
<i>Sargan-Hansen P- Value</i>	0.06	0.08	0.12	0.11

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.4: GROWTH DETERMINANTS: ALL COUNTRIES 1996-2009 WITH GOVERNANCE

<i>Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP</i>				
Variables	(1)	(2)	(3)	(4)
Trade Openness (Trade% of GDP)	0.043*** (0.007)	0.043*** (0.007)		
Trade Openness (SWWW)			1.295*** (0.491)	1.350*** (0.483)
Education (Edu)	0.584** (0.262)	0.580** (0.262)	1.399*** (0.286)	0.950*** (0.257)
Initial Income (Yt-1) in log	-6.456*** (0.670)	-6.451*** (0.669)	-6.290*** (0.763)	-6.739*** (0.676)
Capital Formation (Cap)% of GDP	0.176*** (0.018)	0.176*** (0.018)	0.229*** (0.019)	0.199*** (0.018)
Natural Resources Rent (Nres) % of GDP	0.096*** (0.013)	0.097*** (0.013)	0.157*** (0.017)	0.112*** (0.013)
Governance Quality	1.482*** (0.511)	1.471*** (0.511)	1.672*** (0.548)	1.394*** (0.515)
Africa (Dummy)	-5.060*** (1.310)	-5.070*** (1.314)	-2.873* (1.547)	-4.498*** (1.257)
Landlocked Developed Economies	-2.402 (2.370)		-4.279 (3.403)	
Landlocked Developing Economies	-13.590*** (2.418)	-13.298*** (2.393)	-12.970*** (2.702)	-14.350*** (2.362)
Non-landlocked Developing Economies	-9.091*** (1.811)	-8.799*** (1.785)	-8.121*** (2.072)	-9.602*** (1.766)
<i>Number of observations</i>	2,005	2,005	1,772	2,014
<i>F Statistic</i>	31.98	35.55	28.15	31.60
<i>Sargan-Hansen statistic</i>	4.26	4.06	28.82	2.83
<i>Sargan-Hansen P- Value</i>	0.12	0.13	0.01	0.24

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

2.6.2 All Developing Countries

The results reported above (Subsection 2.6.1) suggest that on average landlockedness is a much more binding constraint on growth for developing countries. Based on this result, to examine the impact of landlockedness on developing countries, Table 2.5 presents estimation results for all developing countries for the period 1980-2009, with a landlockedness dummy. The coefficient of the landlockedness variable is statistically significant with the expected negative sign. The negative impact is very large, that is, by being landlocked, a country has a lower annual growth rate of four percentage points on average holding other variable constant, and is much larger compared to results reported in previous studies such as Sachs & Warner (1997), Collier & Gunning (1999*b*) and Hailou (2007) which show this coefficient as roughly three percentage points.⁷ Both indicators of openness are statistically significant. The coefficients for education are similar to those for the all countries group for the same period. The coefficients for initial income, capital formation, and natural resources rent are not substantially different to those for the all countries group. The Africa dummy's statistical significance level has declined substantially and the coefficients are much smaller than those of the all countries group, as expected.

Table 2.6 presents the estimation results for developing countries for the period 1996-2009. The landlockedness variable is statistically significant with the expected negative sign, but the coefficients are smaller compared to those shown in Table 2.5. This indicates that the economic growth of landlocked developing countries after mid-1990s was much faster than in the previous period, and the gap with non-landlocked developing countries is narrowed. However, the coefficient of this variable for the landlocked developing countries is still negative and statistically sig-

⁷Note that if the dependent variable is in natural log form, the coefficients of binary dummy variable is calculated as: $exp^{\beta} - 1$. For detail see Garderen & Shah (2002) but this is not the case here as the dependent variable is not in the log.

nificant, suggesting that these countries grow at least two and a half percentage points more slowly than the other developing countries. The coefficients of both indicators of openness are statistically significant. The coefficients for education variable are similar to that for the all countries group for the same period. The magnitude of the coefficients of the initial income variable is reduced, indicating the slow rate of convergence compared to the previous period. The results for capital formation and natural resources rent are not substantially different to those for the all countries group. The coefficient of the Africa dummy is statistically significant only when the natural resource variable is included.

Table 2.5: GROWTH DETERMINANTS: ALL DEVELOPING COUNTRIES 1980-2009

<i>Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP</i>				
Variables	(1)	(2)	(3)	(4)
Landlockedness	-4.888*** (1.403)	-4.832*** (1.425)	-4.168*** (1.242)	-4.067*** (1.278)
Trade Openness (Trade% of GDP)	0.036*** (0.006)	0.038*** (0.006)		
Trade Openness (SWWW)			2.671*** (0.308)	2.423*** (0.306)
Education (Edu)	1.349*** (0.125)	1.368*** (0.125)	0.954*** (0.138)	1.043*** (0.137)
Initial Income (Yt-1) in log	-5.663*** (0.506)	-5.683*** (0.504)	-5.081*** (0.501)	-5.091*** (0.499)
Capital Formation (Cap)% of GDP	0.173*** (0.017)	0.173*** (0.017)	0.187*** (0.016)	0.192*** (0.016)
Natural Resources Rent (Nres) % of GDP	0.047*** (0.015)		0.077*** (0.015)	
Africa (Dummy)	-1.444 (1.339)	-1.453 (1.356)	-2.184* (1.193)	-2.026* (1.224)
<i>Number of observations</i>	2,592	2,598	2,597	2,610
<i>F Statistic</i>	51.24	57.32	57.39	61.01
<i>Sargan-Hansen statistic</i>	0.17	0.31	0.03	0.49
<i>Sargan-Hansen P- Value</i>	0.92	0.57	0.98	0.48

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.6: GROWTH DETERMINANTS: ALL DEVELOPING COUNTRIES 1996-2009

Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP				
Variables	(1)	(2)	(3)	(4)
Landlockedness	-2.758** (1.171)	-2.533** (1.197)	-3.013*** (1.128)	-2.841** (1.154)
Trade Openness (Trade% of GDP)	0.044*** (0.009)	0.051*** (0.009)		
Trade Openness (SWWW)			1.579*** (0.589)	1.277** (0.604)
Education (Edu)	0.717** (0.334)	0.927*** (0.334)	0.875*** (0.337)	1.259*** (0.335)
Initial Income (Yt-1) in log	-3.966*** (0.809)	-3.875*** (0.819)	-4.315*** (0.811)	-4.253*** (0.826)
Capital Formation (Cap)% of GDP	0.143*** (0.021)	0.136*** (0.021)	0.173*** (0.020)	0.170*** (0.021)
Natural Resources Rent (Nres) % of GDP	0.068*** (0.014)		0.085*** (0.013)	
Africa (Dummy)	-2.397* (1.274)	-1.659 (1.288)	-2.650** (1.263)	-1.467 (1.272)
<i>Number of observations</i>	1,393	1,393	1,398	1,398
<i>F Statistic</i>	22.49	21.65	20.00	16.66
<i>Sargan-Hansen statistic</i>	3.28	0.01	3.48	0.04
<i>Sargan-Hansen P- Value</i>	0.19	0.92	0.18	0.84

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.7 presents the estimation results for developing countries for the period 1996-2009, controlling the quality of governance. The variable, landlockedness has the statistically significant negative sign as expected but the significance level has declined, which shows that one of the ways to minimise the negative impacts of landlockedness could be to improve the quality of governance. Both the indicators of openness are statistically significant. The governance quality variable is statistically

highly significant with the expected positive sign. The coefficients for education are statistically significant with the expected positive sign. The coefficients for initial income are reduced, indicating the slow rate of convergence compared to the previous period and consistent with that shown in Table 2.6. The results for capital formation and natural resources rent are not substantially different to those for the all countries group. The Africa dummy's statistical significance has disappeared, as explained previously in the results shown in Table 2.6. This shows that once governance is controlled, the African developing countries are not different to the other developing countries in this group, other things remaining the same.

Estimates using data averaged by five-year frequency for all developing countries are reported in Table 2.8. These results are consistent with those reported in the previous Tables.

Table 2.7: GROWTH DETERMINANTS: ALL DEVELOPING COUNTRIES 1996-2009 WITH GOVERNANCE

Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP				
Variables	(1)	(2)	(3)	(4)
Landlockedness	-2.071* (1.057)	-2.159* (1.155)	-2.062** (0.957)	-2.324** (1.068)
Trade Openness (Trade% of GDP)	0.044*** (0.009)	0.052*** (0.009)		
Trade Openness (SWWW)			1.577*** (0.580)	1.320** (0.601)
Governance Quality	2.481*** (0.531)	1.917*** (0.535)	2.551*** (0.519)	1.801*** (0.527)
Education (Edu)	0.791** (0.331)	1.003*** (0.333)	0.964*** (0.333)	1.328*** (0.334)
Initial Income (Yt-1) in log	-3.679*** (0.699)	-3.895*** (0.742)	-3.759*** (0.685)	-4.157*** (0.742)
Capital Formation (Cap)% of GDP	0.123*** (0.021)	0.122*** (0.021)	0.151*** (0.020)	0.157*** (0.021)
Natural Resources Rent (Nres) % of GDP	0.079*** (0.014)		0.096*** (0.013)	
Africa (Dummy)	-1.623 (1.102)	-1.285 (1.191)	-1.484 (1.031)	-0.957 (1.139)
<i>Number of observations</i>	1,375	1,375	1,379	1,379
<i>F Statistic</i>	21.41	19.29	19.89	15.21
<i>Sargan-Hansen statistic</i>	2.34	0.91	2.72	0.11
<i>Sargan-Hansen P- Value</i>	0.51	0.63	0.44	0.94

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.8: GROWTH DETERMINANTS: ALL DEVELOPING COUNTRIES 1996-2009 (5-YEAR AVERAGE)

Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP				
Variables	(1)	(2)	(3)	(4)
Landlockedness	-3.202*** (1.171)	-3.075** (1.195)	-2.816*** (1.074)	-2.688** (1.110)
Trade Openness (Trade% of GDP)	0.036*** (0.011)	0.039*** (0.011)		
Trade Openness (SWWW)			1.096** (0.525)	0.942* (0.528)
Education (Edu)	1.046*** (0.218)	1.099*** (0.219)	1.098*** (0.227)	1.214*** (0.226)
Initial Income (Yt-1) in log	-3.650*** (0.844)	-3.653*** (0.853)	-3.266*** (0.850)	-3.266*** (0.866)
Capital Formation (Cap)% of GDP	0.116*** (0.032)	0.113*** (0.032)	0.134*** (0.030)	0.131*** (0.031)
Natural Resources Rent (Nres) % of GDP	0.049** (0.020)		0.063*** (0.018)	
Africa (Dummy)	-0.984 (1.161)	-0.889 (1.182)	-0.595 (1.064)	-0.345 (1.093)
<i>Number of observations</i>	439	439	440	440
<i>F Statistic</i>	11.76	12.38	11.09	10.83
<i>Sargan-Hansen statistic</i>	1.23	0.86	1.18	0.12
<i>Sargan-Hansen P- Value</i>	0.54	0.35	0.55	0.73

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

2.6.3 Landlocked Developing Countries

Table 2.9 presents the estimates for a group of landlocked developing countries for the period 1980-2009. The coefficient of trade openness measured using trade as a percentage of GDP is consistently statistically significant in all estimations. The

coefficient of the alternative measure of trade openness, Sachs-Warner index of liberalisation is also positive and statistically highly significant. This suggests that a landlocked country with trade openness grows faster. The education variable is significant as expected, showing that one additional year of schooling causes an increase in growth by an average of more than one percentage point. The initial income variable results throughout all estimations strongly support the growth convergence hypothesis. The natural resource rent variable is statistically highly significant, suggesting that exploitation of natural resources contributes to economic growth in LLLDCs, contrary to the “resource curse” hypothesis. The results suggest that capital formation has a statistically significant positive effect on growth, as expected. The results also suggest that the African landlocked countries are not different to the other developing countries; instead, the coefficients are positive but not statistically significant.

Table 2.10 presents estimates for a group of landlocked developing countries for the period 1996-2009 after adding two new variables: Market size in neighbour and Market Access. Trade openness, measured using trade as a percentage of GDP, is consistently significant in all estimations. The coefficient of the alternative measure of trade openness, Sachs-Warner index of trade liberalisation, is also positive but not statistically significant. The MSN variable is statistically significant with the expected positive sign indicating that a one percent increase in the market size in the neighbour of a LLDC impacts on its growth by an average of about one and a half percentage points. The coefficient of the neighbours’ market size variable is consistently statistically significant in all equations, suggesting that a landlocked country surrounded by large economies has a more advantageous environment for economic growth than those locked by the poor countries. Thus, improving the neighbours’ infrastructure that is used by a landlocked country may be a useful means of improving the development prospects of landlocked countries. For example, economic growth in Uganda is affected by the condition of the infrastructure in its neighbour Kenya, the transit country of Uganda. However, Uganda has some other neighbours such as

the Democratic Republic of Congo, Rwanda, Sudan and Tanzania but Uganda does not use the infrastructure of these countries.

Education variable has a negative sign, against expectations, and is statistically significant in some specifications. It could be that education has a negative influence on development though social unrest if the other preconditions for growth are not met. The results for the initial income (y_{t-1}) variable strongly support the conditional growth convergence hypothesis in all equations. The coefficient of the natural resource rent variable is highly significant, and suggests that exploitation of natural resources contributes to economic growth in LLLDCs, contrary to the “resource curse” hypothesis. The coefficient of capital formation is positive and statistically significant, as expected. The coefficient of the Africa dummy is negative but not statistically significant, indicating that growth rates in the African landlocked developing countries are not different from those of the other landlocked developing countries, after controlling for the other relevant variables.

Table 2.9: GROWTH DETERMINANTS: LANDLOCKED DEVELOPING COUNTRIES 1980-2009

Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP				
Variables	(1)	(2)	(3)	(4)
Trade Openness (Trade% of GDP)	0.032** (0.014)	0.034** (0.014)		
Trade Openness (SWWW)			3.709*** (0.754)	3.369*** (0.763)
Education (Edu)	1.651*** (0.347)	1.655*** (0.347)	1.046*** (0.368)	1.020*** (0.368)
Initial Income (Yt-1) in log	-6.568*** (1.226)	-6.050*** (1.213)	-6.158*** (1.200)	-5.273*** (1.171)
Capital Formation (Cap)% of GDP	0.140*** (0.034)	0.136*** (0.035)	0.149*** (0.034)	0.149*** (0.034)
Natural Resources Rent (Nres) % of GDP	0.077*** (0.025)		0.094*** (0.024)	
Africa (Dummy)	3.099 (2.928)	2.351 (2.933)	0.383 (2.774)	-0.535 (2.738)
<i>Number of observations</i>	646	648	646	653
<i>F Statistic</i>	12.91	12.41	16.58	14.89
<i>Sargan-Hansen statistic</i>	0.84	1.68	0.05	1.01
<i>Sargan-Hansen P- Value</i>	0.66	0.20	0.98	0.32

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.10: GROWTH DETERMINANTS: LANDLOCKED DEVELOPING COUNTRIES 1996-2009

<i>Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP</i>				
Variables	(1)	(2)	(3)	(4)
Trade Openness (Trade% of GDP)	0.046*** (0.017)	0.054*** (0.017)		
Trade Openness (SWWW)			1.448 (1.162)	1.607 (1.199)
Market Access	-1.629 (2.812)	-2.297 (3.183)	-2.675 (2.795)	-3.613 (3.225)
Market Size in neighbour	1.387*** (0.500)	1.848*** (0.544)	1.443*** (0.503)	1.978*** (0.551)
Education (Edu)	-1.220 (0.757)	-1.546* (0.805)	-1.071 (0.772)	-1.359 (0.833)
Initial Income (Yt-1) in log	-2.805* (1.546)	-3.410** (1.605)	-3.445** (1.539)	-4.250*** (1.609)
Capital Formation (Cap)% of GDP	0.071* (0.038)	0.057 (0.039)	0.095** (0.038)	0.083** (0.039)
Natural Resources Rent (Nres) % of GDP	0.064*** (0.021)		0.076*** (0.021)	
Africa (Dummy)	-1.714 (3.787)	-2.110 (4.118)	-2.044 (3.917)	-2.414 (4.311)
<i>Number of observations</i>	377	377	377	377
<i>F Statistic</i>	5.05	4.77	4.26	3.47
<i>Sargan-Hansen statistic</i>	1.60	0.39	1.46	0.08
<i>Sargan-Hansen P- Value</i>	0.45	0.53	0.48	0.77

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.11 presents the estimates for a group of landlocked developing countries for the period 1996-2009 after adding governance (Gov) as a proxy of governance quality in the model. This variable has a statistically significant positive impact on economic growth in the landlocked developing countries. This suggests that if the

quality of governance is improved by an index point, on average the rate of economic growth increases by at least two and a half percentage points, holding other variables constant. The results for other variables are consistent with those reported in the previous tables.

As a further step to check the robustness of the results, the model is re-estimated for using rule of law as an alternative variable to quality of governance (Table 2.12). The results for the main variable of interest in this estimation are not substantially different to those shown in Table 2.10 and Table 2.11. In addition, Table 2.13 presents the results for estimation with the interaction of two variables: quality of governance and the natural resources. The coefficient of this interaction variable is statistically significant, suggesting that the quality of governance matters to gain from the natural resources. The LLDC with higher quality of governance benefits more from the natural resources than the LLDC with poor quality of governance. The results for the main variables of interest are remarkably robust to the inclusion of this additional interaction variable.

Table 2.11: GROWTH DETERMINANTS: LANDLOCKED DEVELOPING COUNTRIES 1996-2009 WITH GOVERNANCE

Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP				
Variables	(1)	(2)	(3)	(4)
Trade Openness (Trade% of GDP)	0.050*** (0.017)	0.060*** (0.017)		
Trade Openness (SWWW)			1.330 (1.140)	1.574 (1.188)
Market Access	-0.109 (2.730)	-1.204 (3.197)	-1.272 (2.598)	-2.742 (3.149)
Market Size in neighbour	1.248*** (0.467)	1.929*** (0.539)	1.238*** (0.466)	2.001*** (0.549)
Governance Quality	2.785** (1.162)	2.868** (1.201)	2.350** (1.161)	2.269* (1.210)
Education (Edu)	-0.856 (0.725)	-1.391* (0.794)	-0.635 (0.737)	-1.159 (0.826)
Initial Income (Yt-1) in log	-2.464* (1.466)	-3.557** (1.583)	-3.006** (1.456)	-4.334*** (1.599)
Capital Formation (Cap)% of GDP	0.056 (0.039)	0.039 (0.040)	0.082** (0.039)	0.067* (0.040)
Natural Resources Rent (Nres) % of GDP	0.068*** (0.021)		0.081*** (0.021)	
Africa (Dummy)	-0.469 (3.725)	-1.091 (4.137)	-0.756 (3.761)	-1.494 (4.255)
<i>Number of observations</i>	364	364	364	364
<i>F Statistic</i>	4.77	4.56	3.89	3.13
<i>Sargan-Hansen statistic</i>	3.58	0.95	3.06	0.24
<i>Sargan-Hansen P- Value</i>	0.31	0.63	0.38	0.88

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.12: GROWTH DETERMINANTS: LANDLOCKED DEVELOPING COUNTRIES 1996-2009 WITH RULE OF LAW

<i>Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP</i>				
Variables	(1)	(2)	(3)	(4)
Trade Openness (Trade% of GDP)	0.049*** (0.017)	0.059*** (0.017)		
Trade Openness (SWWW)			1.261 (1.143)	1.486 (1.192)
Market Access	-0.006 (2.646)	-1.121 (3.121)	-1.229 (2.527)	-2.709 (3.084)
Market Size in neighbour	1.190** (0.462)	1.873*** (0.540)	1.207*** (0.461)	1.955*** (0.550)
Governance (Rule of Law)	2.194** (1.003)	2.038** (1.031)	1.784* (1.007)	1.446 (1.042)
Education (Edu)	-0.705 (0.727)	-1.267 (0.800)	-0.532 (0.744)	-1.080 (0.837)
Initial Income (Yt-1) in log	-2.389 (1.484)	-3.421** (1.598)	-2.975** (1.473)	-4.202*** (1.613)
Capital Formation (Cap)% of GDP	0.057 (0.039)	0.041 (0.040)	0.082** (0.039)	0.069* (0.040)
Natural Resources Rent (Nres) % of GDP	0.070*** (0.021)		0.082*** (0.021)	
Africa (Dummy)	0.251 (3.675)	-0.436 (4.093)	-0.177 (3.741)	-1.024 (4.239)
<i>Number of observations</i>	364	364	364	364
<i>F Statistic</i>	4.65	4.32	3.81	2.95
<i>Sargan-Hansen statistic</i>	3.57	0.92	2.82	0.20
<i>Sargan-Hansen P- Value</i>	0.31	0.63	0.42	0.90

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2.13: LANDLOCKED DEVELOPING COUNTRIES 1996-2009 WITH GOVERNANCE*RESOURCES

<i>Hausman-Taylor Estimations, Dependent Variable: Growth of Per Capita GDP</i>				
<i>Variables</i>	(1)	(2)	(3)	(4)
Trade Openness (Trade% of GDP)	0.044*** (0.017)	0.060*** (0.017)		
Trade Openness (SWWW)			1.502 (1.134)	1.574 (1.188)
Market Access	-0.290 (2.775)	-1.204 (3.197)	-1.447 (2.773)	-2.742 (3.149)
Market Size in neighbour	1.197** (0.467)	1.929*** (0.539)	1.209** (0.471)	2.001*** (0.549)
Governance	2.066* (1.224)	2.868** (1.201)	1.488 (1.220)	2.269* (1.210)
Education (Edu)	-0.949 (0.719)	-1.391* (0.794)	-0.921 (0.740)	-1.159 (0.826)
Initial Income (Yt-1) in log	-2.181 (1.470)	-3.557** (1.583)	-2.650* (1.470)	-4.334*** (1.599)
Capital Formation (Cap)% of GDP	0.051 (0.039)	0.039 (0.040)	0.073* (0.039)	0.067* (0.040)
Natural Resources Rent (Nres) % of GDP	0.174*** (0.062)		0.214*** (0.061)	
Africa (Dummy)	-0.951 (3.761)	-1.091 (4.137)	-1.807 (3.909)	-1.494 (4.255)
Governance* Natural Resources	0.088* (0.048)		0.112** (0.048)	
<i>Number of observations</i>	364	364	364	364
<i>F Statistic</i>	4.61	4.55	4.03	3.13
<i>Sargan-Hansen statistic</i>	4.11	0.91	3.74	0.24
<i>Sargan-Hansen P- Value</i>	0.39	0.63	0.44	0.90

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

2.7 Conclusion

This chapter has examined the determinants of economic growth in developing countries, with an emphasis on landlockedness. The empirical results confirm the findings of previous studies, that landlockedness hampers economic growth, especially among the developing countries. However, the magnitude of the negative impact is sensitive to alternative estimation methods. There is evidence that a good governance system and policy initiation of trade reform can help to lower the negative impact of the constraint imposed by landlockedness. However, these countries are still disadvantaged relative to countries with similar policies. Openness is positively associated with economic growth in landlocked countries, suggesting that more openness to foreign trade could enhance the growth prospects of these countries.

The economic development of neighbour countries is one of the major determinants of economic growth in landlocked developing countries. However, the evidence found on the role of physical market access in the economic growth of these landlocked countries is not strong. This suggests that market size in neighbours is a more important issue than that of physical market access. Contrary to the “resource curse” hypothesis, the results suggest that the extraction of natural resources rent contributes significantly to economic growth in landlocked developing countries. When the African countries are compared with other developing countries, they are disadvantaged but the African landlocked countries are not significantly different than other landlocked countries in terms of economic growth. I did not find the African landlocked developing countries to be different to other landlocked developing countries in the economic growth context.

The major policy inferences drawn from this analysis are as follows: it appears that coordinating the development tasks with neighbours’ infrastructure may be a useful means to improve the development prospects of landlocked developing

countries; strengthening the quality of governance and creating a more trade friendly environment in landlocked developing countries helps minimise the negative impact of the constraints imposed by landlockedness.

Appendix 2A

Table 2A.1: DETAILS OF COUNTRIES COVERED AND UPDATED SACHS-WARNER INDEX

Countries	Inc. level	LLOCK	SWI	WWI	Updated ind.	Remarks
Afghanistan	li	1	-	-	n/a	Close until 2009
Albania	lm	0	1992	1992	1992	
Algeria	um	0	n/a	n/a	n/a	Lack of non tariff info.
American Samoa	um	0	-	-	-	
Andorra	hi	1	-	-	n/a	Lack of non tariff info.
Angola	lm	0	n/a	n/a	2001	
Antigua and Barbuda	hi	0	-	-	2001	
Argentina	um	0	1991	1991	1991	
Armenia	lm	1	n/a	1995	1995	
Aruba	hi	0	-	-	n/a	Lack of non tariff info.
Australia	hi	0	1964	1964	1964	
Austria	hi	1	1960	1960	1960	
Azerbaijan	um	1	n/a	1995	1995	
Bahamas, The	hi	0	-	-	n/a	Lack of non tariff info.
Bahrain	hi	0	-	-	closed	Political Reason-socialist
Bangladesh	li	0	n/a	1996	1996	
Barbados	hi	0	1966	1966	1966	
Belarus	um	1	1994	n/a	n/a	Lack of non tariff info.
Belgium	hi	0	1959	1959	1959	
Belize	lm	0	-	-	2000	
Benin	li	0	1990	1990	1990	
Bermuda	hi	0	-	-	n/a	Lack of non tariff info.
Bhutan	lm	1	-	-	closed	Political Reason-socialist
Bolivia	lm	1	1985	1985	1985	
Bosnia and Herzegov.	um	0	-	-	n/a	Lack of non tariff info.
Botswana	um	1	1979	1979	1979	
Brazil	um	0	1991	1991	1991	
Brunei Darussalam	hi	0	-	-	2001	
Bulgaria	um	0	1991	1991	1991	
Burkina Faso	li	1	n/a	1998	1998	
Burundi	li	1	n/a	1999	1999	
Cambodia	li	0	-	-	2001	
Cameroon	lm	0	1993	1993	1993	
Canada	hi	0	1952	1952	1952	

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Table 2A.1 – Continued from previous page....

Countries	Inc. level	LLOCK	SWI	WWI	Updated ind.	Remarks
Cape Verde	lm	0	n/a	1991	1991	
Cayman Islands	hi	0	-	-	n/a	Lack of non tariff info.
Central African Rep.	li	1	n/a	n/a	closed	Lack of non tariff info.
Chad	li	1	n/a	n/a	2001	
Channel Islands	hi	0	-	-	n/a	Lack of non tariff info.
Chile	um	0	1976	1976	1976	
China	lm	0	n/a	n/a	closed	Political Reason-socialist
Colombia	um	0	1986	1986	1986	
Comoros	li	0	-	-	n/a	Lack of non tariff info.
Congo, Dem. Rep.	li	0	n/a	n/a	closed	Political reason
Congo, Rep.	lm	0	n/a	n/a	closed	Political Reason & exp. Board.
Costa Rica	um	0	1986	1986	1986	
Cote d'Ivoire	lm	0	n/a	1994	1994	
Croatia	hi	0	1993	n/a	2001	
Cuba	um	0	-	-	closed	Political reason -socialist
Cyprus	hi	0	1960	1960	1960	
Czech Republic	hi	1	1991	1991	1991	
Denmark	hi	0	1959	1959	1959	
Djibouti	lm	0	-	-	2001	
Dominica	um	0	-	-	2001	
Dominican Republic	um	0	n/a	1992	1992	
Ecuador	lm	0	1991	1991	1991	
Egypt, Arab Rep.	lm	0	n/a	1995	1995	
El Salvador	lm	0	1989	1989	1989	
Equatorial Guinea	hi	0	-	-	n/a	Lack of non tariff info.
Eritrea	li	0	-	-	n/a	Lack of non tariff info.
Estonia	hi	0	1992	n/a	1999	
Ethiopia	li	1	n/a	1996	1996	
Faeroe Islands	hi	0	-	-	n/a	Lack of non tariff info.
Fiji	um	0	-	-	closed	Political Reason
Finland	hi	0	1960	1960	1960	
France	hi	0	1959	1959	1959	
Gabon	um	0	n/a	n/a	2001	
Gambia, The	li	0	1985	1985	1985	
Georgia	lm	0	n/a	1996	1996	
Germany	hi	0	1959	1959	1959	
Ghan/a	li	0	1985	1985	1985	
Gibraltar	hi	0	-	-	n/a	Lack of non tariff info.
Greece	hi	0	1959	1959	1959	

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Table 2A.1 – Continued from previous page....

Countries	Inc. level	LLOCK	SWI	WWI	Updated ind.	Remarks
Greenland	hi	0	-	-	n/a	Lack of non tariff info.
Grenada	um	0	-	-	2001	
Guam	hi	0	-	-	n/a	Lack of non tariff info.
Guatemala	lm	0	1988	1988	1988	
Guinea	li	0	1986	1986	1986	
Guinea-Bissau	li	0	1987	1987	1987	
Guyana	lm	0	1988	1988	1988	
Haiti	li	0	n/a	n/a	2001	
Honduras	lm	0	1991	1991	1991	
Hong Kong SAR, China	hi	0	Always	Always	Always	
Hungary	hi	1	1990	1990	1990	
Iceland	hi	0	n/a	n/a	2001	
India	lm	0	1994	n/a	2001	
Indonesia	lm	0	1970	1970	1970	
Iran, Islamic Rep.	hi	0	n/a	n/a	n/a	Lack of non tariff info.
Iraq	lm	0	n/a	n/a	n/a	Lack of non tariff info.
Ireland	hi	0	1966	1966	1966	
Isle of Man	hi	0	-	-	n/a	Lack of non tariff info.
Israel	hi	0	1985	1985	1985	
Italy	hi	0	1959	1959	1959	
to Jamaica	um	0	1989	1989	1989	
Japan	hi	0	1964	1964	1964	
Jordan	lm	0	1965	1965	1965	
Kazakhstan	um	1	n/a	n/a	n/a	Lack of non tariff info.
Kenya	li	0	1993	1993	1993	
Kiribati	lm	0	-	-	n/a	Lack of non tariff info.
Korea, Dem. Rep.	li	0	-	-	n/a	Lack of non tariff info.
Korea, Rep.	hi	0	1968	1968	1968	
Kosovo	lm	1	-	-	n/a	Lack of non tariff info.
Kuwait	hi	0	-	-	2001	
Kyrgyz Republic	li	1	1994	1994	1994	
Lao PDR	li	1	-	-	n/a	Lack of non tariff info.
Latvia	hi	0	1993	1993	1993	
Lebanon	um	0	-	-	closed	Political reason
Lesotho	lm	1	n/a	n/a	2001	
Liberia	li	0	n/a	n/a	n/a	Lack of non tariff info.
Libya	um	0	-	-	n/a	Lack of non tariff info.
Liechtenstein	hi	1	-	-	-	
Lithuania	um	0	1993	1993	1993	
Luxembourg	hi	1	1959	1959	1959	

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Table 2A.1 – Continued from previous page....

Countries	Inc. level	LLOCK	SWI	WWI	Updated ind.	Remarks
Macao SAR, China	hi	0	-	-	2001	
Macedonia, FYR	um	1	1994	1994	1994	
Madagascar	li	0	n/a	1996	1996	
Malawi	li	1	n/a	n/a	2001	
Malaysia	um	0	1963	1963	1963	
Maldives	lm	0	-	-	2001	
Mali	li	1	1988	1988	1988	
Malta	hi	0	n/a	n/a	2001	
Marshall Islands	lm	0	-	-	n/a	Lack of non tariff info.
Mauritania	li	0	1992	1995	1995	
Mauritius	um	0	1968	1968	1968	
Mayotte	um	0	-	-	n/a	Lack of non tariff info.
Mexico	um	0	1986	1986	1986	
Micronesia, Fed. Sts.	lm	0	-	-	n/a	Lack of non tariff info.
Moldova	lm	1	1994	1994	1994	Lack of non tariff info.
Monaco	hi	0	-	-	n/a	Lack of non tariff info.
Mongolia	lm	1	-	-	1997	
Montenegro	um	0	-	-	n/a	Lack of non tariff info.
Morocco	lm	0	1984	1984	1984	
Mozambique	li	0	n/a	1995	1995	
Myanmar	li	0	n/a	n/a	closed	Political reason
Namibia	um	0	-	-	2001	
Nepal	li	1	1991	1991	1991	
Netherlands	hi	0	1959	1959	1959	
Netherlands Antilles	hi	0	-	-	n/a	
New Caledonia	hi	0	-	-	n/a	Lack of non tariff info.
New Zealand	hi	0	1986	1986	1986	
Nicaragua	lm	0	1991	1991	1991	
Niger	li	1	n/a	1994	1994	
Nigeria	lm	0	n/a	n/a	2001	
Northern Mariana Islad.	hi	0	-	-	n/a	Lack of non tariff info.
Norway	hi	0	Always	Always	Always	
Oman	hi	0	-	-	closed	Political reason
Pakistan	lm	0	n/a	2001	2001	
Palau	um	0	-	-	n/a	Lack of non tariff info.
Panama	um	0	n/a	1996	1996	
Papua New Guinea	lm	0	n/a	n/a	closed	Political reason
Paraguay	lm	1	1989	1989	1989	
Peru	um	0	1991	1991	1991	
Philippines	lm	0	1988	1988	1988	

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Table 2A.1 – Continued from previous page....

Countries	Inc. level	LLOCK	SWI	WWI	Updated ind.	Remarks
Poland	hi	0	1990	1990	1990	
Portugal	hi	0	Always	Always	Always	
Puerto Rico	hi	0	-	-	n/a	Lack of non tariff info.
Qatar	hi	0	-	-	closed	Political reason
Romania	um	0	1992	1992	1992	
Russian Federation	um	0	n/a	n/a	n/a	
Rwanda	li	1	n/a	n/a	2001	
Samoa	lm	0	-	-	n/a	Lack of non tariff info.
San Marino	hi	1	-	-	n/a	Lack of non tariff info.
Sao Tome and Principe	lm	0	-	-	n/a	Lack of non tariff info.
Saudi Arabia	hi	0	-	-	closed	Political reason
Senegal	um	0	n/a	n/a	closed	Political reason
Serbia	um	1	-	-	n/a	Lack of non tariff info.
Seychelles	um	0	-	-	n/a	Lack of non tariff info.
Sierra Leone	li	0	n/a	2001	2001	
Singapore	hi	0	1965	1965	1965	
Slovak Republic	hi	1	1991	1991	1991	
Slovenia	hi	0	1991	1991	1991	
Solomon Islands	lm	0	-	-	2001	
Somalia	li	0	n/a	n/a	n/a	Lack of non tariff info.
South Africa	um	0	1991	1991	1991	
Spain	hi	0	1959	1959	1959	
Sri Lanka	lm	0	1991	1991	1991	
St. Kitts and Nevis	um	0	-	-	n/a	Lack of non tariff info.
St. Lucia	um	0	-	-	n/a	
St. Vincent and the Gren.	um	0	-	-	n/a	Lack of non tariff info.
Sudan	lm	0	-	-	n/a	Lack of non tariff info.
Suriname	um	0	-	-	2001	
Swaziland	lm	1	n/a	n/a	2001	
Sweden	hi	0	1960	1960	1960	
Switzerland	hi	1	Always	Always	Always	
Syrian Arab Republic	lm	0	n/a	n/a	n/a	Lack of non tariff info.
Tajikistan	li	1	n/a	1996	1996	
Tanzania	li	0	n/a	1995	1995	
Thailand	lm	0	Always	Always	Always	
Timor-Leste	lm	0	-	-	n/a	Lack of non tariff info.
Togo	li	0	n/a	n/a	closed	Political reason
Tonga	lm	0	-	-	n/a	
Trinidad and Tobago	hi	0	n/a	1992	1992	
Tunisia	lm	0	1989	1989	1989	

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Table 2A.1 – Continued from previous page....

Countries	Inc. level	LLOCK	SWI	WWI	Updated ind.	Remarks
Turkey	um	0	1989	1989	1989	
Turkmenistan	lm	1	n/a	n/a	closed	Political reason
Turks and Caicos Islands	hi	0	-	-	closed	Political reason
Tuvalu	um	0	-	-	n/a	Lack of non tariff info.
Uganda	li	1	1988	1988	1988	
Ukraine	lm	0	n/a	n/a	2008	
United Arab Emirates	hi	0	-	-	closed	Political Reason-socialist
United Kingdom	hi	0	Always	Always	Always	
United States	hi	0	Always	Always	Always	
Uruguay	um	0	1990	1990	1990	
Uzbekistan	um	1	n/a	n/a	n/a	Lack of non tariff info.
Vanuatu	lm	0	-	-	n/a	Lack of non tariff info.
Venezuela, RB	um	0	n/a	1996	1996	
Vietnam	um	0	-	-	closed	Political reason
Virgin Islands (U.S.)	hi	0	-	-	n/a	Lack of non tariff info.
West Bank and Gaza	lm	0	-	-	n/a	Lack of non tariff info.
Yemen, Rep.	um	0	Always	Always	Always	
Yugoslavia, FR			n/a	2001	2001	
Zambia	li	1	1993	1993	1993	
Zimbabwe	li	1	n/a	n/a	n/a	

Note: Inc.=income, SWI=Sachs-Warner Index, WWI=Wacziarg-Welch index, Ind.=Index, - refers country was not covered, n/a refers not sufficient data to declare country as open, exp. =Export, and info.=information.

Table 2A.2: DESCRIPTIVE STATISTICS

Variables	Observations	Mean	Std. Dev.	Min	Max
Growth Rate of Per Capita GDP (G)	5284	1.69	6.18	-50.05	90.47
Initial Income (y_{t-1})	5078	7.69	1.62	4.13	11.67
Openness (Trade/GDP)	4927	83.47	48.24	0.31	438.09
Capital Formation (Cap)	4828	23.24	9.10	-23.76	113.58
Education (Edu)	4581	6.35	3.04	0.03	13.22
Natural Resources Rent (Nres)	5389	8.34	16.31	0.00	214.49
Openness (SWWW index)	6360	0.40	0.49	0.00	1.00
Africa	6360	0.22	0.42	0.00	1.00
Landlockedness (Llock)	6360	0.20	0.40	0.00	1.00
Governance (Gov)	2714	-0.04	0.99	-2.40	2.20
Market Size Neighbour (MSN)	1285	20.22	3.61	11.60	26.19
Market Access (MA)	1290	0.36	0.50	0.00	1.93

Source: Author's calculation from the main dataset.

Table 2A.3: CORRELATION MATRIX

Variables	G	(y_{t-1})	Trade/GDP	Cap	Edu	Nres	SWWW index	africa	Llock	Gov	MSN	MA
G	1.00											
(y_{t-1})	0.02	1.00										
Trade/GDP	0.10	0.55	1.00									
Cap	0.32	0.19	0.29	1.00								
Edu	0.22	0.67	0.54	0.25	1.00							
Nres	0.40	-0.06	0.01	0.06	0.12	1.00						
SWWW index	0.00	0.18	0.09	0.00	0.10	-0.31	1.00					
africa	-0.22	-0.50	-0.36	-0.27	-0.74	-0.13	-0.08	1.00				
Llock			
Gov	-0.06	0.83	0.43	0.21	0.41	-0.30	0.33	-0.26	.	1.00		
MSN	0.09	0.58	0.43	0.28	0.61	-0.06	0.07	-0.77	.	0.40	1.00	
MA	-0.01	-0.53	-0.34	-0.23	-0.31	0.00	-0.16	0.16	.	-0.40	-0.19	1.00

Note: see table "Descriptive Statistics" for the detail of Variables

Table 2A.4: GROWTH DETERMINANTS: ALL COUNTRIES 1980-2009 WITH TRADE/GDP

<i>POLS, FE, RE and HT Estimations, Dependent Variable: Growth of Per Capita GDP</i>				
Variables	(POLS)	(FE)	(RE)	(HT)
Trade Openness (Trade% of GDP)	0.005*** (0.002)	0.029*** (0.005)	0.013*** (0.003)	0.029*** (0.004)
Education (Edu)	0.308*** (0.042)	1.463*** (0.099)	0.639*** (0.065)	1.461*** (0.098)
Initial Income (Yt-1) in log	-0.572*** (0.110)	-6.653*** (0.410)	-1.623*** (0.195)	-6.650*** (0.406)
Capital Formation (Cap)% of GDP	0.140*** (0.011)	0.186*** (0.014)	0.151*** (0.013)	0.185*** (0.014)
Natural Resources Rent (Nres) % of GDP	0.032*** (0.006)	0.054*** (0.014)	0.055*** (0.008)	0.056*** (0.013)
Africa (Dummy)	-0.372 (0.247)	dropped	-0.188 (0.467)	-2.176 (1.333)
Landlocked Developed Economies	-0.539 (0.438)	dropped	-1.241 (0.879)	-2.481 (2.752)
Landlocked Developing Economies	-0.842** (0.407)	dropped	-3.120*** (0.752)	-15.590*** (1.992)
Non-landlocked Developing Economies	-0.362 (0.298)	dropped	-1.717*** (0.560)	-9.750*** (1.520)
<i>Number of observations</i>	3,790	3,790	3,790	3,790
<i>F Statistic / Wald Statistic</i>	39.13	113.38	366.91	64.11
<i>R-squared</i>	0.09	0.14	0.11	
<i>corr</i>		-0.94		
<i>Sargan-Hansen statistic</i>				0.12
<i>Sargan-Hansen P- Value</i>				0.94

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 2A.5: GROWTH DETERMINANTS: ALL COUNTRIES 1980-2009 WITH SWWW INDEX

<i>POLS, FE, RE and HT Estimationn, Dependent Variable: Growth of Per Capita GDP</i>				
Variables	(POLS)	(FE)	(RE)	(HT)
Trade Openness (SWWW)	2.410*** (0.181)	2.447*** (0.255)	2.712*** (0.222)	2.446*** (0.253)
Education (Edu)	0.230*** (0.041)	1.212*** (0.104)	0.502*** (0.067)	1.210*** (0.103)
Initial Income (Yt-1) in log	-0.694*** (0.107)	-5.982*** (0.402)	-1.759*** (0.201)	-5.979*** (0.398)
Capital Formation (Cap)% of GDP	0.152*** (0.010)	0.195*** (0.014)	0.166*** (0.013)	0.195*** (0.014)
Natural Resources Rent (Nres) % of GDP	0.053*** (0.006)	0.075*** (0.014)	0.075*** (0.008)	0.077*** (0.012)
Africa (Dummy)	-0.462* (0.240)		-0.636 (0.487)	-2.268* (1.201)
Landlocked Developed Economies	-0.493 (0.422)		-0.985 (0.920)	-1.821 (2.463)
Landlocked Developing Economies	-0.919** (0.396)		-3.368*** (0.781)	-14.305*** (1.835)
Non-landlocked Developing Economies	-0.421 (0.289)		-2.013*** (0.581)	-9.263*** (1.393)
<i>Number of observations</i>	3,824	3,824	3,824	3,824
<i>F Statistic / Wald Statistic</i>	60.08	124.89		70.78
<i>R-squared</i>	0.12	0.15		
<i>corr</i>		-0.93		
<i>Sargan-Hansen statistic</i>				0.12
<i>Sargan-Hansen P- Value</i>				0.94

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Landlockedness and Export Performance in Developing Countries

Summary

This chapter examines the determinants of export performance in developing countries with emphasis on landlocked developing countries (LLDCs). The chapter begins with a comparative overview of export performance of landlocked developing countries and non-landlocked developing countries. This is followed by an econometric analysis of the determinants of trade flows within the standard gravity modelling framework technique. Despite recent trade policy reforms, the overall export performance of LLDCs seems poor compared to that of other developing countries. The conventional wisdom that export performance is aided by economic openness also applies to LLDCs. However, rather than the trade policies, distance is found to be a bigger problem for LLDCs. Evidence suggests that the African LLDCs have maintained a relatively better export performance compared to other LLDCs.

3.1 Introduction

Many studies have highlighted the role played by exports in economic development. A number of empirical studies have explored the strong and positive relationship between exports and economic growth for different periods. Representative studies include Balassa (1985), Krueger (1990), Sengupta & Espana (1994), Greenaway & Sapsford (1994), Ekanayake (1999), Athukorala (2011) and Allaro (2012). These studies show the role of export performance in economic development and find support for the export-led growth hypothesis.

Improved export performance of many developing countries is considered to be one of the major outcomes of trade liberalisation and market oriented policy reform in the literature. The nexus of export performance and economic development has received considerable attention from trade economists, especially since the East Asian Miracle (EAM), when East Asian countries enhanced economic growth by improving export performance, including other policy reforms and productivity growth (Stiglitz 1996).

Most developing countries have witnessed major changes in trade policies since the 1990s: making more trade friendly economies by reducing trade barriers. The exports data suggest that exports from landlocked developing countries (LLDCs) grew by almost one percent less annually compared to other developing countries from 1960 to 2009. The export-led growth hypothesis suggests that trade liberalisation helps to industrialise a country at a faster pace, and has dynamic impacts on economic activities so that export performance is improved. Whether the trade policy adopted by LLDCs, in addition to their geographic constraints, has caused their poor export performance, is not clear.

Because of these development outcomes, the export performance in LLDCs

is a crucial issue that directly affects the global context because a sizable share of the 'bottom billion' of the poorest people live in these countries (Collier 2007). Landlockedness imposes exogenous costs on exports, consequently, the costs of exports are higher; on the other hand, most of these countries lack technological innovation, therefore such factors make their exports uncompetitive. Grigoriou (2007) investigated on the impact of landlockedness and internal infrastructure on Central Asian trade flows and found a negative role of landlockedness on export flows. Behar & Venables (2010) studied the trade flows of a mix sample of developing and developed countries, considering different aspects of transportation costs, including landlockedness and other factors related to economic geography. They found that landlockedness increases trade costs by almost 50 percent, more than the costs imposed by distance, and reduces trade volume by 30 to 60 percent. Limao & Venables (2001) suggested that a median landlocked country trades 30 percent less than other countries.

Few studies of export performance of developing countries at the global or regional level have focused on the relative export performance of landlocked countries from a broader comparative perspective. For example, Coe & Hoffmaister (1999) and Soderbom & Teal (2003) studied the export performance of African countries, including the landlocked countries in the region. Other studies, such as Munoz (2006) and Ng & Yeats (2003) have included Zimbabwe and Lesotho, respectively, in the country coverage of their studies. However, so far no systematic analysis has been carried out of the export performance of all LLDCs from a comparative perspective.

The main objectives of this chapter are: first, to undertake a comparative analysis of export performance of developing countries noting the differences between the export performance of landlocked developing countries and non-landlocked developing countries. Second, more specifically, to investigate whether trade policies or geographical constraints such as landlockedness and transportation costs are the

major constraints for poor export performance of LLDCs. Third, to assess whether African LLDCs are unusual, in the context that Africa experienced slow growth for almost two decades, most countries in the region initiated trade reforms in the 1990s and now has an investment flow from China and other developing countries.

The findings suggest that, although landlocked developing countries have been making some progress over the past four decades, their export performance remains poor compared to other developing countries. While landlockedness remains a constraint, there are opportunities for these countries to improve their export performance by creating a more trade-friendly environment through further trade liberalisation and averting real exchange rate appreciation by combining a flexible exchange rate regime with sound macroeconomic management. There is no evidence to suggest that African landlocked countries are disadvantaged compared to other landlocked countries in world trade. On the contrary, *ceteris paribus*, the average export levels for these countries are about 100 percent higher than the average level for other LLDCs.

The organization of this chapter is as follows: the following section presents the policy and logistic contexts of LLDCs. Section 3.3 presents an overview of export performance, comparing the export trends and patterns, disaggregating the data for LLDCs and other non-landlocked developing countries. Section 3.4 develops the research methodologies and presents the results. The final section concludes.

3.2 Policy and Logistic Contexts

3.2.1 Trade Policy

It is widely considered that trade liberalization is a necessary prerequisite for better export performance. Weiss (1999), Greenaway et al. (2002), Santos-Paulino & Thirlwall (2004), Awokuse (2008) and Athukorala (2011) suggested that the greater the magnitude of trade liberalization, with efficient management, the better the export performance it provides. Some developing countries initiated liberalisation and reform since the late 1970s, but most of these countries only started their reforms in the early 1990s. Most LLDCs belong to the latter category. Trade liberalisation is normally explained in the literature using three broad sets of indicators of openness to international trade: first, the Sachs–Warner binary index of trade liberalisation updated by Wacziarg & Welch (2008); second, ‘trade orientation’ measured by the share of exports in GDP; and the third, the average tariff rate. The tariff rate is included in the Sachs-Warner index too, but the tariff rate itself has a direct relationship to exports and explains much about the trade policies of a country. Each of these measures has its own limitations, but taken together they enable us to conclude with reasonable confidence whether an economy is generally open.

Landlocked developing countries are scattered across five regions. East Asia and the Pacific (EAP) has two, Eastern Europe and Central Asia (ECA) has 12, Latin America and the Caribbean (LAC) has two, South Asia (SA) has three, and Sub Saharan Africa (SSA) has 15 countries (see Figure 1.1 and Table 1.1 in chapter 1 for detail). South Sudan has been excluded due to a lack of data. Table 3.1 presents the five year average tariff rate structure in the developing countries classified by the region. In only the EAP region, the average tariff rate in LLDCs is slightly higher compared to non-landlocked developing countries over the period 1995 to 2010. This

average rate for LLDCs is lower compared to non-landlocked developing countries in the ECA, LAC, SA, and SSA region. This implies that LLDCs are more open to foreign trade compared to non-landlocked developing countries, indicating that not only the trade policy, but also some other factors such as infrastructure and export promotion strategies are responsible for poor export performance of these countries .

Table 3.1: AVERAGE REGIONAL TARIFF STRUCTURE IN DEVELOPING COUNTRIES (%)

Region		1995-99	2000-04	2005-10	1995-2010
EAP	Landlocked	NA	12.6	7.4	10.0
	Non-landlocked	12.1	8.3	5.4	8.4
ECA	Landlocked	4.2	5.1	3.7	4.3
	Non-landlocked	5.9	4.9	3.1	4.5
LAC	Landlocked	9.0	8.8	4.1	7.1
	Non-landlocked	11.5	9.2	6.3	8.8
SA	Landlocked	15.3	14.4	11.4	13.5
	Non-landlocked	33.2	17.2	10.6	19.7
SSA	Landlocked	15.4	11.1	9.4	11.8
	Non-landlocked	17.7	11.8	9.3	12.7

Note: NA refers data are not available

Source: Based on data compiled from World Bank (2012b).

I updated the widely used Sachs-Warner index of trade liberalisation, which was developed in the Sachs & Warner (1995), to 2009 covering all LLDCs and including other developing countries not covered in the previous update of the index by

Wacziarg & Welch (2008). The Sachs-Warner index defines a country as liberalised when it has: average tariff rates of not more than 40 percent; a black market premium rate not more than 20 percent; non-tariff barriers rates not more than 40 percent; no state monopoly on major exports; and when it does not have a socialist economic system. Table 3.2 shows the liberalization status of all LLDCs based on this index. According to this index 23 landlocked developing countries are open, while 11 of them still remained closed until 2009.

Lao PDR, Belarus, Kazakhstan, Kosovo, Serbia, Turkmenistan, Uzbekistan, Bhutan, Afghanistan, and Central African Republic are classified as closed because of the remaining non-tariff barriers. Zimbabwe remains closed because its black market premium rate exceeds the 20 percent criterion. Only five countries, Chad, Lesotho, Malawi, Rwanda and Swaziland, have graduated to open, satisfying all the criteria since 1999. As seen in the same table, based on the average tariff rate, only Zimbabwe has a tariff rate greater than 20 percent, followed by Bhutan 18 percent, and both the Central African Republic and Lesotho about 15 percent. The rest of the landlocked developing countries have average tariff rates of less than 15 percent. Notably, only seven countries have an average tariff rate of less than five percent. Turkmenistan has the lowest average tariff rate of 1.4 percent; however, because of other criteria it is still classified as a closed economy.

Table 3.2: LIBERALIZATION STATUS: LANDLOCKED DEVELOPING COUNTRIES

Region/Country	Lib. Status	Updated Sachs-Warner Criteria of Liberalisation for 1999-2009				
		Av. tariff percent	NTB Rate percent	B-M Prm. percent	Exp. Mkt. Board	Socialist State
EAP						
Lao PDR	-	11.3	na	na	0	0
Mongolia	1997	4.8	0	0	0	0
ECA						
Armenia	1995	2.2	0	0	0	0
Azerbaijan	1995	4.9	0	0	0	0
Belarus	-	6.3	na	0	0	0
Kazakhstan	-	4.4	na	na	0	0
Kosovo	-	na	na	na	0	0
Kyrgyz Republic	1994	4.3	0	0	0	0
Macedonia, FYR	1994	5.3	0	0	0	0
Moldova	1994	2.3	0	0	0	0
Serbia	-	6.6	na	na	0	0
Tajikistan	1996	5.3	0	0	0	0
Turkmenistan	-	1.4	na	na	0	0
Uzbekistan	-	6.6	na	0	0	0
LAC						
Bolivia	1985	7.5	0	0	0	0
Paraguay	1989	7.7	0	0	0	0
SA						
Nepal	1991	15	0	0	0	0
Bhutan	-	18.0	na	0	0	0
Afghanistan	-	5.5	na	22	0	0
SSA						
Botswana	1979	7.9	0	0	0	0
Burkina Faso	1998	11.2	0	0	0	0
Burundi	1999	13.2	0	0	0	0
CA Republic	-	15.5	na	0	1	0
Chad	2001	14.1	0	0	0	0
Ethiopia	1996	12.6	0	0	0	0
Lesotho	2001	15.3	0	0	0	0
Malawi	2001	13.1	0	0	0	0
Mali	1988	9.8	0	0	0	0
Niger	1994	11.1	0	0	0	0
Rwanda	2001	12.5	0	0	0	0
Swaziland	2001	7.0	0	0	0	0
Uganda	1988	7.7	0	0	0	0
Zambia	1993	9.3	0	0	0	0
Zimbabwe	-	20.3	0	29	0	0

Note: (1) Updated Sachs Warner criteria (a country is liberalized when it has no more than 40 percent of NTB, no more than 40 percent of average tariff rate, no more than 20 percent black market exchange rate and does not have an export marketing board and is not a socialist state), (2) "na" not available, but the figures probably exceed the given criteria, making these countries remain closed, (3) lib., Av., CA, B-M prm., Exp. Mkt., and NTB stand for liberalization, average, Central African Republic, black market premium, export market and non-tariff barriers. "-" refers remain close.

Source: Sachs & Warner (1995), Wacziarg & Welch (2008) and GFDDatabase (2011)

As an alternative indicator for measuring the openness of these countries, merchandise exports as a percentage of GDP and trade (import + exports) as a percentage of GDP are used. These indicators are reported in Table 3.3. However, no consistent pattern emerges across countries and over time, particularly over the period from 1995 to 2010. A total of eight of these countries (Armenia, Moldova, Tajikistan, Nepal, Botswana, Burundi, Central African Republic and Malawi) have a lower ratio in 2005-2010 than in 1995-1999. The rest of the landlocked developing countries have substantially increased their trade to GDP ratio in the latter period, indicating the important role of exports in their national economies. Notably, 10 of the Sub-Saharan African countries had a higher ratio of exports to GDP in 2005-2010 than in 1995-1999. In the latter period, the average ratio is found to be highest in Swaziland, that is, 59 percent, followed by Azerbaijan, Belarus and Chad, while Afghanistan, Nepal, Burundi, Central African Republic, Ethiopia and Niger have a ratio less than 10 percent.

The exports of Azerbaijan and Kazakhstan are dominated primarily by oil exports and fuel products. In the region, ECA had the highest annual average exports to GDP share over the period from 1995 to 2010, that is, the exports share is 37 percent of GDP, followed by EAP at 31 percent and SSA at 23 percent. These figures reveal that the trade of landlocked countries has been dominated by imports. This can be seen from Table 3.3, which shows that total trade to GDP ratios are much higher than exports to GDP ratios. This reflects the situation of the poor countries those lack the production technology and are in the initial phase of industrialisation.

Many LLDCs started trade liberalisation as part of a macroeconomic policy reform program. Only a few countries have a fixed exchange rate system. Black market premiums were found only in Afghanistan and Zimbabwe heavily in 2009. Exchange rate reform, interest rate deregulation, reform in the banking and finance sectors were made at a similar pace to that of trade reform in most of the LLDCs.

Table 3.3: TRADE PERCENT OF GDP ON AVERAGE: LLDCs

Countries / Region	1995-99		2000-04		2005-10		Average 1995-2010	
	X/GDP	T/GDP	X/GDP	T/GDP	X/GDP	T/GDP	X/GDP	T/GDP
EAP	30	84	29	95	33	98	31	93
Lao PDR	21	71	17	68	21	81	20	74
Mongolia	39	96	42	122	44	115	42	112
ECA	35	92	39	103	37	96	37	98
Armenia	15	77	19	76	13	62	16	71
Azerbaijan	19	77	37	96	58	93	39	89
Belarus	44	114	58	137	50	123	51	125
Kazakhstan	28	75	43	96	45	88	39	86
Kosovo	-	-	-	-	-	71	-	-
Kyrgyz Republic	31	87	32	85	34	130	32	103
Macedonia, FYR	31	84	32	100	36	113	33	100
Moldova	43	122	38	131	29	131	36	128
Serbia	-	47	15	65	22	82	21	68
Tajikistan	65	143	61	151	33	81	52	122
Turkmenistan	52	135	69	139	54	102	58	124
Uzbekistan	25	51	27	61	34	72	29	62
LAC	13	79	18	71	28	91	20	81
Bolivia	14	49	18	50	33	74	22	59
Paraguay	12	108	18	91	23	107	18	102
SA	21	72	13	79	18	81	16	78
Afghanistan	-	-	3	111	4	79	4	90
Bhutan	33	86	24	75	42	117	33	93
Nepal	9	58	11	50	8	46	10	51
SSA	21	63	23	70	25	73	23	67
Botswana	47	93	40	83	37	78	41	84
Burkina Faso	10	38	8	32	10	37	10	10
Burundi	8	27	6	33	6	57	7	35
Cen. Af. Republic	15	40	13	36	9	36	12	37
Chad	16	50	21	85	50	107	30	83
Ethiopia	6	30	6	40	7	45	6	39
Lesotho	23	150	47	163	47	161	39	158
Malawi	24	66	21	64	20	69	22	66
Mali	20	60	24	70	24	66	23	65
Niger	15	41	14	42	16	39	15	41
Rwanda	4	31	4	34	5	39	4	35
Swaziland	57	142	81	191	59	154	65	162
Uganda	9	34	8	35	10	50	9	40
Zambia	30	67	26	72	36	72	31	71
Zimbabwe	30	79	28	72	40	92	33	82

Note: "-" refers data are not available, X=exports, and T= Total trade.

Source: World Bank (2012b).

3.2.2 Trade-related Logistics

Openness to trade is a necessary, but not sufficient condition for improving export performance and economic integration. The business and logistic environments are equally important. The logistic environment can be developed in combination with other aspects of the political economy of a country, such as macroeconomic management, export and reform policies, geographical economic structure and trade infrastructure.

In recent years, various attempts have been made to build databases of indicators that explain the business environment of a large number of countries, in many cases based on some subjective assessments. Table 3.4 presents five of these indicators for LLDCs; in addition to these, distance to the nearest commercial port for a landlocked developing country is added.

Data on the ease of doing business, the logistics performance index (LPI), time to export, documents required to export, and costs to export per container for these countries are drawn from the databases of the World Bank (World Development Indicators). The Ease of Doing business index ranks 183 countries based on ten aspects of doing business in each country: starting a business, dealing with construction permits, obtaining electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. The position of LLDCs seems to be very poor in terms of ease of doing business. The data show that only Macedonia FYR, Kazakhstan and Rwanda are ranked in the top 50 countries, followed by Botswana at number 52. Other nine countries are ranked in the top 100. Most of the other LLDCs rank poorly; the Central African Republic and Chad are the bottom two.

The LPI is constructed based on efficiency of customs clearance, quality of

trade and transport infrastructure, condition of shipments, quality of logistic services and consignment handling. The ranking uses a number of qualitative and quantitative indicators for the domestic logistics environment. None of the developing countries have an LPI over 3. Kazakhstan, Uganda, Uzbekistan and Macedonia FYR are the top four among landlocked developing countries. Kazakhstan has the highest LPI, that is, 2.83; and the other 12 other countries have indices close to 2.5 and the rest have a lower index.

The third column of Table 3.4 shows that the time to export in LLDCs is substantially higher than the top ranking countries in the world; five days is the best worldwide. Serbia and the Macedonia, FYR seem to be most efficient in managing the time required to export. Armenia, Belarus, Kosovo, Swaziland, and Bolivia take less than 20 days to complete export procedures. Tajikistan takes the longest time to complete the export procedures, that is, 80 days; Kazakhstan, Chad, Afghanistan and Uzbekistan take more than 70 days.

The number of documents needed for exports reflects the lengthy procedures involved in exporting the goods. Exporters in Tajikistan need to submit the highest number, 11 documents; followed by exporters in Uzbekistan, Afghanistan, Burkina Faso and Malawi, who require 10 documents to export. The most efficient country in the LLDCs group is Armenia, which requires five documents, followed by Macedonia, FYR; Moldova; Serbia; Botswana and Zambia with six documents each.

The cost per container (a 22 foot container) for exports is very high in LLDCs; US\$ 5902 in Chad, followed by the Central African Republic US\$5491. Among the LLDCs, 10 countries have costs of more than US\$3000 per container and eight others have more than US\$2000 per container. None of the countries in this group has costs of less than US\$1000. Apart from this, distance to the nearest commercial port also affects the transportation costs for these countries. Nordas & Piermartini

(2004) found that sea ports have the largest impact on trade, compared to rail, roads, telecommunication and airports. Products from Kazakhstan and the Kyrgyz Republic have to travel almost 3200 kilometres. to reach the nearest commercial port from their business centres. Most LLDCs have to move their goods more than 500 miles, although there are some exceptions. These facts make exports from LLDCs more expensive, thus, uncompetitive.

Table 3.4: EXPORT POLICY AND LOGISTIC INDICATORS

Regions Countries	Ease of doing bus.	Logistic perf. indx.	Time to export	Docs. to export	costs to export	Dist. to port
EAP						
Lao PDR	163	2.46	48	9	1860	373
Mongolia	89	2.25	46	8	2131	1323
ECA						
Armenia	61	2.52	13	5	1665	337
Azerbaijan	69	2.64	38	8	2980	525
Belarus	91	2.54	15	9	1772	401
Kazakhstan	47	2.83	76	9	3005	2091
Kosovo	117	-	17	8	2230	269
Kyrgyz Republic	67	2.62	63	8	3010	1917
Macedonia, FYR	34	2.77	12	6	1376	178
Moldova	99	2.57	32	6	1765	145
Serbia	88	2.69	12	6	1398	320
Tajikistan	152	2.35	80	11	3350	1370
Turkmenistan	-	2.49	-	-	-	414
Uzbekistan	164	2.79	71	10	3150	1450
LAC						
Bolivia	147	2.51	19	8	1425	540
Paraguay	100	2.75	33	8	1440	803
SA						
Afghanistan	154	2.24	74	10	3545	1081
Bhutan	146	2.38	38	8	2230	560
Nepal	110	2.2	41	9	1960	641
SSA						
Botswana	52	2.32	28	6	3010	358
Burkina Faso	151	2.23	41	10	2412	414
Burundi	177	2.31	25	9	2747	1129
Central African Republic	183	-	54	9	5491	986
Chad	182	2.49	75	8	5902	1067
Ethiopia	104	2.41	43	7	1760	563
Lesotho	142	-	31	8	1680	328
Malawi	141	-	41	10	1713	451
Mali	148	2.27	26	6	2202	715
Niger	172	2.54	59	8	3545	797
Rwanda	50	2.04	35	8	3275	1091
Swaziland	123	-	18	9	1745	132
Uganda	119	2.82	37	7	2780	932
Zambia	80	2.28	44	6	2664	849
Zimbabwe	168	-	53	8	3280	464

Notes: Ease of doing business - ranking of 183 countries (best is 1) in 2011. "-" refers data are not available. Logistic performance index: overall (1=low and 5=high), time to export-days (5 - 80 days), documents to export: number of documents to export (2 - 11 documents), costs to export per container (US\$ 450 - US\$5902) in 2010, and distance to port: main business city to nearest commercial port in kilometres, bus. refers to business, perf. index refers to performance index, Docs. refers to documents, and Dist. is for distance.

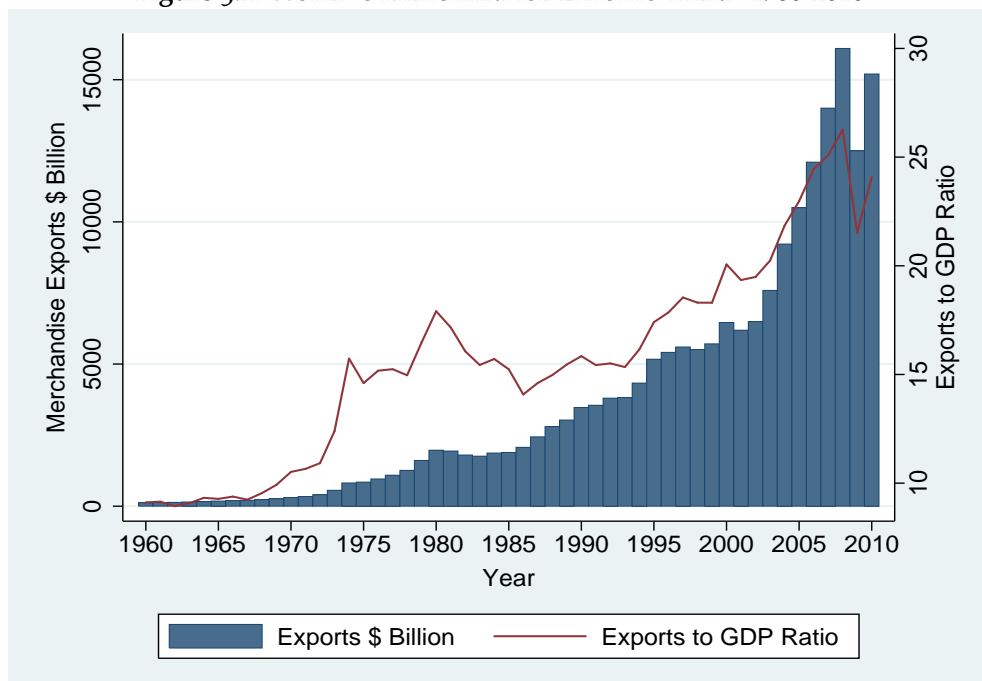
Source: Based on data compiled from World Bank (2012a) and www.findaport.com.

3.3 Export Performance: An Overview

3.3.1 Export Trends

Over the past four decades, world exports have been growing at a much faster rate than world GDP (Krugman 1995, 2008). Between 1960 and 2010, world exports (in current US\$ terms) increased 120 fold, compared to a GDP increase of 46 fold. World exports totalled \$124 billion, roughly 10 percent of World GDP in 1960, which had increased to \$15,200 billion, almost 25 percent of the World GDP by 2010 (Figure 3.1).

Figure 3.1: WORLD'S MERCHANDISE EXPORTS TREND 1960-2010

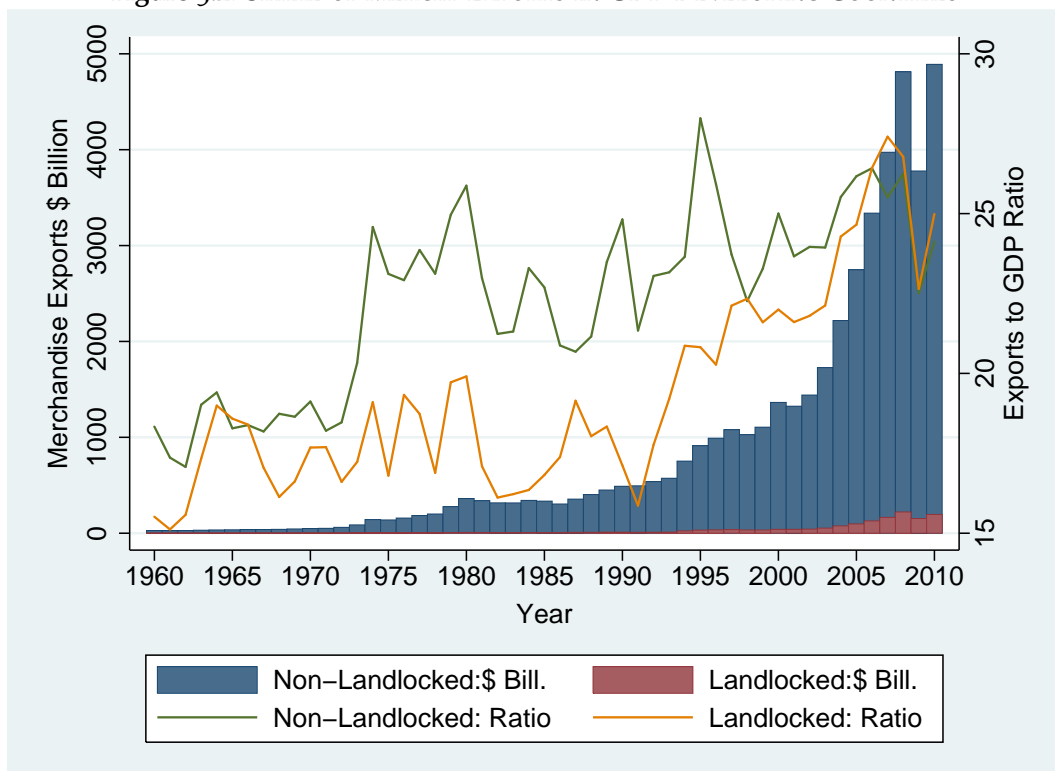


Source: Based on data compiled from World Bank (2012c).

Developing countries' merchandise exports have grown much faster than world exports, but they still account for just one third of total exports. Figure 3.2 shows that export to GDP ratio is lower in LLDCs throughout the period with the

exception of 2007; however it grew at a much faster pace after 1990. Again with the exception of 2007, despite the policy reforms in LLDCs, their share of exports in GDP remains poor compared to the rest of the developing countries. The LLDCs were less affected by the global financial crisis (GFC) compared to the non-landlocked developing countries, because they were less integrated in the global economy through trade and foreign direct investment. Reflecting this difference the growth rate of LLDCs was relatively higher during this period. This figure excludes nine of the landlocked countries, which only became separate countries after the dissolution of the USSR, to maintain the consistency of the number of landlocked countries.¹

Figure 3.2: SHARE OF MERCH. EXPORTS IN GDP-DEVELOPING COUNTRIES

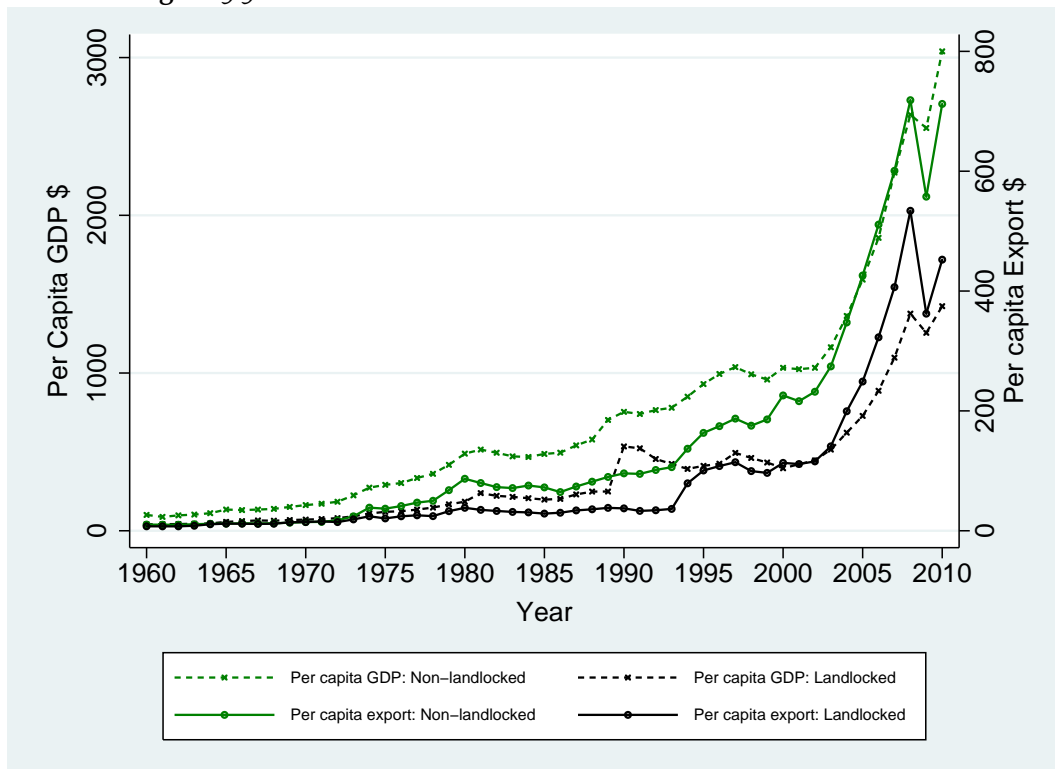


Source: Based on data compiled from World Bank (2012c), Post USSR dissolution countries are excluded.

¹These countries include Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan and Uzbekistan (Idan & Shaffer 2011)

Figure 3.2 reveals that since the 1990s LLDCs' exports are growing much faster than those of other developing countries since the 1990s, but still LLDCs' level of exports is poor in comparison. Figure 3.3 shows that per capita exports from LLDCs were about US\$ 450 compared to US\$ 725 for other developing countries in 2010. Thus, the LLDCs' per capita GDP and per capita exports are all lower compared to those from other developing countries for the entire period from 1960 to 2010.

Figure 3.3: PER CAPITA GDP AND EXPORTS: DEVELOPING COUNTRIES

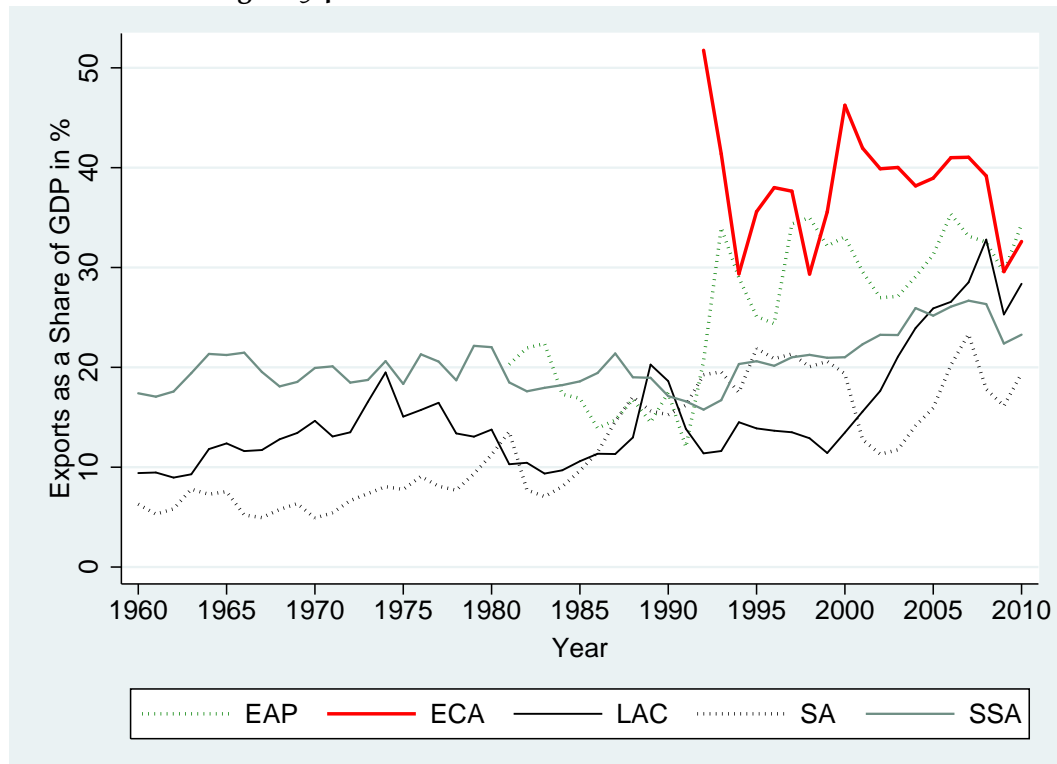


Source: Based on data compiled from World Bank (2012c).

Figure 3.4 shows that the LLDCs in the ECA, which includes nine LLDCs formed after the dissolution of the USSR, have a predominantly higher share of exports in their GDP. Since 1990, ECA's share has been declined substantially, although it still remains higher than that of others, with very few exceptions. Moreover, the

LLDCs in all regions have increased their share of exports in GDP since 1990 except in the ECA region, with some fluctuations caused by the Asian Financial Crisis (AFC) and the GFC.

Figure 3.4: SHARE OF MERCH. EXPORTS IN GDP-LLDCs



Source: Based on data compiled from World Bank (2012c).

3.3.2 Export Patterns

Exports as a share of GDP in LLDCs account for about 30 percent on average. In particular, since the early 1990s, the share of exports to GDP has increased substantially. The rate of growth of exports is different for countries in different income groups. The export values of Azerbaijan, Kazakhstan and Bolivia are larger because of the dominance of oil products in their exports. In these countries, the share of non-oil ex-

ports declined to 51 percent in 2009, from 80 percent in 1999, which is contrary to the experience in the export trade in other developing countries. In addition, the sources of exports are not unique in all landlocked developing countries. The shares of manufacturing and primary exports were 22 percent and 29 percent respectively, in 2009, declining from 37 and 43 percent in 1999; the shares of these sectors was recorded 63 percent and 19 percent in other developing countries in 2009, a slight decline from that of 1999 (Table 3.5). These data show that manufactured goods are not the dominant exports from LLDCs, and are more stagnant than in the non-landlocked developing countries.

At the individual country level, market share gains have varied substantially over time in only a few countries. Based on the data from 2009, among the 34 LLDCs Kazakhstan is the largest exporter, but 70 percent of its exports come from the oil sector; it is followed by Belarus, also an oil exporter (with 27 percent of merchandise exports). Azerbaijan and Bolivia are the other notable oil exporters.

Primary commodities dominate the export structures of most landlocked developing countries. Only three countries, Macedonia FYR, Nepal and Botswana, experienced a contribution of more than 50 percent from manufacturing exports in their export trade in 2009 (Armenia and Belarus also in 2007). The contribution from manufacturing increased by 2009, compared to 1999, in only five countries: Bhutan, Niger, Rwanda, Uganda and Zimbabwe (Table 3.5).

Table 3.5: EXPORT % OF MERCHANDISE IN 1999, 2007 AND 2009

Regions / Countries	Year	Total Exports (%)	Non-oil Exports (%)	Manufacturing Exports(%)	Primary Exports(%)	Total Exports (US\$ million)
EAP						
Lao PDR	1999	-	-	-	-	-
	2007	-	-	-	-	-
	2009	-	-	-	-	-
Mongolia	1999	100	20	80	358	
	2007	91	5	86	1887	
	2009	-	-	-	-	
ECA						
Armenia	1999	92	59	32	232	
	2007	99	56	43	815	
	2009	100	31	69	586	
Azerbaijan	1999	21	9	13	929	
	2007	19	6	12	6058	
	2009	7	3	4	14689	
Belarus	1999	91	75	16	5909	
	2007	65	53	12	24275	
	2009	63	48	15	21282	
Kazakhstan	1999	56	24	33	5871	
	2007	34	13	21	47748	
	2009	30	13	17	43196	
Kosovo	1999	-	-	-	-	
	2007	-	-	-	-	
	2009	-	-	-	-	
Kyrgyz Republic	1999	88	20	68	454	
	2007	88	35	53	904	
	2009	97	19	78	1178	
Macedonia, FYR	1999	98	66	32	1191	
	2007	99	51	48	2692	
	2009	99	51	48	2692	
Moldova	1999	100	27	73	428	
	2007	100	32	68	846	
	2009	100	23	77	780	
Serbia	1999	-	-	-	-	
	2007	-	-	-	-	
	2009	-	-	-	-	

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Table 3.5 – *Continued from previous page*

Region / Country	Year	Total Non-oil Exports (%)	Manufacturing Exports(%)	Primary Exports(%)	Total Exports (US\$ million)
Tajikistan	1999	87	13	74	692
	2007	-	-	-	-
	2009	-	-	-	-
Turkmenistan	1999	36	12	24	1187
	2007	-	-	-	-
	2009	-	-	-	-
Uzbekistan	1999	-	-	-	-
	2007	-	-	-	-
	2009	-	-	-	-
LAC					
Bolivia	1999	95	38	56	1402
	2007	52	7	45	4813
	2009	61	6	55	5297
Paraguay	1999	100	15	85	741
	2007	100	13	87	2817
	2009	100	11	89	3167
SA					
Afghanistan	1999	-	-	-	-
	2007	-	-	-	-
	2009	100	18	82	403
Bhutan	1999	58	40	18	116
	2007	63	38	25	675
	2009	58	41	16	496
Nepal	1999	100	77	23	524
	2007	-	-	-	-
	2009	100	67	33	886
SSA					
Botswana	1999	100	90	10	2763
	2007	100	73	27	5073
	2009	100	76	23	3456
Burkina Faso	1999	99	15	84	236
	2007	100	7	93	453
	2009	100	6	94	796
Burundi	1999	100	0	100	62
	2007	96	21	76	156
	2009	99	15	83	113

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Table 3.5 – *Continued from previous page*

Region / Country	Year	Total Non-oil Exports (%)	Manufacturing Exports(%)	Primary Exports(%)	Total Exports (US\$ million)
Central African Republic	1999	100	61	39	110
	2007	100	22	78	131
	2009	100	3	97	81
Chad	1999	-	-	-	-
	2007	-	-	-	-
	2009	-	-	-	-
Ethiopia	1999	100	7	93	449
	2007	100	13	87	1277
	2009	100	8	92	1587
Lesotho	1999	100	95	5	336
	2007	-	-	-	-
	2009	-	-	-	-
Malawi	1999	100	9	91	438
	2007	100	11	89	868
	2009	100	9	91	1188
Mali	1999	100	5	95	472
	2007	100	3	96	1441
	2009	100	4	96	1930
Niger	1999	100	2	98	181
	2007	99	6	92	494
	2009	99	4	94	628
Rwanda	1999	100	3	97	57
	2007	100	4	96	154
	2009	100	20	80	237
Swaziland	1999	-	-	-	-
	2007	99	70	29	1086
	2009	-	-	-	-
Uganda	1999	100	3	97	506
	2007	99	21	78	1099
	2009	99	26	73	1085
Zambia	1999	99	18	81	1063
	2007	99	13	87	4618
	2009	99	10	89	4312
Zimbabwe	1999	98	27	71	1887

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Table 3.5 – *Continued from previous page*

Region / Country	Year	Total Non-oil Exports (%)	Manufacturing Exports(%)	Primary Exports(%)	Total Exports (US\$ million)
	2007	99	48	51	3185
	2009	99	33	66	2179
Landlocked Developing	1999	80	37	43	24803
	2007	58	28	30	114228
	2009	51	22	29	110312
Other Developing	1999	87	65	21	979690
	2007	82	64	18	3550952
	2009	82	63	19	3439865
Developed	1999	96	81	14	3988681
	2007	91	74	17	8345468
	2009	91	71	20	7230073
World	1999	93	77	16	5175221
	2007	87	70	17	12700000
	2009	86	67	19	11400000

Note: “-” indicates figures are not available.

Source: Based on data compiled from World Bank (2012c).

In sum, the manufacturing exports of LLDCs seems to be far lower than that of other developing countries. The share of primary sectors is still higher in the LLDCs compared to other developing countries.

3.3.3 Revealed Comparative Advantage (RCA) of LLDCs

Knowledge of the product lines that were exported by LLDCs in the past, is essential for the best policy inferences to enhance the export performance of these countries. How the export dynamics have been developed in these countries over the decade of interest is reflected in Revealed Comparative Advantage (RCA), which measures a country’s export performance in individual product categories relative to its overall

export performance in world trade (Balassa 1965).

The RCA index is calculated using the formula: $RCA = (X_{i,j}/X_{i,t}) / (X_{n,j}/X_{n,t})$, in which, if $RCA > 1$, shows the revealed comparative advantage from exports.

where,

X refers to exports,

i stands for country,

j refers to the commodity,

t refers to total exports of all commodities from the country, and

n refers to the world for the commodity exports.

This index has been criticized by Yeats (1985), who argues that Balassa (1965) did not provide an empirical basis for the index, but it has become a simple tool to reveal the comparative advantage of a country's exports.

The export data for LLDCs are not reported regularly for long periods and are potentially not accurately recorded compared to imports, hence mirror data (that is data extracted from import records of trading partners) are used to calculate the RCA. Table 3.6 presents the RCA indices that are greater than one for three different years (2000, 2005, 2010) including the number of products and share of these products in total exports from a particular country. The analysis covers total non-oil merchandise exports, and the years have been selected to avoid the major regional and global crises and macroeconomic shocks.

The RCA calculation based on non-oil exports data shows that in Armenia, Azerbaijan, Kazakhstan, Kyrgyz Republic, Bolivia, Burkina Faso, Niger, Zambia and Zimbabwe, the number of products with revealed comparative advantage has shrunk

sharply in the last decade; for example, the number of revealed comparative advantage products for Armenia was 177 in 2000 and this had declined to 89 in 2010. Only a few countries, Moldova, Nepal, Botswana, Burundi, Ethiopia, Malawi, Mali and Uganda, extended their product lines with revealed comparative advantage by 2010.

On the other hand, the exports share of the products with revealed comparative advantage is increasing for some countries such as Kyrgyz Republic, Paraguay, Nepal, Bhutan, Botswana, Burkina Faso, Mali, Swaziland, and Zimbabwe indicating that these countries are focusing on products with more revealed comparative advantage. Due to insufficient data, we cannot conclude whether an expansion or contraction of product lines occurred in 2010 for rest of the countries in the group. These data shows that Belarus, among LLDCs, has the most diversified export patterns.

Table 3.6: EXPORTS DYNAMICS IN LLDCs "RCA>1"

Countries / Region	YEAR					
	2000		2005		2010	
	No of Products	Export Share	No of Products	Export Share	No of Products	Export Share
EAP						
Lao PDR	-	-	-	-	-	-
Mongolia	96	0.40	82	0.56	-	-
ECA						
Armenia	177	0.79	95	0.91	89	0.63
Azerbaijan	85	0.09	70	0.17	42	0.04
Belarus	460	0.55	344	0.45	359	0.53
Kazakhstan	114	0.28	104	0.21	17	0.02
Kosovo	-	-	-	-	-	-
Kyrgyz Republic	222	0.64	191	0.72	174	0.72
Macedonia, FYR	320	0.50	274	0.49	-	-
Moldova	205	0.69	206	0.76	210	0.67
Serbia	-	-	-	-	-	-
Tajikistan	25	0.61	-	-	-	-
Turkmenistan	49	0.06	-	-	-	-
Uzbekistan	-	-	-	-	-	-
LAC						
Bolivia	145	0.52	112	0.35	93	0.36
Paraguay	106	0.36	128	0.43	102	0.45
SA						
Afghanistan	-	-	-	-	20	0.62
Bhutan	-	-	85	0.65	70	0.86
Nepal	101	0.54	-	-	263	0.85
SSA						
Botswana	80	0.94	87	0.90	135	0.90
Burkina Faso	141	0.32	93	0.14	61	0.74
Burundi	18	0.92	39	0.94	61	0.90
Central African Republic	43	0.94	31	0.82	-	-
Chad	-	-	-	-	-	-
Ethiopia	59	0.91	96	0.72	125	0.79
Lesotho	48	0.39	-	-	-	-
Malawi	109	0.33	107	0.34	126	0.27
Mali	48	0.63	67	0.71	58	0.90
Niger	101	0.49	79	0.48	73	0.42
Rwanda	-	-	45	0.73	107	0.73
Swaziland	242	0.80	170	0.83	-	-
Uganda	98	0.73	132	0.74	204	0.78
Zambia	134	0.93	106	0.84	106	0.86
Zimbabwe	294	0.42	188	0.59	114	0.66

Source: Compiled from SITC Revision 3 digit 5 data, World Bank (2012c).

The top 20 products ranked in terms of average RCA for 2010 are reported in Table 3A.1 in the Appendix 3A. The table includes product details and individual product share and group (that has greater than one RCA) share in total exports. These are included to facilitate an analysis of the focus of export trade for these countries. The data show that most LLDCs have better revealed comparative advantage in fairly light-weight product lines such as dried fruits, processed foods, garments and textiles, some cash crops (tea and coffee), cosmetics and jewellery. However, the product categories are different for different countries. The lesson from this calculation is that the major proportion of their exports comes from these product lines, with exception of Kazakhstan, Azerbaijan, Niger and Paraguay. The exports of Kazakhstan and Azerbaijan are dominated by oil and fuel products, therefore, their share of exports from revealed comparative advantage product lines is less than five percent of total exports for both countries. For Niger and Paraguay these data are found to be far above but less than 50 percent in both cases. Notably, Kazakhstan has only 17 product lines with revealed comparative advantage when oil and fuel products are excluded. The remaining LLDCs in the table have fairly diversified product lines with revealed comparative advantage.

Some countries such as Botswana, Nepal, Rwanda, Uganda, Zambia, Zimbabwe, Burundi, Bolivia, Bhutan, Armenia and Afghanistan have some products that have $RCA > 1000$, but such products are few. Some of the LLDCs are dropped from these calculations due to unavailability of the data to calculate RCA. However, other than RCA product lines, domestic trade policies, foreign trade barriers and endowments play significant roles in their export performance. In this situation, RCA is just an indication of potential product lines for which a country has expanded exports. To analyze LLDCs export performance, supply side factors also need to be analysed due to the different trade policies and infrastructure levels among the countries in addition to the constraints imposed by landlockedness.

In summary, most of the products in which countries have revealed comparative advantage ($RCA > 1$) are generally high-value-to-weight products. For these products the incidence of transport costs presumably has a lesser negative impact compared to low-value-to-weight products. For example, carpet, knotted wool/hair products from Afghanistan cover almost 18 percent of its exports, other ferrous-alloys has about 13 percent share in Armenia's exports, diamonds and its process such as sorting, cleaving has about 58 percent share of Botswana's exports, Non-monetary gold, semi-manufactured has almost 70 percent of Burkina Faso's export and about 50 percent in Kyrgyz Republic's exports, coffee not roasted/decaf has about 60 percent share in Burundi's exports, about 30 percent in Ethiopia's exports and about 27 percent contribution in Rwanda's exports.

3.4 Determinants of Export Performance

3.4.1 The Model

The analytical tool used for the empirical analysis in this section is the gravity model, which has now become the 'workhorse' for modeling bilateral trade flows. The standard gravity model (originated in Tinbergen (1962)) postulates that trade between two countries, like the gravitational force between two masses, is a function of their economic size and the geographic distance between them.² The basic model was as in Equation (3.1). I augment this basic model by adding a number of explanatory variables to improve the explanatory power of the estimated trade equations following the notable studies in international trade such as Linnemann (1966), Anderson

²For an introduction to the gravity model and recent methodological and theoretical advances in its application to trade flow modelling with a comprehensive survey of this literature, see Bergeijk & Brakman (2010).

(1979), Bergstrand (1985), Deardorff (1995), Limao & Venables (2001), Anderson & Wincoop (2004), and Behar & Venables (2010).

$$\ln(X_{ij,t}) = \alpha + \beta_1 \ln(GDP_{i,t}) + \beta_2 \ln(GDP_{j,t}) + \beta_3 \ln(DIS_{ij,t}) + \epsilon_{ij,t} \dots \quad (3.1)$$

There have been some criticisms of the theoretical basis of the model at the initial stage. Later, Anderson (1979), Bergstrand (1985) and Deardorff (1995) contributed to the theoretical base. Coe & Hoffmaister (1999), Clark et al. (2004), Fugazza (2004), Helpman et al. (2008), Manova & Zhang (2012) and Berman et al. (2012) are other notable studies using the gravity model in the literature.³ Based on this literature the basic model is augmented here by adding a variable to represent the relative price aspects, which is an important factor for trade flows (Equation 3.2).

$$\begin{aligned} \ln(X_{ij,t}) = & \alpha + \beta_1(Llock_i) + \beta_2(OPEN_{i,t}) + \beta_3 \ln(GDP_{i,t}) + \beta_4 \ln(GDP_{j,t}) \\ & + \beta_5 \ln(DIS_{ij,t}) + \beta_6 \ln(RER_{ij,t}) + \beta_7 \ln(GDPPC_{i,t}) + \beta_8 \ln(GDPPC_{j,t}) \\ & + \beta_9(LAN_{ij,t}) + \beta_{10}(BOR_{ij,t}) + \beta_{11} \ln(RFE_{i,t}) + \beta_{12}(RTA_{ij,t}) \\ & + \beta_{13}(AFRICA_i) + \beta_{14}(EUTC_i) + \epsilon_{ij,t} \quad (3.2) \end{aligned}$$

where,

\ln denotes to the natural logarithm,

³See Bergeijk & Brakman (2010) for a comprehensive survey of the methodological and theoretical advances of the Gravity Model.

subscripts i and j refer to the exporter and the partner country in bilateral trade, and t refers to the time.

The variables are listed below with their details and the postulated sign of the regression coefficient for the explanatory variables in brackets.

X	Real non-oil exports, the dependent variable
Llock	Landlockedness, binary dummy (-)
OPEN	Openness measured by weighted average tariff rate (-)
GDP	Real GDP, a measure of the economic size (+)
DIS	The distance between the business cities of country i and j (-)
RER	Real exchange rate (its domestic currency/US\$) (+)
GDPPC	Per capita GDP of exporters and partners (+)
AFRICA	If the country is in Africa, binary dummy (-)
LAN	Common language, a measure of cultural affinity (+)
BOR	Common border of trading countries (+)
RFE	Relative factor endowment (+, -), either H-O or Linder hypothesis
RTA	Regional Trade Agreements, binary dummy (+)
AFRICA	Dummy to represent the African countries
EUTC	Eastern European Transition countries

The last term of the equation (3.4) is the error term. The error component structure is presented in equation (3.3):

$$\epsilon_{ij,t} = \mu_{ij,t} + \theta_t + v_{ij,t} \quad (3.3)$$

where, $\mu_{ij,t}$ is a fixed effect that might be correlated with explanatory variables in (3.5), θ_t captures the time-specific effects common to all cross section units,

and $v_{ij,t}$ is an error term uncorrelated across cross-section units and over time periods.

The dependent variable is Non-oil exports (X) measured in US\$ in the log form. The reasons for selecting non-oil exports are: first, the oil price fluctuates greatly making the estimation more volatile; second, export of oil products depends on geography and does not really explain the role of policies taken by the country; and third, only a few countries export oil products in the LLDCs group. Nominal exports have been converted into real exports by deflating them with the annual US import price index for non-oil commodities for the base year 2000 (for all real values in this thesis, year 2000=100).

Among the explanatory variables, real GDP has been measured in US\$, distance (DIS) is measured in kilometres and shows the distance between the most populated cities (business capitals) of partner countries. Landlockedness is a binary variable, that is, 1 for landlocked developing countries and 0 for non-landlocked developing countries. The expected sign for this variable is negative based on the literature. The variable GDP of exporting and partner countries has been widely explained in the literature and does not need further explanation.

Language (LAN) is also a binary dummy variable, that is, 1 if trading countries have a common official language and 0 otherwise. Similarly, border (BOR) is a binary dummy variable representing whether the trading countries share a common border. Trade reform (OPEN) is measured by the weighted average tariff rate as it helps to compare the level of openness of a country in terms of international trade. It is proxied by the weighted average tariff rate for all products, and a negative sign is expected, meaning that the lower the tariff rate, the higher the export performance. The variable OPEN has been replaced by the Sachs and Warner openness index and

export to GDP ratio in percent form.⁴ The variables: landlockedness, OPEN and Africa are of major interest of this study.

RER is the real exchange rate index, which is defined as: $RER_{i,t} = NER_{i,t} (P^w / P^d)$. Here, NER is the official exchange rate in domestic currency per partner currency for base year 2000. P^w is measured by the partner's GDP deflator with base year 2000, as the measure of the world price. P^d is measured with the GDP deflator of exporting countries, constructed by using the relationship between nominal and real GDP, in local currency for the base year 2000, as the measure of domestic prices. As a measure of price level, the wholesale price index would be the ideal proxy for domestic and world prices, but these series are not long enough and are not available for many countries. Most previous studies have used the consumer price index (CPI) as the measure of price level in constructing RER. However, in most countries the CPI covers only prices prevailing in urban areas (mostly the capital city). In this study GDP deflator, which by construct capture the captures the prices of total production in the economy is used as the relevant measure of the price level. In this variable, an increase in the RER means the depreciation of the domestic currency.

GDPPC is the real per capita GDP of exporters and trading partners. Relative factor endowment (RFE) is the absolute difference between the per capita GDPs of importers and exporters. This variable is included to show the structure of trade between countries with similar income levels. It helps to know whether the trade in these countries supports the Linder hypothesis or the H-O theory.⁵ If RFE is positive it will support the H-O theory and a negative RFE will support the Linder hypothe-

⁴Sachs and Warner index is presented in Table 3.2 and Exports to GDP ratio is presented in Table 3.3. These have not been reported as the results are not substantially different for our interest variable and tariff rate is preferable over these two.

⁵The H-O hypothesis suggests that more trade occurs if their endowment levels are different. On the other hand, a negative sign for this variable would support the Linder (1961) hypothesis, which suggests that the different levels of endowment affect trade negatively, meaning that more trade occurs where countries are in almost the same income category.

sis.

There are concerns among development economists that Africa is unusual in many respects such as economic growth, climate, economic geography, and trade. Collier (2007) suggested that African countries suffer due to conflict, bad neighbours of landlocked countries, bad governance and misuse of resources. In terms of trade, Coe & Hoffmaister (1999) found that unusually the low level of trade in the African region is caused by economic size, geographical distance and population. Most recently, Bosker & Garretsen (2012) found that improving market access has improves the manufacturing trade flows in Africa. Maehle et al. (2013) and Martinez & Mlachila (2013) concluded that the reforms in Sub-Saharan Africa have worked to enhance economic development in the region. Motivated by these studies, I tried to identify whether Africa is unusual in terms of export performance. This question is relevant not only because Africa experienced slow growth for almost two decades, but also Africa initiated policy reforms in the early 1990s. More recently, Africa has been able to attract investment from China and other countries, substantially.

Against this background, I include a binary dummy variable (AFRICA) for the African countries which takes value 1 if the country is in Africa and 0 otherwise. The expected sign of the coefficient of this variable is negative. A binary dummy variable (EUTR) is also included to test whether the export performance of the transitional landlocked countries in Central and Eastern Europe which have emerged following the disintegration of the former Soviet Union, are different from the other landlocked countries. The expected sign for this variable is either positive or negative.

3.4.2 Econometric Methodology

Many previous studies have estimated the gravity equation using either a pooled ordinary least squares (POLS) estimation, a fixed effect estimation (FE) or a random effect (RE) estimation. One important assumption made is that the country-specific effects (fixed effects) $\mu_{ij,t}$ in (3.5) are uncorrelated with all regressors, although this assumption has been rejected in most empirical works. Therefore, among these three methods, FE is the preferred method to reduce the bias caused by this assumption. However, we cannot estimate the coefficients of time invariant variables, which are the main variables in the gravity modelling framework, under FE. In this study, the main variables of interest, landlockedness dummy, AFRICA dummy and distance, are time-invariant. For this reason, this study estimates the gravity model using Hausman & Taylor (1981) instrumental variable estimation as the preferred method in the second stage, as in Brun et al. (2005) and Shin & Serlenga (2007).

There are other issues relating to the estimation of a gravity model for trade flow, especially when dealing with a large heterogeneous sample. Because of extensive heterogeneity in a large panel of trade data, the Hausman Taylor (HT) estimator also fails to pass the post-estimation tests, and in this case the results are not credible (Shin & Serlenga 2007). Also, there are some issues with the log linearization and missing data, as data are not available for some countries for the dependent variable. Thus, if a gravity model is estimated using any of the OLS-based approaches it does not give consistent results, as suggested by Silva & Tenreyro (2006). The reason behind this is that the log-linearization of the gravity equation changes the properties of the error term. This leads to inefficient estimations due to the presence of heteroskedasticity, which is a common feature of trade data. Even though, the coefficients are still unbiased, the variance of the estimated parameters becomes

inconsistent resulting in doubtful t-statistics.⁶ Thus, the remainder of the empirical analysis follows the PPML as a preferred estimation method, on which the coefficients of PPML estimations are elasticities, if the independent variables are in the log (Genc 2013).

Alternative methods for redressing these problems include the Non-linear Least Squares (NLS) method, Feasible Generalized Least Squares (FGLS), the Heckman sample selection model, Gamma Pseudo Maximum Likelihood (GPML), and the Poisson Pseudo Maximum Likelihood (PPML). Among these, the PPML method is preferred over the others for three reasons: (i) it assigns equal weight to all missing observations and provides unbiased estimates in the presence of heteroskedasticity, however, it has some limitations, for example it may lead to dependent variable bias when many observations are missing; (ii) it fits well in the semi-log model, so that countries with a small quantity of exports would not be penalized in the data; and (iii) it allows us to estimate the coefficients for time-invariant variables (see Herrera (2013) for detail). Therefore, additional estimations are made using the PPML method, following Silva & Tenreyro (2006). In sum, the empirical analysis is made using POLS, RE and FE initially and then PPML estimation methods, using a gravity model. PPML allows estimation of the time-invariant variables. Further, it performs comparatively better where there are missing observations of dependent variables, which is always the case when data rich and data poor countries are mixed.

3.4.3 Data Sources and Method of Compilation

The model is estimated using a panel data set of bilateral export trade over the period 1995-2010. The variables have been regressed interacting with the landlockedness

⁶See Silva & Tenreyro (2006) and Herrera (2013) for details.

dummy to detect possible differences in the coefficients of the variables in the case of LLDCs. Developed countries are not included as the objective of the study is to compare the export performance of non-landlocked and landlocked developing countries. The focus of this study is solely on merchandise exports. Services exports are effectively excluded from the context because of the unavailability of the data for the majority of the countries. The data for exports, real GDP in US\$, real GDP and nominal GDP in local currency, used to calculate the GDP deflator, nominal exchange rate, weighted average tariff rate and GDPPC, are collected from World Bank (2012b).

The nominal exchange rate data for European Union countries were collected from the website of the European Central Bank (2012) and converted to \$US using the nominal exchange rate of the local currency to match the series for other countries. The distance, language and border data were compiled from CEPII (2012). The data for regional trade agreements (RTA) were collected from de Sousa (2012); these are based on the regional trade agreements reported to the WTO by the relevant countries. The data for weighted average tariff rates are for non-oil products and are linearly interpolated.

3.4.4 Results

Descriptive statistics and correlation matrix tables are presented in Appendix 3A (Table 3A.2 and Table 3A.3). First, the model is estimated as specified in equation (3.3), and then the interaction terms are added in the estimation. This approach helps us to know the coefficients for two sets of developing countries and to identify the differences in the magnitude of the LLDCs' data. The estimations for the initial models as specified in equations (3.2) and (3.3), which are related with the cost of exports, are presented in Table 3A.4 and Table 3A.5 in the Appendix 3A. The estimated results are statistically highly significant with the expected signs. The results explain the

situation of high trade costs in LLDCs.

Table 3.7 presents the estimated results for the augmented gravity model for all developing countries. The initial analysis is made to select a suitable estimation method; for this POLS, RE and FE results are compared and the Hausman test is conducted. The results confirm FE as the preferred method over RE for the estimation. Here, the major problem with FE is that the main variables of interest are dropped from the estimation. The estimation results for the variables are : landlockedness, openness, exporter's and partner's GDP, exporter's and partner's per capita GDP, real exchange rate, and relative factor endowment have the expected sign in all estimation methods. Distance, common border, and common official language variables have the expected sign in POLS and RE, while they are also dropped in the FE estimation.

Table 3.8 presents the estimations for developing countries using the PPML estimation method. The results in column (1) of this table suggest that holding other variables constant, landlocked developing countries export about 25 percent less than other developing countries⁷. This result for landlockedness is similar to that reported in previous studies.⁸ The results for openness have the expected sign, suggesting that on average, a one percentage point decrease in the tariff rate results in an increase in exports by 0.08 percent in non-landlocked developing countries and in only about 0.02 percent for LLDCs.⁹ These results confirm that trade reform is important in both sets of developing countries, but it shows that has a lesser impact on the export performance of LLDCs because of the presence of other constraints. The results are consistent with the view that generally trade liberalisation promotes exports.

⁷The real coefficient for landlockedness for this model is about -0.229, which is to be calculated as $4.24 + /-(\text{coefficients of interaction term}) \times \text{mean of the variables from descriptive statistics}$

⁸The formula to compute this coefficient is $\exp(c - 1) \times 100$ per cent, where c is the estimated coefficient.

⁹To calculate the coefficients for LLDCs, sum of the coefficients of (2) with the respected interaction variables. For example, for openness, $-0.083 + 0.063 = -0.020$.

The bilateral real exchange rate has a positive and statistically significant impact on exports, suggesting the depreciation of the domestic currency promotes exports in both sets of developing countries.

Exporter's and partners' GDP are highly significant as expected and indicate that own GDP is more crucial to improving export performance in non-landlocked developing countries, while partners' GDP is more important for LLDCs, holding other things the same in the model. Distance has a statistically highly significant negative impact as expected: on average the negative impact is about 60 percent on export performance of non-landlocked developing countries, while this is found to be almost 80 percent for LLDCs. The difference between the two coefficients is statistically significant as suggested by the "suest test" (the suest test allows us to find the statistical significance of the difference of the two coefficients). This result confirms that distance related transport cost is a much more binding constraint on the export performance of landlocked developing countries compared to the other developing countries.

The variable of relative factor endowment supports the H-O hypothesis, indicating that a one percent increase in the difference in factor endowment results in an increase in exports of 0.08 percent on average, holding other things the same. However, in the case of LLDCs, the results support the Linder hypothesis, suggesting that LLDCs trade with countries with the similar income levels. Regional trade agreement contributes more to LLDCs compared to non-landlocked countries, however it has statistically significant positive impact on export performance for both types of developing countries. Bilateral exchange rate has a more important role to play in LLDCs compared to non-landlocked developing countries. However, the coefficients are small on both occasions. Per capita GDP of own and partners' contribute positively for LLDCs.

The coefficients estimates for the common language and the common border variables are positive and statistically significant. Having a common border enables a developing country to export more if the other variables remain constant. More importantly, having a common border is more beneficial than to have a common official language for developing countries.

The coefficient of AFRICA is negative and statistically significant. This result suggests that African developing countries, on average, have about 25 percent lower exports than the developing countries in other regions, other things remaining the same. In this estimation, the results are consistent with those of previous studies such as Coe & Hoffmaister (1999). If we compare the African developing countries with other developing countries, African developing countries' export performance is poor. But if we compare the African LLDCs with other developing countries, the African LLDCs, on the contrary, *ceteris paribus*, have average export levels higher than the average level for other landlocked developing countries. This might be because of the benefits of relatively strong regional cooperation as discussed by Faye et al. (2004). A similar story emerges in the case of the Eastern European transition countries, which are landlocked.

Table 3.7: AUGMENTED GRAVITY MODEL: DEVELOPING COUNTRIES

<i>Dependent Variable.: exports (log)</i>	(POLS)	(RE)	(FE)
Landlockedness (llock-dummy)	-0.489*** (0.022)	-0.370*** (0.058)	dropped
Openness (Tariff Rate %)	-0.027*** (0.001)	-0.006*** (0.001)	-0.004*** (0.001)
Exporter's GDP (log)	1.089*** (0.004)	1.109*** (0.012)	-1.140*** (0.125)
Partner's GDP (log)	0.958*** (0.004)	0.982*** (0.011)	1.847*** (0.099)
Distance (log)	-1.072*** (0.011)	-1.225*** (0.028)	
Regional Trade Agreement	1.181*** (0.027)	0.325*** (0.028)	0.159*** (0.029)
Relative Factor Endowment	-0.052*** (0.007)	-0.081*** (0.011)	-0.071*** (0.013)
Bilateral RER (log)	0.156*** (0.021)	0.279*** (0.017)	0.310*** (0.017)
Per Capita GDP (log)	-0.049*** (0.008)	0.106*** (0.021)	2.214*** (0.112)
Partner's per capita GDP (log)	0.031*** (0.008)	0.064*** (0.017)	-0.188** (0.093)
Common Border	0.796*** (0.045)	1.122*** (0.127)	dropped
Common Language	0.873*** (0.020)	0.977*** (0.055)	dropped
Africa-dummy	-0.343*** (0.020)	-0.309*** (0.052)	dropped
Eastern Europe Transition Countries	0.121*** (0.028)	0.209*** (0.075)	dropped
<i>Number of observations</i>	122,544	122,544	122,544
<i>Number of country groups</i>		11,258	11,258
<i>F-Statistics</i>	10,933.26		471.01
<i>R-squared</i>	0.59		0.09
<i>Corr.</i>			-0.78

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors. To know the coefficients of LLDCs, all variables have been interacted with landlockedness in the column (2). The column contd... (2) is the continuation of the results for model specification (2).

Table 3.8: AUGMENTED GRAVITY MODEL:PPML ESTIMATION-DEVELOPING COUNTRIES

<i>Dependent Variable: exports</i>	(1)	(2) <i>Interactions</i>	<i>contd...(2)</i>
Landlockedness (llock-dummy)	-0.204*** (0.000)	4.424*** (0.001)	
Openness (Tariff Rate %)	-0.083*** (0.000)	-0.083*** (0.000)	Openness*llock 0.063*** (0.000)
Exporter's GDP (log)	1.048*** (0.000)	1.045*** (0.000)	GDP*llock -0.360*** (0.000)
Partner's GDP (log)	0.801*** (0.000)	0.799*** (0.000)	Partners' GDP*llock 0.048*** (0.000)
Per Capita GDP (log)	-0.346*** (0.000)	-0.351*** (0.000)	Per Cap. GDP*llock 0.668*** (0.000)
Partner's per capita GDP (log)	0.017*** (0.000)	0.010*** (0.000)	Part. Per.Cap.GDP*llock 0.058*** (0.000)
Bilateral RER (log)	0.101*** (0.000)	0.093*** (0.000)	Bilater RER*llock 0.077*** (0.000)
Relative Factor Endowment (RFE -log)	0.118*** (0.000)	0.137*** (0.000)	RFE*llock -0.358*** (0.000)
Distance (log)	-0.577*** (0.000)	-0.571*** (0.000)	Distance*llock -0.172*** (0.000)
Common Border	1.113*** (0.000)	1.116*** (0.000)	Com.Border*llock -0.167*** (0.000)
Common Language	0.847*** (0.000)	0.842*** (0.000)	Com. Language*llock -0.570*** (0.000)
Regional Trade Agreement (RTA)	0.259*** (0.000)	0.237*** (0.000)	RTA*llock 1.227*** (0.000)
Africa-dummy	-0.316*** (0.000)	-0.296*** (0.000)	africa*llock 1.207*** (0.000)
Eastern Eur. Trans. Countries (EUTC)	-0.138*** (0.000)	-0.183*** (0.000)	EUTC*llock 1.052*** (0.000)
<i>Number of observations</i>	122544		122544
<i>Pseudo R-squared</i>	0.8799		0.87
<i>RESET test p-values</i>	0.27		0.29
<i>Year Effect</i>	Yes		Yes

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors. To know the coefficients of LLDCs, all variables have been interacted with landlockedness in the column (2). The column contd... (2) is the continuation of the results for model specification (2).

Robustness Check

Next, I test whether the results are consistent with alternative specifications. For this, the model is tested removing AFRICA and EUTC dummies (Table 3.9), and found that the estimated results for the main variables of interest reported in this table are consistent with those of previous tables. The magnitude of landlockedness dummy remains unchanged, maintaining the same level of statistical significance. Some other important variable such as openness, real exchange rate, common border, common language, and distance also have maintain the same level of statistical significance with expected signs, however, the magnitudes of the coefficients are slightly fluctuated.

Further estimations have been made including partner country specific effect in the model (Table 3.10). These results also suggest the consistency for the main variables of interest of this chapter. The magnitude of the variable landlockedness has declined slightly but the level of statistical significance remain same with the expected negative sign.

Further, I test whether the results for the variable AFRICA dummy are dominated by the data from Botswana, an upper middle income landlocked developing country in Sub-Saharan Africa. The model is estimated excluding Botswana, as can be seen in (Table 3.11), the results for all variables of main interest are consistent with the main results presented in Table 3.8.

Table 3.9: AUGMENTED GRAVITY MODEL:PPML ESTIMATION-DEVELOPING COUNTRIES

<i>Dependent Variable: exports</i>	(1)	(2) <i>Interactions</i>	<i>contd...(2)</i>
Landlockedness (llock-dummy)	-0.243*** (0.000)	6.587*** (0.001)	
Openness (Tariff Rate %)	-0.085*** (0.000)	-0.085*** (0.000)	Openness*llock 0.034*** (0.000)
Exporter's GDP (log)	1.078*** (0.000)	1.076*** (0.000)	GDP*llock -0.310*** (0.000)
Partner's GDP (log)	0.803*** (0.000)	0.801*** (0.000)	Partners' GDP*llock 0.011*** (0.000)
Per Capita GDP (log)	-0.335*** (0.000)	-0.342*** (0.000)	Per Cap. GDP*llock 0.545*** (0.000)
Partner's per capita GDP (log)	0.033*** (0.000)	0.026*** (0.000)	Part. Per.Cap.GDP*llock 0.022*** (0.000)
Bilateral RER (log)	0.137*** (0.000)	0.140*** (0.000)	Bilater RER*llock 0.057*** (0.000)
Relative Factor Endowment (RFE-log)	0.082*** (0.000)	0.099*** (0.000)	RFE*llock -0.338*** (0.000)
Distance (log)	-0.566*** (0.000)	-0.557*** (0.000)	Distance*llock -0.190*** (0.000)
Common Border	1.043*** (0.000)	1.044*** (0.000)	Com.Border*llock -0.159*** (0.000)
Common Language	0.810*** (0.000)	0.813*** (0.000)	Com. Language*llock -0.427*** (0.000)
Regional Trade Agreement (RTA)	0.300*** (0.000)	0.288*** (0.000)	RTA*llock 0.810*** (0.000)
<i>Number of observations</i>	122,544		122,544
<i>Pseudo R-squared</i>	0.88		0.87
<i>RESET test p-values</i>	0.27		0.29
<i>Year Effect</i>	Yes		Yes

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors. To know the coefficients of LLDCs, all variables have been interacted with landlockedness in the column (2). The column contd... (2) is the continuation of the results for model specification (2).

Table 3.10: AUGMENTED GRAVITY MODEL:PPML ESTIMATION-DEVELOPING COUNTRIES

<i>Dependent Variable: exports</i>	(1)	(2) <i>Interactions</i>	<i>contd...(2)</i>
Landlockedness (llock-dummy)	-0.181*** (0.000)	3.508*** (0.001)	- -
Openness (Tariff Rate %)	-0.075*** (0.000)	-0.075*** (0.000)	Openness*llock 0.062*** (0.000)
Exporter's GDP (log)	1.042*** (0.000)	1.040*** (0.000)	GDP*llock -0.327*** (0.000)
Partner's GDP (log)	1.474*** (0.000)	1.454*** (0.000)	Partners' GDP*llock 0.047*** (0.000)
Per Capita GDP (log)	-0.325*** (0.000)	-0.333*** (0.000)	Per Cap. GDP*llock 0.626*** (0.000)
Partner's per capita GDP (log)	-0.322*** (0.000)	-0.308*** (0.000)	Part. Per.Cap.GDP*llock 0.097*** (0.000)
Bilateral RER (log)	0.168*** (0.000)	0.178*** (0.000)	Bilater RER*llock 0.058*** (0.000)
Relative Factor Endowment (RFE -log)	0.083*** (0.000)	0.104*** (0.000)	RFE*llock -0.301*** (0.000)
Distance (log)	-0.655*** (0.000)	-0.648*** (0.000)	Distance*llock -0.201*** (0.000)
Common Border	0.730*** (0.000)	0.736*** (0.000)	Com.Border*llock 0.164*** (0.000)
Common Language	0.384*** (0.000)	0.360*** (0.000)	Com. Language*llock -0.032*** (0.000)
Regional Trade Agreement (RTA)	0.315*** (0.000)	0.286*** (0.000)	RTA*llock 1.063*** (0.000)
Africa-dummy	-0.168*** (0.000)	-0.137*** (0.000)	africa*llock 0.851*** (0.000)
Eastern Eur. Trans.Countries (EUTC)	-0.124*** (0.000)	-0.156*** (0.000)	EUTC*llock 0.859*** (0.000)
<i>Number of observations</i>	122033		122033
<i>Pseudo R-squared</i>	0.91		0.91
<i>RESET test p-values</i>	0.27		0.31
<i>Partner Country fixed effect</i>	Yes		Yes
<i>Year Effect</i>	Yes		Yes

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors. To know the coefficients of LLDCs, all variables have been interacted with landlockedness in the column (2). The column contd... (2) is the continuation of the results for model specification (2).

Table 3.11: AUGMENTED GRAVITY MODEL:PPML ESTIMATION-DEVELOPING COUNTRIES

<i>Dependent Variable: exports</i>	(1)	(2) <i>Interactions</i>	<i>contd...(2)</i>
Landlockedness (llock-dummy)	-0.231*** (0.000)	6.213*** (0.001)	
Openness (Tariff Rate %)	-0.086*** (0.000)	-0.086*** (0.000)	Openness*llock 0.048*** (0.000)
Exporter's GDP (log)	1.061*** (0.000)	1.059*** (0.000)	GDP*llock -0.385*** (0.000)
Partner's GDP (log)	0.801*** (0.000)	0.799*** (0.000)	Partners' GDP*llock 0.028*** (0.000)
Per Capita GDP (log)	-0.347*** (0.000)	-0.349*** (0.000)	Per Cap. GDP*llock 0.600*** (0.000)
Partner's per capita GDP (log)	0.030*** (0.000)	0.024*** (0.000)	Part. Per.Cap.GDP*llock 0.035*** (0.000)
Bilateral RER (log)	0.098*** (0.000)	0.092*** (0.000)	Bilater RER*llock 0.076*** (0.000)
Relative Factor Endowment (RFE -log)	0.084*** (0.000)	0.100*** (0.000)	RFE*llock -0.331*** (0.000)
Distance (log)	-0.557*** (0.000)	-0.552*** (0.000)	Distance*llock -0.179*** (0.000)
Common Border	1.047*** (0.000)	1.048*** (0.000)	Com.Border*llock -0.065*** (0.000)
Common Language	0.818*** (0.000)	0.816*** (0.000)	Com. Language*llock -0.634*** (0.000)
Regional Trade Agreement (RTA)	0.295*** (0.000)	0.276*** (0.000)	RTA*llock 1.168*** (0.000)
Africa-dummy	-0.299*** (0.000)	-0.265*** (0.000)	africa*llock 1.076*** (0.000)
Eastern Eur. Trans. Countries (EUTC)	-0.125*** (0.000)	-0.167*** (0.000)	EUTC*llock 0.920*** (0.000)
<i>Number of observations</i>	122033		122033
<i>Pseudo R-squared</i>	0.86		0.85
<i>RESET test p-values</i>	0.29		0.31
<i>Year Effect</i>	Yes		Yes

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors. To know the coefficients of LLDCs, all variables have been interacted with landlockedness in the column (2). The column contd... (2) is the continuation of the results for model specification (2).

3.5 Conclusion

This chapter has examined the determinants of export performance in developing countries, with emphasis on landlockedness. The results suggest that, although landlocked developing countries have been making some progress in export expansion over the past four decades, their export performance remains poor compared to other developing countries. While landlockedness remains a constraint, there are opportunities for these countries to improve their export performance by creating a more trade-friendly environment through lowering tariffs, reforming exchange rates and involving themselves in regional trade agreements. Both demand and supply side factors play a significant role in determining the export performance of LLDCs, as indicated by their own and their partners' GDPs.

The real exchange rate is a significant determinant of export performance. The results for the relative factor endowment variable (measured by the absolute difference between the per capita incomes of trading partners) confirm the Linder hypothesis that trade links are much stronger among countries with similar income levels. The coefficients for the distance variable suggest that distance-related trade costs restrict export performance more in landlocked developing countries than in other developing countries. Having a common border is more important than having a common language for export performance in these countries. There is no evidence to suggest that African landlocked countries are disadvantaged compared to other landlocked countries in world trade. On the contrary, *ceteris paribus*, the average export levels for these countries are about 100 percent higher than the average level for other LLDCs. This result perhaps reflects the liberalisation reforms undertaken by a number of these countries since the early 1990s, the impact of which is not adequately captured by the explanatory variables used in the model.

The findings of this chapter imply that the immediate trade policy challenge

for landlocked developing countries is to create a more trade-friendly environment and to improve the quality of infrastructure and the logistic environment, to improve the supply side factors in the international trade of LLDCs. However, the advantage from trade liberalisation is not equally beneficial to LLDCs compared to non-landlocked developing countries. These countries need to find potential export avenues, such as becoming involved in a global production sharing network, product specialization, and building up strong infrastructure relative to the comparative size of their economies. The empirical analysis suggests that these countries need to create a more trade-friendly environment in the economy by reducing tariff rates and putting exchange rate policies into effect that favour exports.

The major policy inference from this study is that even though landlockedness is a constraint, landlocked developing countries can improve their export level by creating a more export-friendly environment and maintaining export-friendly exchange rate system. Trade related cost is more crucial to improving the export performance in LLDCs than the trade liberalisation. There is a benefit from trade liberalisation in LLDCs too but when compared to other developing countries, the benefits are low.

Appendix 3A

Table 3A.1: TOP 20 RCA PRODUCTS FOR LLLDCs IN 2010

SITC Rev3 dig 5 Prod.Des.	Productcode	RCA	Share%
Afghanistan : Share of products with RCA>=1=0.62			
Carpet,knotted,wool/hair	65921	1705.05	18.0
Grapes dried(raisins)	5752	1115.29	13.5
Mate	7431	855.04	0.6
Vegetable saps/extracts	29294	671.78	10.3
Thyme/saffron/bay leaves	7528	671.65	2.0
Flagstones etc,nat stone	66131	577.93	1.6
Seed spices	7526	438.70	1.6
Pistachios, fresh/dried	5778	215.49	3.7
Almonds, fresh/dried	5774	199.51	4.6
Fodder roots/crops	8113	97.92	1.1
Grapes fresh	5751	60.11	2.5
Walnuts, fresh/dried	5776	48.80	0.6
Nuts edible,frsh/dry nes	5779	47.35	0.4
Stone fruit nes, fresh	5793	25.40	0.8
Marble/etc slabs	27312	17.89	0.3
Gut,bladders,etc nonfish	29193	14.26	0.4
Brazil nuts, fresh/dried	5772	8.87	0.0
Seeds of forage plants	29252	8.43	0.1
Berries fresh	5794	3.34	0.1
Peas	5421	3.11	0.0
Armenia : Share of products with RCA>=1=0.63			
Molybdenum unwrght/waste	68912	1380.63	1.8
Other ferro-alloys nes	67159	332.45	13.4
Brandies/marcs etc.	11242	325.79	10.5
Copper unref,exc cement	68211	321.35	10.7
Siliceous fossil meals	27895	217.71	0.2
Synthetic rubbr ciir/biir	23214	173.77	1.0
Aluminium foil t<0.2	68424	113.13	9.0
Tomato juice	5992	68.29	0.0
Molybdenum ore, other	28782	40.37	0.4
Waste/scrap alloy st nes	28229	30.42	0.7
Mineral water/ice/snow	11101	30.15	0.6
Glass bottles/jars/etc	66511	23.59	1.3
Marble etc finished	66136	16.24	0.3

Continued on next page

Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Grapes fresh	5751	13.31	0.6
Watches,battery,prec mtl	88531	11.70	0.2
Lead waste and scrap	28824	10.72	0.0
Fruit/nuts nes,preserved	5896	10.65	0.2
Acetals/hemiacetals/derv	51612	9.17	0.0
Artificial corundum	52267	8.01	0.1
Scouring piowders/pastes	55434	7.71	0.0
Azerbaijan : Share of products with RCA>=1=0.04			
Refined maize oil	42169	27.88	0.1
Hazelnuts, fresh/dried	5775	17.69	0.2
Black tea, pack to 3kg	7413	13.52	0.2
Veg fat/oil/fractions	43122	13.28	0.4
Refined safflower oil	42159	12.47	0.2
Other fresh fruit	5798	10.28	0.2
Sugar beet frsh dried	5487	10.12	0.0
Bran, etc of wheat	8126	8.32	0.0
Oil cake of cotton seed	8133	8.10	0.0
Propanols	51212	7.51	0.1
Raw solid sugar nes	6129	6.77	0.7
Misc edible prods nes	9109	6.75	0.2
Bentonite	27827	6.38	0.0
Refined cotton seed oil	42129	5.49	0.0
Juice,one fruit/veg nes	5995	4.70	0.1
Woven fabr frm strip etc	65312	4.29	0.0
Petroleum resins etc.	57596	4.18	0.1
Grape must in fermentat.	11211	4.04	0.0
Fluorine,bromine,iodine	52225	3.43	0.0
Woven silk fabrics nes	65419	3.21	0.0
Belarus : Share of products with RCA>=1=0.52			
Beef, frozen, bone in	1121	98.67	0.7
Potassium chloride fert.	56231	97.35	8.8
Caviar/substitutes	3717	67.91	0.2
Acrylic filament tow	26663	63.39	0.3
Sil-mang steel bars nes	67642	55.99	0.1
Milk(ex dry) prsvd,swtnd	2224	52.62	0.3
Varnish solvents,thinner	53355	48.18	0.6
Acrylic/modacrylic fibre	26653	42.71	0.2
Polyester filament tow	26662	34.52	0.0

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Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Matches	89932	34.02	0.1
Optical telescopes etc	87115	29.38	0.1
Cast,rolled glass wired	66452	29.25	0.0
Milk(ex dry) prsvd,unswt	2223	29.05	0.3
Oth harv/thresher/mower	72123	29.02	0.8
Casein	59221	27.40	0.2
Tyres nes,other	62559	24.83	0.8
Wheeled tractors nes	72249	23.96	2.6
Cereal meal/flour nes	4719	23.34	0.1
Poultry(whole)frsh/chld	1231	22.48	0.2
Telescopic sights/etc	87191	22.15	0.1
Bhutan : Share of products with RCA>=1=0.86			
Calcium carbide	52493	2497.39	5.1
Dolomite	27823	1570.29	3.9
Iron/simple steel ingot	67241	1443.23	3.1
Hf free-cutting st bar	67622	1377.06	3.9
Ferro-silicon alloy	67151	1078.49	30.1
Limestone etc for cement	27322	804.16	1.3
Gypsum and anhydrite	27323	792.90	2.3
Manganese/articles/waste	68994	610.81	4.0
Irn,smple stl shapes nes	67269	355.98	2.2
Nutmeg/mace/cardamoms	7525	264.70	1.2
Carbides of metals nes	52494	200.01	2.4
Portland cement	66122	142.21	7.2
Homogenized fruit preps	9813	119.28	0.2
Refined copper wire	68241	72.66	9.1
Talc/natural steatite	27893	70.70	0.3
Calcined gypsum,plaster	27324	55.36	0.2
Mixtures of diff juices	5996	54.80	0.6
Oranges,fresh or dried	5711	54.24	1.8
Natural quartz exc sand	27851	54.14	0.1
Marble etc., worked	66134	40.81	0.3
Bolivia : Share of products with RCA>=1=0.36			
Brazil nuts, fresh/dried	5772	1045.41	1.4
Silver ore/concentrates	28911	714.29	9.9
Crude natural borates	27894	371.27	0.2
Tungsten ore/concentrate	28792	314.09	0.3
Cereals grains nes	4599	301.34	0.7

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Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Felt hat bodies/forms ..	65761	255.63	0.1
Pile,chenille fabric nes	65495	203.39	0.1
Tin not alloyed unwrt	68711	137.50	4.2
Ores/concentrates nes	28799	87.22	0.2
Antimony/articles/waste	68993	85.75	0.1
Chestnuts, fresh/dried	5777	66.70	0.1
Oil cake of sunflower	8135	47.29	0.3
Crude safflower oil	42151	43.02	1.2
Crude soya bean oil	42111	39.81	2.3
Boric oxide and acid	52235	33.80	0.1
Oil cake of soya beans	8131	27.88	4.5
Refined soya bean oil	42119	24.63	0.3
Polyester fibre spinable	26672	24.62	0.0
Dried beans n.e.s.	5423	22.81	0.5
Silver unwrought	68113	18.79	1.7
Botswana : Share of products with RCA>=1=0.90			
Tin foil+backed t<.2	68723	2904.06	0.0
Cement copper	28322	2904.06	0.0
Vulcanized rubber film	58227	2904.06	0.0
Nonelec typewriter <12kg	75118	2904.06	0.0
Lignite based waxes	59831	2904.06	0.0
Tin tubes/fittings/etc	68724	2904.06	0.0
Copper dom cook/heat eq.	69734	2388.07	0.0
Inners for vacuum vessel	66512	2366.62	0.0
Bovine hide fresh/salted	21111	2096.87	0.1
Auto typewriters/wp mach	75113	2086.71	0.0
Headgear of felt	84841	2084.47	0.0
Record players nes	76333	1678.60	0.0
Thermo-copying apparatus	75135	955.06	0.0
Recording tape w<4mm	89841	491.33	0.0
Pipe and reed organs	89821	414.87	0.0
Telephone switch equipmt	76415	405.72	0.0
Nickel mattes	28421	314.96	10.9
Diamonds,sorted,cleaved	66722	295.59	58.3
Recorded tapes w>6.5mm	89867	258.03	0.0
Cartridges rivet gun etc	89121	257.73	0.0
Burkina Faso : Share of products with RCA>=1=0.74			
Oil cake of cotton seed	8133	614.35	0.4

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Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Tanned goat/kid leather	61161	232.09	0.1
Refined cotton seed oil	42129	190.50	0.1
Nonmon gld unwrt,semi-mf	97101	70.12	68.6
Cashew nuts, fresh/dried	5773	44.69	0.6
Dolomite	27823	40.72	0.1
Tanned sheep/lamb leathr	61151	38.57	0.1
Goats, live	122	33.10	0.0
Fixed vegetable oils nes	42299	22.59	0.1
Avocado/mango/guava frsh	5797	21.87	0.4
Sheep, live	121	20.62	0.1
Millet	4591	19.08	0.0
Cereals grains nes	4599	16.67	0.0
Crude linseed oil	42211	16.44	0.0
Dried beans n.e.s.	5423	15.74	0.4
Cut foliage, etc	29272	14.49	0.1
Bovine animals, other	119	13.70	0.6
Cereal, prepd nes ex rice	4814	13.59	0.0
Minrl moulding etc machn	72834	11.19	0.2
Brazil nuts, fresh/dried	5772	9.98	0.0
Burundi : Share of products with RCA>=1=0.90			
Tungsten ore/concentrate	28792	2526.90	2.5
Hides and skins nes, raw	21199	585.11	1.6
Coffee not roasted/decaf	7111	565.60	59.3
Coffee/substitute mixes	7132	427.98	0.3
Black tea, bulk	7414	351.05	8.3
Maize (corn) flour	4711	312.70	0.5
Cigarette paper nes	64155	87.16	0.2
Ores/concentrates nes	28799	71.96	0.1
Waste/scrap alloy st nes	28229	70.89	1.7
Toilet soap in bars etc.	55411	55.32	1.1
Mens/boys ensembles wovn	84123	37.91	0.2
Beryllium unwrght/waste	68991	37.14	0.0
Mate	7431	32.63	0.0
Footw all rub/plast weld	85111	31.38	0.0
Cigars etc(tobacco subs)	12231	22.55	0.0
Pepper crushed/ground	7512	18.42	0.0
Black tea, pack to 3kg	7413	17.81	0.2
Fish, live	3411	14.39	0.2
Siliceous fossil meals	27895	13.48	0.0

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Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Pharmacy plants nes	29249	12.98	0.2
Ethiopia: Share of products with RCA>=1=0.79			
Goat meat,fresh/chld/frz	1213	804.47	1.4
Dried broad/horse beans	5425	674.83	1.4
Nb/ta/va ore/concentrate	28785	441.03	0.7
Prepd sheep/lamb leather	61152	299.82	1.9
Coffee not roasted/decaf	7111	291.20	30.5
Nat gums/resin/etc nes	29229	281.42	0.5
Color wovn cotn nes<200g	65293	257.52	0.1
Dried chickpeas	5422	227.18	1.3
Ginger (excpt preserved)	7527	189.54	0.9
Vegetables nes,frsh/chld	5459	165.57	10.7
Dried legumes nes	5429	160.51	0.3
Cut flowers	29271	114.48	6.3
Insect waxes/spermaceti	43142	103.94	0.1
Dried beans n.e.s.	5423	96.68	2.2
Cotton (>85 percent)yarn,retail	65131	80.19	0.1
Bovine animals, other	119	73.42	3.4
Cotton yarn nes, retail	65132	69.37	0.1
Dried lentils	5424	56.44	0.7
Wovn viscose rayon fabrc	65351	53.44	0.0
Offal,sheep etc frozen	1256	52.34	0.1
Kazakhstan : Share of products with RCA>=1=0.02			
Beryllium unwrght/waste	68991	208.56	0.0
Chromium oxides	52252	53.53	0.001
Titanium unwrought/waste	68983	34.09	0.2
Cadmium unwrought/waste	68982	21.13	0.0
Chromium ore/concentrate	28791	20.74	0.4
Tantalum unwrought/waste	68913	12.49	0.0
Salts of metallic acids	52431	5.76	0.1
Other inorg cmpounds nes	52499	3.44	0.0
Slag/ash nes(incl kelp)	27869	3.41	0.0
Ores/concentrates nes	28799	2.74	0.0
Slate, slabs	27311	2.63	0.0
Bismuth/articles/waste	68992	2.43	0.0
Lead oxides	52257	2.34	0.0
Ivory/tortoise-shell/etc	29116	1.75	0.0
Asbestos/fibre cemnt art	66183	1.63	0.0

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Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Nonmon gld unwrt,semi-mf	97101	1.54	1.5
Ambergris/civet/musk/etc	29198	1.33	0.0
Kyrgyz Republic : Share of products with RCA>=1=0.72			
Limestone etc for cement	27322	124.64	0.2
Dried beans n.e.s.	5423	121.20	2.7
Slate, slabs	27311	100.54	0.1
Wool, greasy, nes	26819	78.08	0.0
Leather waste/dust etc.	21191	73.86	0.0
Artificial fur/articles	84832	69.77	0.0
Nonmon gld unwrt,semi-mf	97101	52.64	51.5
Elec filament lamps nes	77821	45.34	1.5
Root vegetables,frsh/chd	5455	41.29	0.4
Concrete articles nes	66334	35.96	0.4
Stone fruit nes, fresh	5793	34.68	1.1
Nat barium sulphate,carb	27892	32.95	0.1
Beet/other molasses	6159	31.75	0.1
Lignite,agglomerated	32222	30.74	0.0
Milk (fat 1 percent-6 percent)	2212	29.22	0.9
Walnuts, fresh/dried	5776	27.91	0.3
Tanned sheep/lamb leathr	61151	27.20	0.1
Mutton fresh/chilled	1211	25.12	0.4
Wom/girl suits woven	84221	24.82	0.2
C-f ir/st bar nes c>0.6 percent	67633	23.36	0.2
Malawi : Share of products with RCA>=1=0.27			
Dried legumes nes	5429	332.43	0.7
Black tea, bulk	7414	320.13	7.6
Cotton yarn waste	26331	213.28	0.1
Cotton waste n.e.s.	26339	169.53	0.3
Coffee/substitute mixes	7132	159.01	0.1
Fire extinguishr charges	59894	158.27	0.3
Peas	5421	118.20	1.2
Nuts edible,frsh/dry nes	5779	105.41	1.0
Pepper crushed/ground	7512	85.22	0.1
Natural rubber nes	23129	76.52	0.9
Cotton yarn nes, retail	65132	73.46	0.1
Raw cane sugar	6111	65.70	6.5
Groundnuts shelled	22212	60.32	0.6
Gloves etc not knit/croc	84614	56.53	0.3

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Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Dried chickpeas	5422	38.62	0.2
Gin/geneva	11245	37.73	0.2
Indus weighing machines	74531	35.84	0.4
Blankets of textiles nes	65839	28.24	0.0
Refined cotton seed oil	42129	27.38	0.0
Textile sacks/bags nes	65819	27.09	0.0
Mali : Share of products with RCA>=1=0.90			
Tanned goat/kid leather	61161	262.47	0.2
Sheep, live	121	144.77	1.0
Tanned sheep/lamb leathr	61151	91.68	0.2
Nonmon gld unwrt, semi-mf	97101	83.58	81.8
Millet	4591	81.98	0.1
Bovine animals, other	119	54.60	2.5
Cotton yarn waste	26331	51.16	0.0
Nit-phos-pot fertilzr nes	56291	48.71	1.6
Goats, live	122	40.88	0.0
Avocado/mango/guava frsh	5797	40.44	0.8
Cotton (>85 percent)yarn, retail	65131	35.52	0.0
Plaits, plaited products	89979	26.75	0.0
Alloy steel nes bars nes	67644	25.48	0.1
Mobile drilling derricks	78223	19.43	0.0
Synth fibre nes spinable	26679	12.70	0.0
Parts nes hydraul turbin	71819	9.35	0.1
Degras-fat residues	43133	8.85	0.0
Postcards etc	64222	8.51	0.0
Groundnuts in shell	22211	6.65	0.0
Gum arabic	29222	6.28	0.0
Moldova : Share of products with RCA>=1=0.67			
Walnuts, fresh/dried	5776	452.65	5.7
Calcined gypsum, plaster	27324	217.25	0.8
Apple juice	5994	140.82	2.2
Brandies/marcs etc.	11242	108.17	3.5
Crude safflower oil	42151	107.76	3.1
Oil cake of sunflower	8135	106.80	0.7
Wine lees/argol	8194	105.22	0.0
Beet/other molasses	6159	88.17	0.2
Sweet corn	5677	85.94	0.5
Still/fortified wines	11217	83.83	14.0

Continued on next page

Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Hoopwood,split poles etc	63491	82.51	0.1
Refined safflower oil	42159	77.36	1.3
Gypsum and anhydrite	27323	75.71	0.2
Carpet,woven,wool/hair	65951	71.00	0.3
Tomato juice	5992	69.99	0.0
Glass bottles/jars/etc	66511	62.68	3.4
Beef, frozen, bone in	1121	57.75	0.4
Fruit temp preserved	5821	57.47	0.1
Hide preparation equipmt	72481	56.96	0.1
Electro/plasma mach tool	73114	45.88	0.1
Nepal : Share of products with RCA>=1=0.85			
Jute etc sacks/bags	65811	2609.56	3.3
Cotton sacks/bags	65812	1272.22	1.0
Woven fabr frm strip etc	65312	1128.97	6.3
Copper kitchen equip nes	69742	1089.49	0.8
Veg material/product nes	29299	844.99	2.2
Tanned goat/kid leather	61161	727.92	0.4
Carpet,knotted,wool/hair	65921	660.63	7.0
Wovn viscose rayon fabrc	65351	645.87	0.4
Dried lentils	5424	498.11	6.1
Nutmeg/mace/cardamoms	7525	433.08	1.9
Felt impregnated etc	65719	425.45	0.6
Plaiting materials nes	29239	389.69	0.1
Syn stap(>85 percent)yarn bulk	65182	337.83	6.0
Terry towelling exc cotn	65496	330.42	0.0
Woven cotton terry nes	65213	330.35	0.2
Irn/steel pipes/etc nes	67949	225.93	2.0
True hemp raw/retted	26521	198.77	0.0
Tomato juice	5992	166.87	0.1
Ginger (excpt preserved)	7527	157.67	0.7
Textile sacks/bags nes	65819	143.70	0.1
Niger : Share of products with RCA>=1=0.42			
Goats,live	122	2150.01	1.3
Mobile drilling derricks	78223	251.02	0.4
Sheep,live	121	242.56	1.7
Bovine animals, other	119	119.60	5.5
Woven cotton print <200g	65234	108.33	2.7
Bulk text wste/old cloth	26901	107.48	2.3

Continued on next page

Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Onions/shallot,frsh/chld	5451	88.49	2.0
Veg prods nes frsh/dried	5489	81.35	0.4
Graders/levellers-constr	72312	69.69	0.9
Earth-moving scrapers	72331	64.23	0.1
Tanned goat/kid leather	61161	47.84	0.0
Horses	151	46.87	0.7
Self prop shovel/exc nes	72329	44.63	0.9
Tanker trailers/semi-	78622	33.79	0.2
Legumes, fresh/chilled	5457	29.12	0.2
Road rollers/tampers	72333	26.41	0.4
Dates, fresh/dried	5796	25.51	0.1
Mnrl mixing,kneading mch	72833	21.93	0.3
Green tea, bulk	7412	20.22	0.0
Blankets of textiles nes	65839	19.90	0.0
Paraguay : Share of products with RCA>=1=0.45			
Wood charcoal-natural	24502	215.85	0.8
Beef fresh/chld boneless	1112	133.70	11.0
Milking machines	72131	111.40	0.2
Beef, frozen, boneless	1122	91.38	8.3
Crude soya bean oil	42111	85.16	04.9
Fruit peel, temp presvd.	5822	66.75	0.0
Beef offal, frozen	1252	64.92	0.7
Tanned bov/equin leather	61141	62.81	1.4
Railway sleepers untreat	24811	55.17	0.0
Manioc (cassava) starch	59214	46.22	0.3
Maize (corn) starch	59212	44.94	0.2
Oil cake of soya beans	8131	43.83	7.1
Bran, etc of legumes	8123	38.14	0.1
Fixed vegetable oils nes	42299	34.64	0.2
Mate	7431	28.95	0.0
Railway sleepers treated	24819	28.47	0.1
Woven fabr frm strip etc	65312	22.94	0.1
Meat meal fodder	8141	19.74	0.2
Crude safflower oil	42151	18.98	0.5
Essential oils-citrus	55131	18.36	0.1
Rwanda : Share of products with RCA>=1=0.73			
Nb/ta/va ore/concentrate	28785	6323.13	9.4
Tungsten ore/concentrate	28792	3591.61	3.6

Continued on next page

Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Coffee/substitute mixes	7132	1863.76	1.4
Tanned goat/kid leather	61161	887.02	0.5
Black tea, bulk	7414	642.40	15.2
Bran, etc of wheat	8126	286.79	1.1
Coffee not roasted/decaf	7111	258.85	27.1
Ores/concentrates nes	28799	190.55	0.4
Black tea, pack to 3kg	7413	172.64	1.9
Zirconium ore/concentrat	28784	153.67	0.7
Coffee decaff not roastd	7112	131.25	0.6
Fish/shellfish waste	29196	66.82	0.2
Chromium ore/concentrate	28791	66.03	1.2
Nat gums/resin/etc nes	29229	65.52	0.1
Maize (corn) flour	4711	61.53	0.1
Veg root/tubr flour/meal	5647	48.04	0.0
Unit construct machines	73122	46.69	0.0
Collages/decor plaques	89612	44.02	0.1
Bovine animals, other	119	41.70	1.9
Seal skins, raw	21226	38.53	0.1
Uganda : Share of products with RCA>=1=0.78			
Coffee/substitute mixes	7132	1232.72	0.9
Fish liver/roe,frsh/chld	3419	932.67	0.3
Vanilla	7521	660.26	0.004
Cobalt ore/concentrate	28793	411.97	0.4
Fish fillets/meat,frs/ch	3451	326.72	8.1
Animal skin leather nes	61179	303.38	0.7
Black tea, pack to 3kg	7413	282.65	3.2
Coffee not roasted/decaf	7111	220.99	23.2
Fish/shellfish waste	29196	211.37	0.5
Fish fillets,dried/saltd	3512	198.85	0.7
Tanned goat/kid leather	61161	179.42	0.1
Postcards etc	64222	176.21	0.1
Irn/steel pipes/etc nes	67949	174.80	1.5
Green tea, bulk	7412	139.89	0.3
Maize (corn) flour	4711	126.86	0.2
Fish(ex cod)dried/salted	3513	124.40	0.6
Portland cement	66122	120.40	6.1
Cereal,prepd nes ex rice	4814	112.16	0.3
Cinnamon,etc whole	7522	103.59	0.1
Black tea, bulk	7414	100.45	2.4

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Table 3A.1 – Continued from previous page

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Zambia : Share of products with RCA>=1=0.86			
Cobalt ore/concentrate	28793	1501.11	1.6
Cobalt wrt/articles nes	69981	554.07	2.7
Refined copper sheet etc	68251	267.38	9.5
Hydraulic lime	66113	177.28	0.0
Copper refined	68212	135.50	62.3
Cobalt oxides/hydroxide	52255	119.89	0.3
Copper alloys nes unwrt	68214	93.70	1.2
Oil cake of cotton seed	8133	65.40	0.0
Sulphuric acid;oleum	52232	60.76	0.3
Bran, etc of maize	8124	51.62	0.1
Sulphur, pure forms	52226	47.81	0.1
Limestone etc for cement	27322	35.55	0.1
Ores/concentrates nes	28799	31.94	0.1
Master alloys of copper	68213	27.55	0.0
Quicklime	66111	20.70	0.1
Raw cane sugar	6111	19.94	2.0
Prec.metal ore/conc nes	28919	17.34	0.3
Refined copper wire	68241	16.72	2.1
Mobile drilling derricks	78223	15.18	0.0
Copper nail/tack/staple	69431	14.69	0.0
Zimbabwe : Share of products with RCA>=1=0.66			
Indust diamonds,sawn etc	27711	2423.99	6.8
Oil cake of cotton seed	8133	438.44	0.3
Nickel mattes	28421	397.35	13.8
Unissued banknotes etc	89283	396.21	17.5
Hides and skins nes,raw	21199	181.08	0.5
Ferro-chromium alloys	67153	122.90	6.1
Diamonds,rough,unsorted	66721	103.34	2.4
Prim form iron/steel nes	67245	83.04	0.1
Ferro-silico-chromium	67154	78.25	0.0
Magnesite	27824	73.19	0.0
Chromium ore/concentrate	28791	69.11	1.2
Hand sieves and riddles	89981	45.70	0.0
Granite/sandstone/etc	27313	36.59	0.4
Pipe tobacco etc.	12232	28.59	0.5
Veg tann extrcts,tannins	53221	27.57	0.1
Woven cottn unbl>200g/m2	65222	25.42	0.1

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Table 3A.1 – *Continued from previous page*

SITC Rev3 dig 5 Prod. Des.	Productcode	RCA	Share%
Syn stap(>85 percent)yarn retl.	65181	25.05	0.0
Prec/semi-p stone shaped	66731	24.70	0.4
Other alloy stl profile	67688	22.36	0.1
Ploughs	72111	19.64	0.1

Source: Author's Calculation, using data from COMTRADE (2012)

Table 3A.2: DESCRIPTIVE STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
Exports (log)	141848	9.322	3.602	-4.90	21.76
Bilateral RER (log)	134121	4.626	0.341	1.59	8.06
GDP (log GDP i,t)	138903	23.281	2.029	16.24	28.62
Partners GDP (log GDP j,t)	139679	24.563	2.207	19.04	30.09
Per Capita GDP (log)	138903	7.035	1.104	4.06	9.58
Partners per capita GDP (log)	139679	8.291	1.567	4.69	10.94
Openness (Tariff Rate percent)	113688	9.943	6.673	0.00	112.57
Relative Factor Endowment (log)	136801	8.105	1.730	-3.82	10.94
Distance (log D i, j)	141689	8.651	0.828	4.45	9.89
Common Boarder (Dummy)	141689	0.03	0.17	0	1
Landlockedness	141848	0.19	0.39	0	1
Common Language (Dummy)	141689	0.17	0.38	0	1
Regional Trade Agreements	141848	0.09	0.28	0	1
Africa	141848	0.29	0.45	0	1
EUTC	141848	0.10	0.30	0	1

Table 3A.3: CORRELATION MATRIX

	lexports	lreer	lgdp	lgdp-p r	lgdppc	lgdppc r	tariff	lrlf	ldist	contig	llock	comlan f	rta	africa	EUTC
lexports	1.00														
lreer	0.01	1.00													
lgdp	0.46	0.04	1.00												
lgdp-partner	0.40	-0.04	-0.19	1.00											
lgdppc	0.17	0.10	0.34	-0.08	1.00										
lgdppc-par r	0.20	-0.03	-0.11	0.54	0.00	1.00									
tariff	-0.10	0.01	-0.08	0.00	-0.17	-0.03	1.00								
lrlf	0.16	0.01	-0.05	0.45	0.08	0.78	-0.03	1.00							
ldist	-0.14	0.04	0.14	0.18	0.07	0.10	0.00	0.16	1.00						
contig	0.16	-0.01	0.02	-0.05	-0.03	-0.13	-0.02	-0.16	-0.39	1.00					
llock	-0.17	-0.09	-0.37	0.12	-0.43	0.06	-0.08	0.02	-0.09	0.04	1.00				
comlang-off	0.01	-0.01	-0.14	-0.12	-0.03	-0.08	0.12	-0.08	-0.25	0.15	0.01	1.00			
rta	0.17	-0.02	-0.04	-0.08	0.06	-0.07	-0.08	-0.12	-0.44	0.28	0.02	0.15	1.00		
africa	-0.20	-0.07	-0.36	0.07	-0.50	-0.01	0.12	-0.02	-0.03	0.02	0.23	0.18	-0.01	1.00	
EUTC	0.05	-0.20	-0.03	0.04	-0.04	0.03	-0.24	0.01	-0.18	0.04	0.27	-0.14	0.03	-0.20	1.00

Note: For details of variables, see Table A.1. Variables are in the same order.

Table 3A.4: EXPORTS, LANDLOCKEDNESS, TRADE COSTS AND TARIFFS

<i>Dependent Variable: export (log)</i>	(POLS)	(RE)	(RE)
Landlockedness (llock-dummy)	-1.828*** (0.027)	-1.783*** (0.077)	0.045 (0.835)
Distance (log Dij)	-0.725*** (0.012)	-0.834*** (0.038)	-0.793*** (0.043)
ldist*llock			-0.214** (0.097)
Openness (Tariff Rate percent)	-0.059*** (0.002)	-0.043*** (0.001)	-0.043*** (0.001)
<i>Number of observations</i>	113,688	113,688	113,688
<i>Number of country pairs</i>		11,878	11,878
<i>F-statistics</i>	2,767.27		
<i>R-squared</i>	0.07	0.06	0.06

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 3A.5: BASIC GRAVITY MODEL: DEVELOPING COUNTRIES

<i>Dependent Variable: export (log)</i>	(POLS)	(RE)	(FE)
Exporter's GDP (log)	1.095*** (0.003)	1.072*** (0.009)	0.655*** (0.031)
Importer's GDP (log)	0.911*** (0.003)	0.929*** (0.008)	1.397*** (0.036)
Distance (log)	-1.367*** (0.008)	-1.408*** (0.024)	
Number of observations	136,801	136,801	136,801
Number of country pairs	12,239	12,239	12,239
F-statistics	54,164.76		4,348.32
R-squared	0.54		0.07
Corr.			-0.37

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Export Performance of a Landlocked Country: The Case of Nepal

Summary

This chapter examines the determinants of the export performance of Nepal, a landlocked developing country. Following an overview of Nepal's policy reforms and trade relations with India, and an analytical narrative of the export performance of Nepal over 1980-2010, an econometric analysis of the determinants of export performance is undertaken using the gravity modelling framework. Given the high trade costs resulting from landlockedness, Nepal seems to do better at exporting high value-to-weight products compared to the low value-to-weight products. The results also suggest that real exchange rate appreciation, resulting mainly from the current practice of pegging the Nepalese Rupee to the Indian Rupee, adversely affects exports to third country markets. Both the real exchange rate appreciation and lower Nepalese tariffs on a number of product lines compared to Indian tariffs seem to compound the heavy dependence of Nepalese exports on the Indian market.

4.1 Introduction

Poor export performance is generally identified as a major constraint on the economic performance of landlocked developing countries (LLDCs) (Feder 1983, Fosu 1990, Collier & Gunning 1999*b*, MacKellar et al. 2000, Raballand 2003, Faye et al. 2004, Easterly et al. 2009). However, there are no detailed country-level studies on export performance of landlocked countries in the literature. The purpose of this chapter is to investigate the determinants of export performance of a landlocked developing country, using Nepal as a case study.

There are several reasons for selecting Nepal for the case study: first, Nepal is one of the LLDCs whose economic fortune depends heavily on its southern giant neighbour, India. Over two-thirds of Nepal's trade is with India. Nepal also depends entirely on the trade-related logistics of India in its trade with the world, except for China. Second, Nepal's exports have not responded as anticipated to liberalisation reforms undertaken much earlier than in many other developing countries. Nepal became the first least developed country to join the World Trade Organisation (WTO) in April 2004. The impact of these policy shifts have not yet been thoroughly investigated. Third, there has not yet been an in-depth analysis of export performance of Nepal using product level data.

This study is focused on the following research questions: why has Nepal's export performance been so poor? Where does the international competitiveness of Nepalese exports come from? What types of product lines are important for Nepalese exports? Is there a Gulliver effect (the Gulliver effect refers here to the influence of Indian trade policies on Nepalese international trade as used by Blejer & Szapary (1991)) on Nepal's export performance?

The strategy adopted to address these questions is follows: first, a descrip-

tive analysis of export performance of Nepal is undertaken with a focus to identify the specific product lines in which Nepal has revealed comparative advantage (RCA). Second, an empirical analysis is made of the determinants of export performance employing the standard gravity modelling framework. The analysis is done using a newly-constructed product-level panel dataset (at the three-digits level of the Standard International Trade Classification (SITC)) covering the period 1980-2010. Emphasis is given to the implications of the export dependence on Nepal's large neighbour, India, for its export performance (the 'Gulliver effect' as Blejer & Szapary (1991) defined).

The key inferences from this chapter are: Nepal as a landlocked country may need to focus on high value-to-weight products to improve its export performance. There is a case for paying attention to the adverse implications of the current practice of pegging the Nepalese Rupee to the Indian Rupee for the diversification of exports to third country markets; the results suggest that this practice is one of the causes of the poor performance of exports to the rest of the world. In addition, apart from the transportation costs, Nepal's political instability is one of the major causes of the slow growth of its exports to countries other than India. An increase in exports to India partly reflects trade deflection – the re-routing of imports by Indian firms via Nepal in order to benefit from the lower Nepalese import duties compared to India on some products.

This chapter proceeds as follows: Section 4.2 presents a brief introduction of Nepal including geography, political history, and economy. Section 4.3 discusses policy and logistic contexts. Section 4.4 presents an overall export performance scenario of Nepal. Section 4.5 explores the determinants of export performance discussing the model, methodology, and estimated results. The final section concludes with some policy inferences.

4.2 Nepal as a Landlocked Country: Overview

4.2.1 Geography

Nepal is a landlocked country with a land area of 147,181 square kilometres and estimated population of almost 29 million in 2011 (Central Bureau of Statistics 2010). The main geographical features include mountains in the north, hills in the middle, and plains in the south. Nepal borders China in the north and India in the east, west and south. Because of the difficult mountainous terrain, trade infrastructure is very costly to build in the northern most area for connecting with China. Only the narrow 'Araniko Highway' is available to trade with China. Also, the quality of the highway itself and the lack of trade infrastructure along this highway cause many bottlenecks. Unless heavy investment is made that would improve trade logistics in the northern part of the country, trade with and via China will remain very difficult. Thus, logistically it is true to say that Nepal is surrounded by India. Because of these geographical features, over 90 percent of Nepal's external trade takes place via India through the Kolkata port which is located 1300 kilometres away from Kathmandu, Nepal's capital. Therefore India's trade policies and the quality of trade infrastructure in India play an important roles in determining the costs of Nepalese exports.

Nepal is rich in natural resources, particularly natural beauty, mountains, rivers, and biodiversity. It is said that it has the world's second largest potential in hydro power after Brazil, but the country runs on regular load-shedding and suffers regular black-outs (Upadhaya 2008). The climate and the country's natural beauty have great potential for the tourism industry; World Heritage sites like Lumbini, the birth place of Buddha (the founder of Buddhism) and many other places are frequently visited by tourists. Mount Everest and other eight out of the 10 highest mountains in the world are in Nepal (Enterprise Europe Network 2008). A wide

diversity of cultures, religions and rituals are also found in Nepal, adding to the potential for tourism in three ways: first, general tourism to exploit the natural beauty and many suitable places for trekking, mountaineering, hiking, and boating. Second, religious tourism targeting Hindus and Buddhists, both of whom have strong connections with Nepal and people from both religions want to visit there at least once in their life time, if the country runs smoothly and peacefully. Third, due to the suitable climate and temperature throughout the year, sports tourism has other possibilities.

4.2.2 The India Factor and Trade Costs

Because of its geographic proximity, India is the biggest trading partner of Nepal and also has a close relationship at the people's level. Nepal has no option other than to cope with the trade policy stance of its Gulliver neighbour (Blejer & Szapary 1991). India's influence is reflected in Nepal's exchange rate, price level and, hence, in the trade volume (see Section 4.3 and 4.4 for details).

Trade costs are an important factor of international trade (Finger & Yeats 1976, Amjadi & Yeats 1995). Landlocked countries face inevitable barriers to trade because of their location and the trade constraints imposed by it (Collier & Gunning 1999*b*, Faye et al. 2004). A growing body of literature has highlighted the negative impact of trade costs on the volume of trade (Anderson & Wincoop 2004). Finger & Yeats (1976) found that transportation costs are comparatively higher for products exported from developing countries compared to products exported from developed countries. Amjadi & Yeats (1995) concluded that high transportation costs and trade policies were responsible for the weak trade performance in the Sub-Saharan African region. Faye et al. (2004) argue that transportation and insurance costs are higher in landlocked countries by nine percent. Theoretically, trade costs comprise: trans-

portation costs, tariff costs, and the costs associated with unreliable supply chains due to the poor infrastructure and other administrative burdens in the transit countries. Transportation costs are comparatively higher in landlocked countries not only because of the long distances to travel to reach a seaport, but also because of the costs associated with the unreliable supply chain caused by administrative burdens and other customs procedures (Arvis et al. 2007). The literature suggests that landlockedness imposes exogenous costs on exports, making them not only expensive, but also more vulnerable, thus uncompetitive.

Trade policies play a vital role in improving export performance (Santos-Paulino 2002, Alvarez 2011), but other factors are also important. These include the logistic environment. On the trade logistics, exporters from Nepal have to travel more than 1000 kilometres to reach Kolkata seaport in India via road transport, the dominant mode of transport in and out of Nepal. The alternative seaport is Chittagong seaport in Bangladesh, which is a almost similar distance to Kolkata but travelling the 17 kilometres of distance via India, raises other complexities. Nepal's transportation costs could be substantially reduced if India extended transit facilities to reach the seaport in Bangladesh (Dubey 2010). In addition, as part of the infrastructure for trade, three Inland Clearance Depots (ICD)- dry ports are operating in Bhairahawa, Birgunj, and Biratnagar (all these cities of Nepal are in the border area with India) but the quality and operation of these dry ports have not been efficient enough to reduce the transportation costs effectively.

An alternative mode of transportation for international trade is air cargo, which is more cost effective generally for light products. In Nepal, only 17.63 million Kgs. of cargo (imports and exports) were handled by air services in 2009 via 20 international air lines networks in 35 countries. About 17 percent of total exports used air transportation in the same year. Railway transport could be a more efficient way to connect to Kolkata seaport to export to third countries; it would also be a

very effective means of transport to connect the wider Indian market via one of the biggest railway networks in the World. Unfortunately, Nepal has a very limited (about 56 kilometres) railway facility to connect with the Indian rail network, and the rail network in Nepal is not reliable. Of the 56 kilometres of railway lines, only 29 kilometres are being used because of managerial inefficiency (Rajkarnikar 2010). Moreover, the railway network has never been a priority item on the agenda of the policy makers in the country.

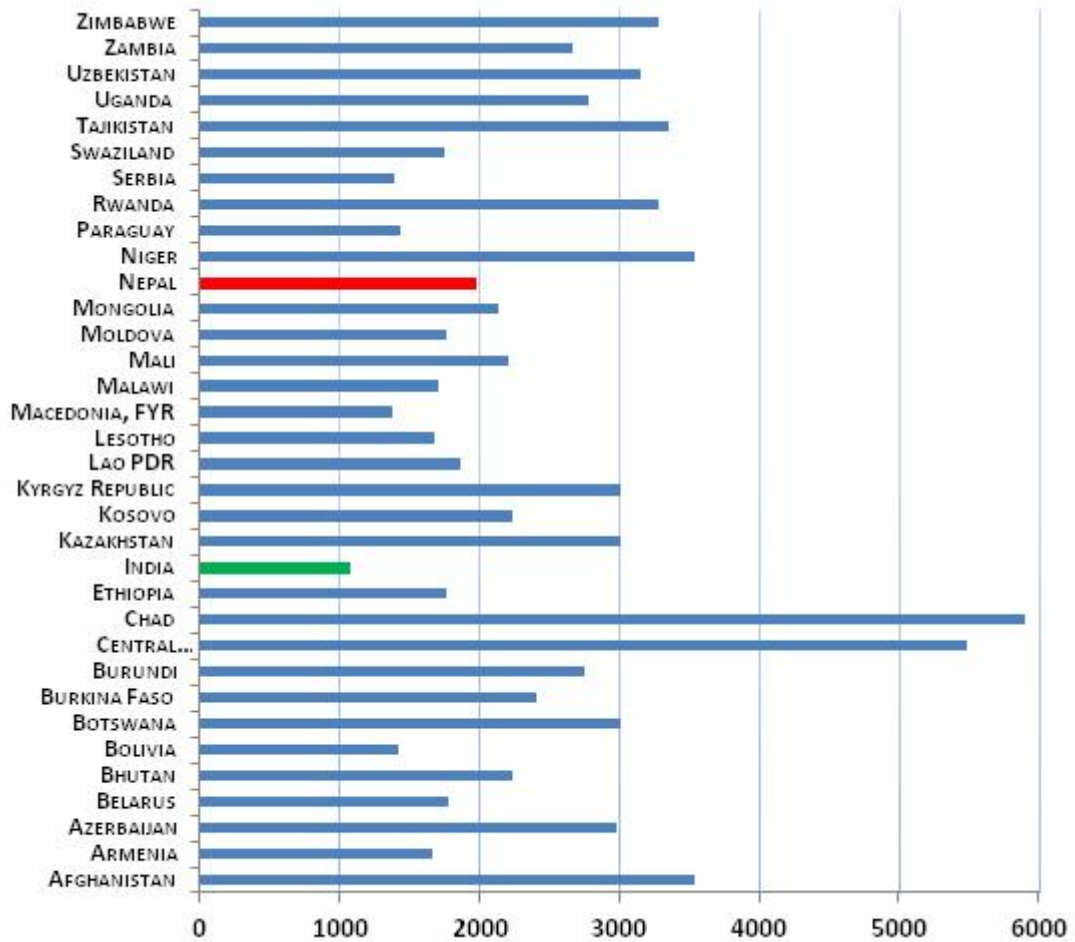
Table 3.4 of Chapter 3 shows that Nepal lacks the quality infrastructure and other logistics needed for international trade. The logistic environment can be built up with a combination of a series of other aspects of the political economy of a country such as macroeconomic management, political stability and improving the trade infrastructure rapidly. Nepal's logistic environment is very poor. For example, the World Bank ranks 183 countries in terms of ease of doing business across ten dimensions: the process to start a business, process of construction permits, electricity facility for business, registration of property, credit facility, protection of investors, tax infrastructure, trading across borders, enforcement of contracts, and resolution of insolvency. Nepal stands in the 110th position on the ease of doing business. The logistic performance index (LPI) is constructed based on the efficiency of customs clearance, quality of trade and transport infrastructure, condition of shipments, quality of logistic service and consignment handling, using a number of qualitative and quantitative indicators of the domestic logistics environment. In this category, Nepal stood at 151st with 2.04 score in 2012 (World Bank 2012a). The time required to export from Nepal is substantially higher, 41 days, compared to 5 days in the top ranking countries in the world.

Trade cost disadvantages arising from landlockedness are compounded by Nepal's own institutional constraints. The documents needed to export reflect the lengthy procedures to participate in the export trade. Nepalese exporters are re-

quired to fill out nine documents to get government approval for exporting, compared to an average of five in other landlocked countries.

Costs to export one 22-foot container is calculated by the World Bank, and is included in all trade related administrative costs of either imports or exports of a country, excluding tariffs and duties *World Bank (2012a)*. These costs to export data show that in Nepal, it costs US\$1960 per container to export, which seems to be moderate costs compared to other landlocked developing countries. Figure 4.1 shows that Nepal's costs are higher by almost US\$1000 per container compared to India. If Chad and Central African Republic are considered outliers, Nepal's costs to exports become far higher than those of many other LLDCs and close to the average for LLDCs. These figures imply that because of higher transportation costs, exporting from Nepal becomes uncompetitive.

Figure 4.1: COSTS PER 22-FOOT CONTAINER TO EXPORT IN 2010 (US\$)



Source: Based on data compiled from World Bank (2012a)

4.2.3 Political Environment

The warrior King Prithvi Narayan Shaha unified many small states to bring about the present shape of Nepal in the 18th century. It was ruled by the Rana regime (an elite feudal system) for 104 years, until 1951. In 1961 the Monarchy suppressed the political parties and ran the country with a party-less political system called the “Panchayat system”, and due to political unrests in 1979, 1985, 1989 and 1990 finally,

a “multiparty system” was re-established in 1989/90 (Brown 1995, Enterprise Europe Network 2008).

For over three decades, until 1989, there was political stability in the country under the Panchayat regime. However, in 1989 political instability arose after the multi-party democracy was restabilised in place of the Panchayat regime. Successive democratic governments failed to address the long-standing economic problems of mass unemployment, widespread poverty and income disparities, and the marginalisation of the rural economy within the broader national economy. Overall economic performance during this period failed to match the economic expectations associated with greater political freedom in the era of democratization. The government initiated a number of reform programs but the impacts of these reforms on both economic growth and poverty were very limited. For example, GDP growth rates, which averaged around five percent per annum during the 1990s, were not significantly higher than during the 1980s, and growth was concentrated predominantly in urban areas. People living in rural areas, accounting for over 85 percent of the total population, and most of the lower middle income and low income class people in urban areas, felt that they were deprived. The resultant simmering political tension was compounded by the fact the traditional elites continued to maintain their dominance in power and state activities ((Brown 1995, Deraniyagala 2005)). This situation has resulted poor institutional development and the quality of the governance has declined.

This volatile economic and political situation provided the breeding ground for the rapid expansion of the power base of the Nepal Communist Party-Maoist (CPN-Maoist). The Maoists embarked on a violent armed uprising, “Jana Yudda” (Peoples’ war), in 1996 in rural areas, and this spread to urban areas, including the

capital, Kathmandu, by 2001.¹ Peace talks between the government and the Maoists began in 1997. After several rounds of negotiations, a peace agreement was signed in 2006. The 240 years of the monarchy system was abolished and a constitutional assembly election was held in May 2008. However, the country is still in political turmoil because no political party was able to gain majority support in the elections.² Over the past five years the country has seen five short-lived governments which primarily involved in unsuccessful efforts to remain in power rather than focussing on economic issues. Political turmoil continues to be the major constraint on overall economic performance of the country.

4.2.4 The Economy

Nepal ranks 105th in the world according to the size of its economy (measured by GDP), and 45th in terms of the size of the population World Bank (2010). The Nepalese economy has been growing by only about three and half percent on average per annum for the last half century, and per capita GDP was just US\$534 in 2010. Nepal has been unable to double its real per capita GDP in the last three decades.

In terms of sectoral contribution of GDP, agriculture was the dominant contributor in Nepal's GDP until 2000. Since then, the share of the service sector has increased rapidly. Over the past five years the service sector has accounted for almost half of total GDP. The manufacturing sector's share has remained around eight percent, with a modest decline in recent years, although it was growing consistently

¹For details on the causes and impacts of the Maoist uprising see Deraniyagala (2005), Sharma (2006), Do & Iyer (2007).

²The detail of the seats in constituent assembly is follows: of a total of 601 (240+335+26) seats in parliament, 240 are elected directly from constituency, 335 elected from proportionate electoral system, and 26 nominated as per recommendation made by the council of ministers. CPN Maoist secured total of 220 (120+100), Nepali Congress (NC) 110 (37+73), Communist Party of Nepal- Unified Marxist and Leninist (CPN- UML) 103 (33+70) and other 25 parties and independent 142 (50+92)(Election Commission of Nepal 2008).

with some fluctuation after 2008 (Table 4.1). Nepal's export growth has been only a seven and a half percent per annum on average for the duration of 1980-2010.

Table 4.1: SECTORAL VALUE ADDED % OF GDP

Year	Agriculture	Service	Industry	Manufacturing
1965	65.5	23.5	11.0	3.3
1975	71.8	20.1	8.2	4.2
1985	51.7	33.2	15.1	5.7
1995	41.8	35.5	22.8	9.5
2000	40.8	37.0	22.1	9.4
2005	36.3	46.0	17.7	8.2
2006	34.6	48.2	17.2	7.8
2007	33.6	49.3	17.1	7.7
2008	32.7	49.9	17.3	7.6
2009	34.0	49.6	16.4	7.2
2010	36.5	47.9	15.6	6.5

Source: Compiled from World Bank (2012b).

4.3 Policy Contexts

4.3.1 Trade Policies

Nepal has passed through three distinct phases of trade policy: a free trade regime (1923-1956), a protectionist regime (1956-1986), and towards a relatively open regime from 1986 onwards. Notably, all these regimes are fundamentally followed the mixed economy concept. Nepal embarked on market-oriented policy reforms in the mid-1980s replacing the inward-oriented policy that failed to fulfill growth and development objectives (Sharma 2001, Karmacharya 2001). However, a major policy reform occurred in the early 1990s (Acharya et al. 2003). Nepal became the first least developed country to join the WTO in April 2004. Since 2001/02, the liberalisation trend

was slightly reversed imposing some import taxes in addition to customs duties and this situation remain unchanged until 2010 (Pursell 2011).

As explained earlier in Chapter 2, one of the major indicators of policy direction in international economics is openness, which is measured mainly in three ways: the Sachs and Warner criteria for openness, tariff rates and trade as percentage of GDP. All of these indicators have their shortcomings but jointly they provide more reliable information. The Sachs and Warner index of trade reform consists of five categories to define a country to be either open or closed.³ Based on this index, Nepal has been maintaining an open trade regime since 1991.

Table 4.2 presents the weighted average applied tariff rates for all products in Nepal and India. The data are calculated over a five-year period average. The data show that during 1990-95, Nepal's tariff rates were lower, at 22 percent on average compared to almost 60 percent for India's. During 1995-2000, Nepal's rates remained unchanged, while India reduced tariff rates heavily to 26 percent. Nepal's tariff rates were lower than those of India from 2000 to 2005. The average rate declined in Nepal from 2005 to 2010, falling to 15.5 percent, but India reduced much faster in this period, to on average of just seven percent. This situation suggests that Nepal has the space to reform its trade policies to match the standards of its main trading partners. The aggregate tariff structure of India seems much smaller in overall than that of Nepal, but still India remains protective of many Indian industries with higher levels of tariff to import from other countries than Nepal. These industries include medical instruments, rolled plated metal and steel, wires, copper, aluminium, metal store and household equipment.⁴

³See Chapter 2 for details

⁴For example preferential duty is zero on metal products, but there are other charges such as basic duty of five percent, additional duty of 12 percent, special duty about four percent, and other nominal charges in different headings, making total of about 25 percent Cybex (2013).

Table 4.2: TARIFF RATES: COMPARISON WITH INDIA (IN %)

Period Average	Nepal	India	Difference
1990-95	22.1	59.6	-37.5
1995-00	22.1	26.0	-4.0
2000-05	17.2	22.0	-4.8
2005-10	15.5	7.2	8.4

Source: Based on data compiled from World Bank (2012b), *Weighted Average Applied Tariff Rates for all products*.

The Nepalese government started to promote foreign direct investment (FDI) in 1992 when the *The Foreign Investment and Technology Transfer Act 1992* and *The Industrial Enterprises Act 1992* were enacted. Since then, foreign investors and the domestic investors have been treated equally with some favourable visa conditions for the initial set up of investment, and with an overall liberal visa policy for foreign investors (Rana & Pradhan 2005). While legal conditions are not a problem for FDI, some practical and policy prospects are still important and are responsible for the poor FDI flows into the country.

The another indicator of openness, that is, the trade as percentage of GDP has declined substantially since 2001 (see subsection 4.4.1, particularly Figure 4.6 for the details).

4.3.2 Macroeconomic Policy

Nepal started macroeconomic policy reforms in 1984 with interest rate deregulation followed by the removal of the entry barrier in the banking sector. Nepal started liberalisation with 14.7 percent devaluation of the NRe in November 1985, initiating a stabilization program under the guidelines of the International Monetary Fund

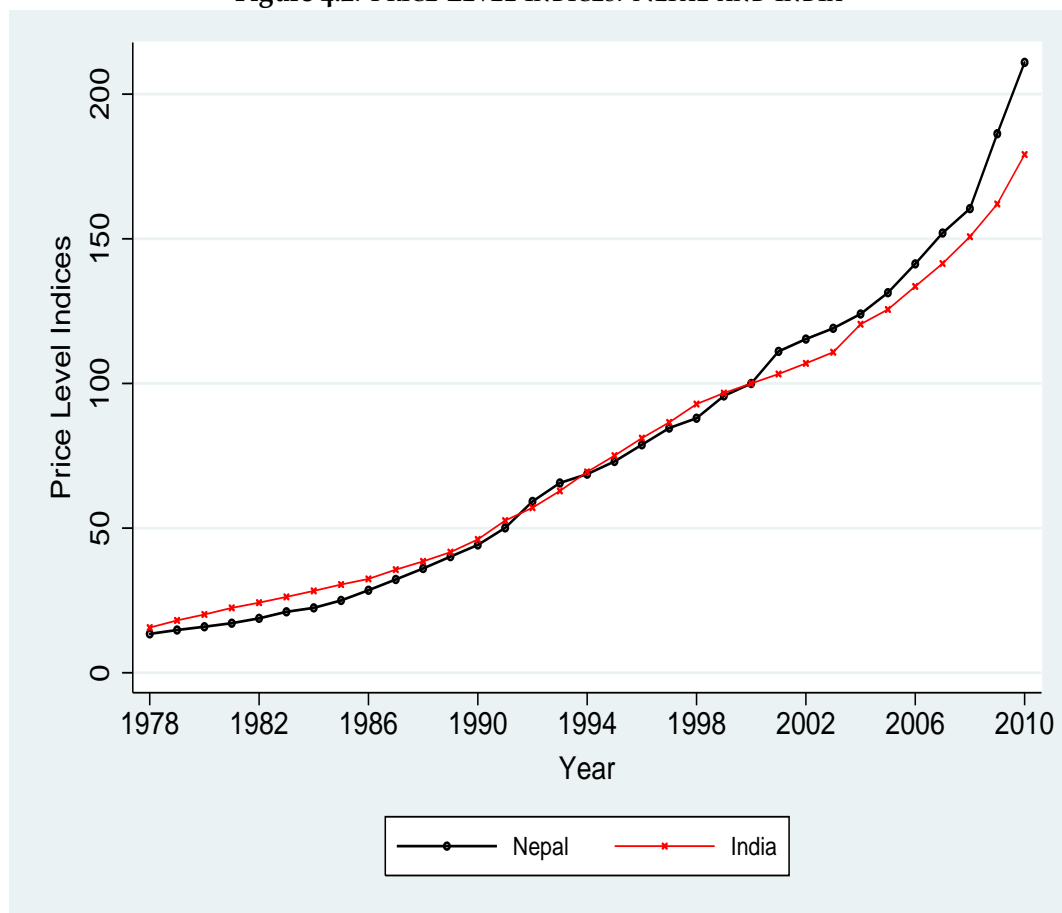
(IMF). Since then, various reforms have been made in industrial development, privatization and internal and external liberalisation of the financial and real sectors in different phases (see Acharya et al. 2003 for details). However, these reforms have not been accompanied by economic stabilisation to ensure the competitiveness of the tradable sector. A set of prudential rules was implemented in 1988. Credit control mechanisms have been gradually relaxed since 1991 and banking reserve requirements were reduced in 1993. The Nepal Rastra Bank (NRB), the central bank, became independent in 2001 (Shrestha 2005).

The Nepalese currency has been fixed to the Indian Rupee and adjusted from time to time. This exchange rate was 1 IRe. to NRe 1.60 in 1960, following NRe. 1.01 in 1966, NRe. 1.35 in 1967, NRe. 1.39 in 1971, NRe. 1.45 in 1978. Again, a 14.7 percent devaluation was made making NRe. 1.70 in 1985 followed by NRe. 1.68, a slight appreciation in 1986. Since 1993, the exchange rate of NRe with IRe remained same i.e IRe. 1 is equivalent to NRe. 1.60 (for details see Table 4A.1 in Appendix 4A).

Figure 4.2 presents the price levels of Nepal and India from 1978 to 2010 in 2000 prices. The price level has been proxied by a GDP deflator which is conceptually a better indicator of the overall price level compared to the readily available consumer price index (CPI). The price levels for both countries show minor differences until 2000, and then the gap has widened gradually. However, the relationship of these price levels is very strong. Because of the open border between Nepal and India, the price level cannot be much different, and market adjusts considering the border areas of these two countries. Nepalese customers can easily purchase goods from the border areas of India if the price level in Nepal is higher, and vice versa. This situation is clearly reflected in the relationship of the price levels, which shows symptom of a strong Gulliver impact. Since 2001, the variation of price level has been much wider, indicating a higher rate of inflation in Nepal compared to India.

Nepal's price level (measured by the GDP deflator) was increasing faster compared to that of India from about 2000. Two reasons are suggested for this: first, budget deficits caused by heavy administrative expenditure; and second, caused by workers' remittances (NRB 2009). A sharp appreciation of real effective exchange rate was made in 2004, because of this; Nepal lost its international competitiveness on the international market for exports at this time.

Figure 4.2: PRICE LEVEL INDICES: NEPAL AND INDIA



Source: Based on data compiled from World Bank (2012b)

Figure 4.3 presents three different real exchange rate indices calculated as: the export weighted index; bilateral index with India (the major trading partner); and the export weighted index excluding India (rest of the world) based on the following

formula:

$$RER = NERI(WP/DP)$$

where,

NERI refers to the export weighted nominal exchange rate index,

WP is the world price, which is captured by the export weighted GDP deflators of partners, and

DP is the domestic price, which is represented by the domestic GDP deflator.

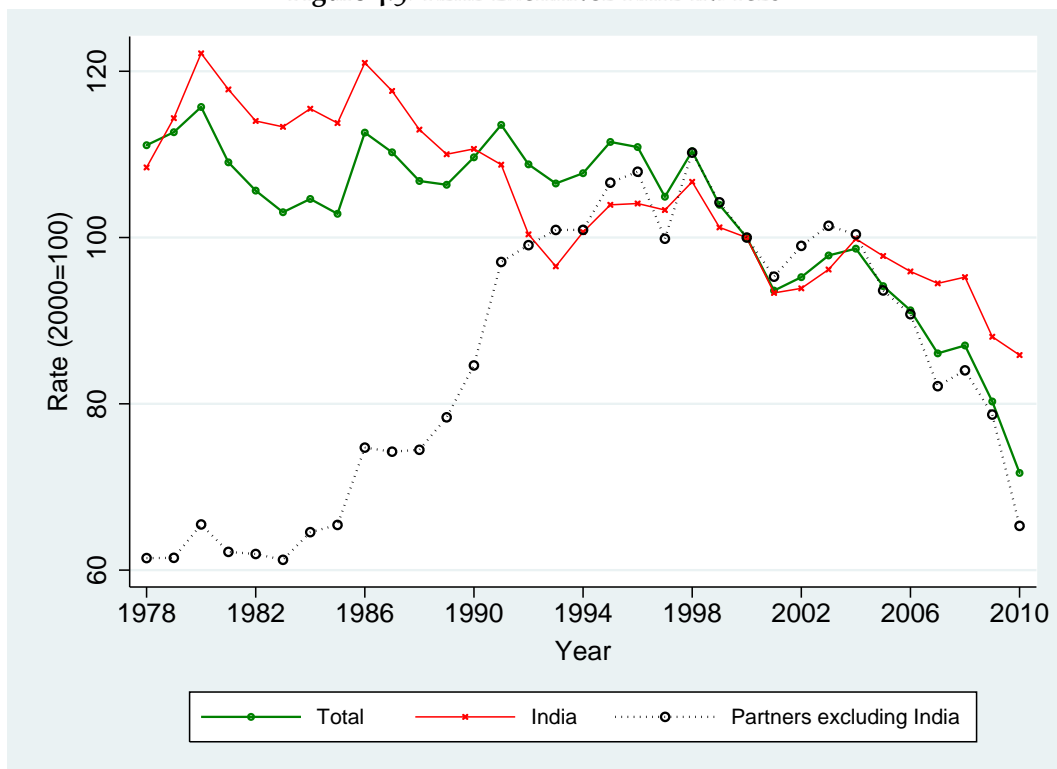
The export share has been calculated on the average exports of Nepal to all countries in the World for the period 1995 to 2010. I acknowledge a trend among researchers to take the share of a particular year, although this may have a bias due to year specific effects and other internal and external shocks in domestic and international markets. To correct this situation and to better represent the appropriate trading partners, the average exports for the given period are calculated and used to calculate the REER indices used in Figure 4.3.

Figure 4.3 shows that the Nepalese exchange rate policy during this period (pegged to the Indian currency), the pattern of the export weighted REER relating to India and the other major destination countries have behaved quite differently depending on the nature of the Indian exchange rate policy. In addition to Nepal's relative price, the behaviour of Nepal's REER relating to exports to other countries depends on what happens to the Indian Rupee's exchange rate vis-a-vis other currencies. During the period from 1983 to 1998, REER relating to exports to other countries depreciated continuously. This was the period when the Indian Rupee substantially depreciated against the other currencies (Pursell & Gupta 2007).

Since then, the Indian Rupee has remained relatively stable against other

currencies with sporadic (but mild) appreciation in some years. Consequently, the Nepalese RER related to exports to other countries has tended to appreciate due to a change in the relative price levels (Nepalese price level relative to that of these countries). This might be the main reason for the decline in export growth in these periods. It also provides the basis for a debate that the appreciation of Indian Rupee in the international currency market has caused the loss of the international competitiveness of Nepalese exports in the last decade. This also explains why about 60 percent of Nepalese exports go to India. On the one hand, the exchange rate policy is favourable for exporting to India, one of the biggest markets, but it might also be the reason for the poor exports to the rest of the world. Exporting more to the rest of the world may be an option for improving the export performance of Nepal, as the present scenario of exports is poor.

Figure 4.3: REAL EXCHANGE RATE INDICES



Source: Based on data compiled from International Monetary Fund (2013), A decrease is an appreciation of the real NRe.

4.4 Export Performance

4.4.1 Trends

Nepal's trade relationship with India was friendly and open in the past with the exception of the period 1989/1990, when India imposed a trade blockade on Nepal for political reasons. Nepal's trade with India was guided by the *Anglo-Nepali Treaty 1923* and other trade policies adopted by the Nepalese government (Sharma 1999). In this scenario, Nepal's international trade is dominated by India, whether in imports or exports.

Almost 60 percent of Nepal's international trade is with India (Table 4.3). A notable point here is that the Nepalese exports to both the world and India is a tiny fraction of Nepal's imports. The huge deficit is financed by a combination of foreign aid and incoming remittance. The amount of export to both India and the world has declined substantially since 2008.

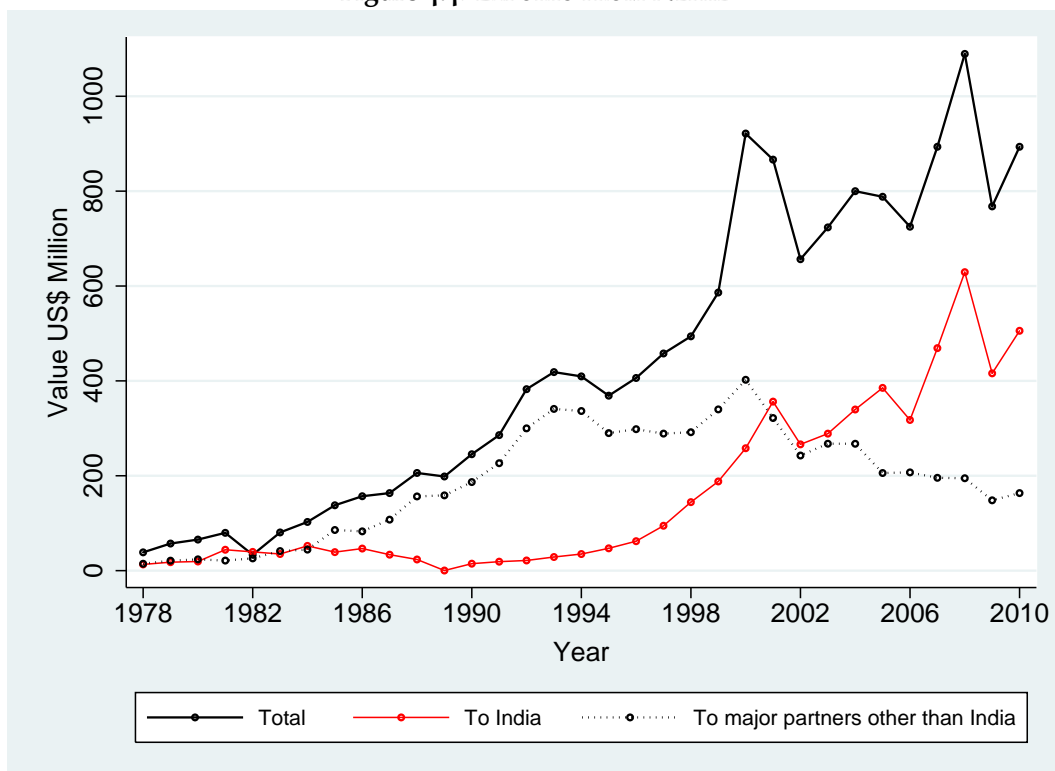
Table 4.3: INTERNATIONAL TRADE OF NEPAL (US\$ MILLION)

Year	Imports From		Exports to		Total Trade	
	India	World	India	World	India	World
1995	117.8	767.40	25	323.5	142.8	1090.9
2000	574.2	1570.30	307.2	720.7	881.4	2291.0
2005	1230.6	2070	540.1	812.6	1770.7	2882.6
2006	1481.5	2397.7	563	829.6	2044.5	3227.3
2007	1916.8	3087.7	592.5	877	2509.3	3964.7
2008	2160.8	3557.1	562.9	893.1	2723.7	4450.2
2009	1559.0	2717.1	388.3	668.1	1947.3	3385.2
2010	2097.4	3676.2	460.6	781.5	2558.0	4457.7

Source: Compiled from Asian Development Bank (2012)

Figure 4.4 presents a picture of Nepalese exports to India, other major trading partners, and the world. The figure shows that Nepalese exports have fluctuated, with a declining growth trend since 2000; however, the maximum of exports was in 2008. India's dominance in Nepalese exports is reflected in the figures specially after 2001 and exports to other major partner countries have been declining gradually since then.

Figure 4.4: EXPORTS FROM NEPAL



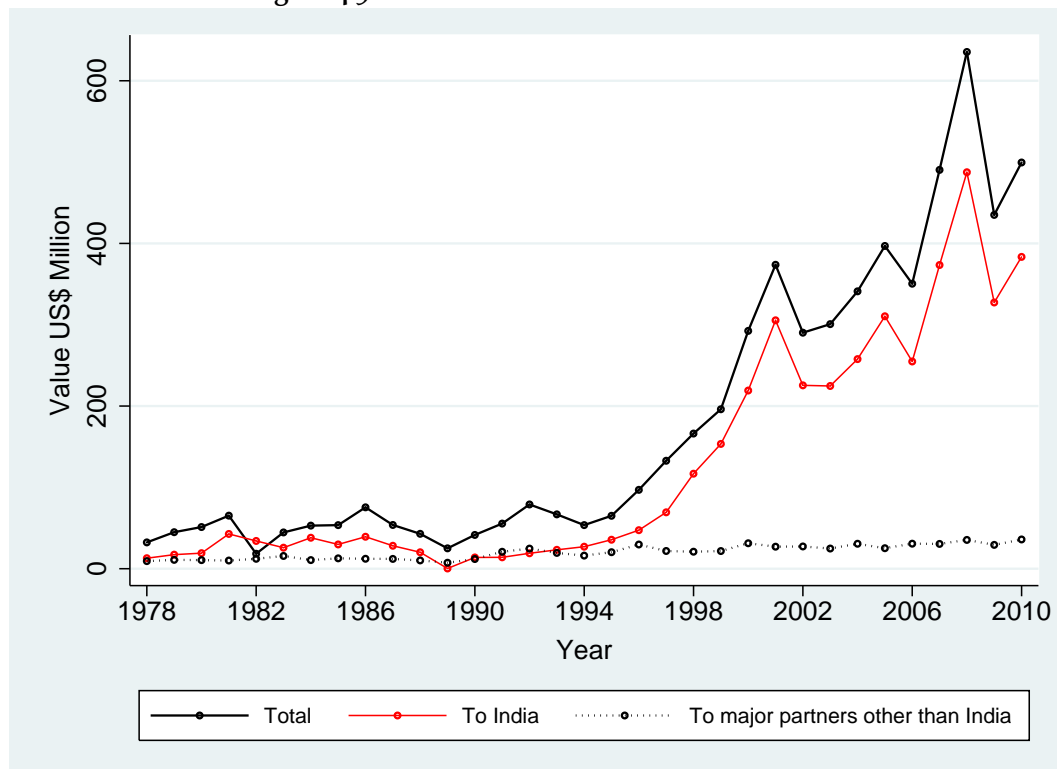
Source: Based on data compiled from World Bank (2012c)

One of the reasons for the decline in Nepalese exports since 2005 appears to be the abolition of the Multi-fibre Arrangement (MFA) with effect from 1 January 2005.⁵ During the MFA era a large number of Indian firms set up production plants

⁵MFA refers to the arrangement through WTO that imposes the quotas on the textile exports of developing countries to developed countries from 1974 to 2004, which expired on 1 January 2005.

in the clothing and garment industries in Nepal to avoid the MFA quota on garment exports from India, and a capital flight to India occurred after 2005. However, no annual data are available to assess the implications of MFA abolition of foreign investment in the clothing industry (Athukorala & Sharma 2006). However, judging by the data on clothing exports from Nepal during the post-MFA years, it seems that most (if not all) of these Indian firms would most likely have gone out of business after the 'easy access' to quota protected markets disappeared. To check this situation, Figure 4.5 presents a picture of non-garment exports from Nepal, which shows that non-garment exports from Nepal to other major trading partners shrank markedly.

Figure 4.5: NON-GARMENT EXPORTS FROM NEPAL



Source: Based on data compiled from Table 4.4

Table 4.4 presents the data for non-garment exports from Nepal to India and other countries. Exports to other major trading partners become even less than 10

percent of those to India after 2005. The export growth rate with countries other than India remained virtually stagnant in the latter years Figure 4.5 . Given the contrasting patterns of REER relating to exports to India and the other countries under the Indian Rupee peg as discussed in subsection 4.3.2, the Nepalese REER with rest of the world (excluding India as partner) has appreciated sharply over the past decade. Whether this exchange rate policy has adversely affected the Nepalese exports to other countries is an important issue worth examining as part of the empirical analysis.

Table 4.4: NON-GARMENT EXPORTS FROM NEPAL (MILLION US\$)

Year	World	India	Rest of World	India's share (%)
1978	32.38	12.91	9.34	40
1979	44.94	17.30	10.90	38
1980	51.24	19.13	10.59	37
1981	65.25	42.75	10.08	66
1982	34.16	18.39	12.20	54
1983	44.65	25.88	15.68	58
1984	52.99	38.09	10.60	72
1985	53.61	29.86	12.77	56
1986	75.48	39.31	12.23	52
1987	53.83	28.23	12.07	52
1988	42.92	20.22	10.19	47
1989	25.07	0.29	7.35	1
1990	41.55	13.85	11.91	33
1991	55.50	14.04	20.82	25
1992	79.02	18.97	24.74	24
1993	66.84	23.25	19.46	35
1994	53.64	27.09	16.13	51
1995	65.11	35.65	20.30	55
1996	97.01	47.38	29.76	49
1997	132.75	69.37	21.83	52
1998	166.22	116.84	20.93	70
1999	196.11	153.46	21.76	78
2000	292.49	219.13	31.31	75
2001	373.74	305.45	27.08	82
2002	290.23	225.50	27.39	78
2003	300.75	224.71	24.81	75
2004	341.09	257.78	30.72	76
2005	396.90	310.40	25.22	78
2006	350.47	254.83	30.78	73
2007	490.44	373.45	30.52	76
2008	635.43	487.54	35.40	77
2009	435.10	327.38	29.31	75
2010	499.52	383.45	35.97	77

Source: Compiled from World Bank (2012c).

Table 4.5 presents the average growth of merchandise exports from Nepal, LLDCs and the world covering the period 1960 to 2010, initially 10-year average growth until 2000, and then 5-year average growth to 2010. The data for Nepal show that export growth declined from 1970-1980, while both LLDCs and the world had

made impressive progress. A gradual increase in the rate is found for Nepal until 2000. Nepal incurred some trade problems with India in 1989, and the political movement to re-establish democracy was in 1989/1990, when the trade blockade started. Despite having these two major problems, exports increased on average by about 10 percent per annum. A notable point is that Nepal started reforms in this period. During 1991-2000, further reforms were made, which helped to increase export growth despite two problems: first, beginning of armed conflict by CPN-Maoist; and second, the Asian Financial Crisis (AFC). After 2000, the Nepalese export growth rate declined substantially, due to both domestic and external factors. On the domestic side, most importantly, city and urban areas were focused of armed conflict of CPN-Maoist. Overall, the unsteady political environment placed many of the policies in limbo, and violations of the rule of law, the constitutional crisis, and the unstable government led business community to lose the confidence. On the other hand, internationally, Nepal had lost the ground to India, China and Bangladesh in the garment sector, the major export items of the initial period. Domestic causes of this are probably more important and responsible for this decline.

Table 4.6 presents the merchandise exports value for Nepal and the share of these exports in LLDCs for the period 1960 to 2010. The export value increased to \$863 million in 2005, from \$17 million in 1960. In 2006 and 2009, total merchandise values declined compared to their respective previous years. As of 2010, the total merchandise value of Nepal accounted for \$856 million, which is about 0.4 percent of that for all LLDCs. Nepal has consistently lost its share in LLDCs' exports since 2000, from two percent to less than one and a half percent in 2010 (excluding the post-USSR LLDCs).

Table 4.5: EXPORTS GROWTH IN NEPAL, LLDCs AND WORLD, AVERAGE (%)

Year	Nepal	LLDCs	World
1960-1970	50.3	15.7	9.4
1971-1980	5.8	21.2	20.6
1981-1990	10.2	7.1	7.6
1991-2000	17.0	6.6	7.3
2001-2005	2.7	18.5	10.6
2006-2010	0.1	15.4	9.0

Note: LLDCs members are the same throughout the period.

Source: Compiled from World Bank (2012b).

Table 4.6: TOTAL MERCHANDIZED EXPORTS AND SHARE IN LLDCs

Year	Value US\$ (Million)	Share-no Post USSR (%)
1960	17.0	1.7
1970	42.4	1.7
1980	80.0	1.0
1990	204.0	1.9
2000	804.0	5.5
2005	863.2	2.7
2006	837.9	2.1
2007	868.4	1.8
2008	938.8	1.6
2009	822.6	1.7
2010	855.8	1.4

Source: Compiled from World Bank (2012b) database.

Measuring the share of total trade in GDP is one way of assessing whether a country is open for international trade. The higher the share of total trade or exports in GDP, the more a country is defined as open. The openness indicator measured by the share of total trade or export in GDP is criticized on the grounds that it is the ratio of two different variables, which are measured in two different ways: total trade or exports are measured in actual value while GDP is measured by gross value added. This share has been used in this context to reflect the exports situation in the country. The share of total exports in GDP measured in percentage uses the 2005 price. Nepal had only an eight percent share of exports in GDP in 1965, which gradually reached 26 percent in 1997, then declined with many fluctuations to less than 10 percent (Figure 4.6).

Figure 4.6: TRADE OPENNESS IN NEPAL



Source: Based on data compiled from World Bank (2012b)

Nepal's share of non-oil exports in the world was just 0.007 percent of global

non-oil exports in 2009/2010 (Table 4.7). This share is lower than that in 1979/1980. The highest share, 0.012 percent was recorded in 1999/2000. In comparison, the share of other LLDCs, on average, tripled in the same period. Nepal's share of the world's manufacturing exports increased to 0.007 percent in 2009/2010, from 0.003 percent in 1979/1980, and its share of manufacturing was also recorded as the maximum among all periods in 1999/2000. The share of manufactured goods in total exports accounted for about 70 percent in 2009/2010, which is more than two times that of 1979/1980.⁶

⁶This unusually high figure reflects combined effect of contraction in the traditional (agricultural) exports in most of the years during this period, and the rapid growth of clothing exports under the country quota system of the Multi-fibre Arrangements (MFA) for over a decade until 2005, when the MFA was phased out.

Table 4.7: NEPAL IN WORLD EXPORTS

	Total non-oil Exports (%)				Manufacturing Exports (%)				Manufacturing in total Exports (%)			
	1979/80	1989/90	1999/00	2009/10	1979/80	1989/90	1999/00	2009/10	1979/80	1989/90	1999/00	2009/10
Nepal	0.008	0.006	0.012	0.007	0.003	0.007	0.011	0.007	29.16	83.47	71.90	69.41
LLDCs	0.21	0.11	0.44	0.60	0.02	0.02	0.27	0.29	13.47	18.38	29.35	25.89
Other DCs	14.91	15.97	18.44	29.56	10.00	14.51	17.07	29.28	16.69	34.53	40.16	40.73
World	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	58.67	73.76	75.46	68.48
World Exports US\$ billion	1275.00	2653.00	5012.00	10632.00	925.00	2114.00	4157.00	8415.00	-	-	-	-

Note: LLDCs refers to landlocked developing countries and DCs to developing countries.

Source: Compiled from World Bank (2012c) database.

4.4.2 Geographic Profile of Exports

Table 4.8 presents the top 15 destinations of Nepalese merchandise exports for three different years, 2000, 2005 and 2010, to analyse how the destinations of the exports have changed over the last decade. Throughout all three years, India was Nepal's top destination for exports, amounting to about US\$506 million in 2010. The USA was the second destination in 2000, but this position was taken by the European Union (EU) in 2005 and 2010. Exports to EU declined by almost US\$4 million in 2010 compared to 2005. The exported value to USA declined to US\$66 million from US\$253 million in 2000. Exports to Germany declined by more than 50 percent in the same period, however, it still remains the fourth top destination of Nepalese exports. Exports to the OECD countries were mainly garments and textiles, which have declined substantially since 2001.

There has been a slight increase in the export volume to the United Kingdom (UK), which has replaced Japan as the fifth destination. Exports to France seem to fluctuate without losing its position. Bhutan, Australia, and Netherlands were new countries in the top 15 in 2010, while Portugal, Belgium, and Spain exited from the top 15 destinations in 2010. China's position has gradually risen, and Japan's position declined gradually in 2010 compared to 2000. Overall, India remained the leading destination of Nepalese exports throughout the periods.

Table 4.8: TOP 15 DESTINATIONS OF NEPALESE EXPORTS

Destinations	2000		Destinations	2005		Destinations	2010	
	US\$ Million	% of total exports		US\$ Million	% of total exports		US\$ Million	% of total exports
India	258.4	28.1	India	385.5	48.7	India	505.7	57.0
United States	253.3	27.3	European Union	116.1	14.7	European Union	112.2	12.2
European Union	165.4	17.8	United States	111.2	14.0	United States	66.2	7.3
Germany	94.9	10.2	Germany	49.3	6.2	Germany	42.0	4.6
Japan	28.3	3.0	United Kingdom	18.4	2.3	United Kingdom	20.7	2.3
United Kingdom	18.4	1.9	France	13.5	1.7	France	19.1	2.1
France	17.1	1.8	Italy	10.7	1.3	Canada	14.9	1.6
Switzerland	12.8	1.3	Canada	10.4	1.3	Bhutan	12.8	1.4
Italy	9.4	1.0	Japan	10.1	1.2	China	11.4	1.2
Singapore	7.6	0.8	China	8.5	1.0	Italy	11.2	1.2
Belgium	7.2	0.7	Portugal	5.9	0.7	Turkey	9.6	1.0
China	7.1	0.7	Belgium	5.7	0.7	Japan	9.6	1.0
Canada	7.1	0.7	Spain	4.8	0.6	Australia	6.8	0.7
Netherlands	5.5	0.6	Switzerland	4.7	0.5	Switzerland	5.5	0.6
Spain	4.8	0.5	Turkey	4.0	0.5	Netherlands	4.0	0.4

Source: Compiled from World Bank (2012c) database.

4.4.3 Commodity Composition

Table 4.9 shows the commodity composition of exports in 2000 and later years. Table 4.9 and Table 4.10 together help to identify whether the exports of Nepal have focused on RCA products or diversified to include other products. Table 4.9 presents the commodity composition and Table 4.10 presents the RCA on those products and their share of total exports of Nepal. Most of the exported items in the given periods are either dynamic or emerging products, based on the RCA index. Notably, the values of the exports are higher for these products; the highest export values are found for textile yarns, floor coverings, made up textile articles, base metal household equipments, steel wire, all from manufactured products. Some items such as dried fruits and nuts, tea and mate, crude vegetable materials, spices from agricultural products have substantially increased over the period.

On the other hand, products with a heavier weight such as butter and cheese, floor coverings, men's and women's wear have declined but the exported values are still substantially higher. After 2000, contracts for exports in these categories were lost, but have revived again since 2009 but at a very slow pace.

The commodity composition of Nepalese exports suggests that Nepal is doing better in high value-to-weight products than in low value-to-weight products to face the higher transportation costs (Table 4.10). Nepal has a higher revealed comparative advantage (RCA) in high-value low-weight products.⁷ These products include tea, spices, textile yarn, floor coverings, clothing accessories, and art collections. There are some products which have the RCA in both periods (defined as dynamic products as appear in the upper panel of Table 4.10). Also, there are some emerging products (which did not have the RCA in the earlier period but have gained the RCA

⁷High-value-low-weight has been defined using the value per Kg. of the exported products.

in the latest year), are presented in the lower panel of the table. Combining both dynamic and emerging products, almost 98 percent of total exports in 2000 comprised these products. This share declined to 89 percent in 2011. This shows a comparatively poor export diversification, concentrated only in 46 products. In this situation, Nepal may need to focus on export diversification to stabilize export earnings in the future as suggested in Derosa (1992). In Contrast, Easterly et al. (2009) found that a higher concentration is positively associated with higher volumes of trade.

Table 4.11 shows the composition of Nepalese exports to India. The data show that exports of agricultural products, which have a comparative advantage, declined to about 10 percent of total exports to India in 2010, from about 25 percent in 2000. The export of manufacturing products has increased from a fairly high share, 75 percent, to almost 90 percent in the same duration. The same table also lists the top 20 products exported from Nepal to India in 2000, 2005 and 2010. Most of these products such as Rolled plated metal/steel, Iron/steel wire, Copper, Misc chemical products nessesities, Iron/steel pipe/tube/etc, Aluminium, Medicaments include veterinary supplies seem to be exported to India via Nepal because of the lower Nepalese tariffs on these products.

Table 4.12 sheds further light on the phenomenon of trade deflection. The major products exported to India and their import into Nepal are given for years 2000 and 2010. The data suggest that most of the products are imported from the world, some of them are consumed in Nepal, some of them are used as raw materials to produce the finished products for consumption in Nepal, and to export to India, but a substantial portion seems to be exported to India. Products such as medicaments include veterinary, iron/steel wire, copper, aluminium, and base metal household equipment belong in this category.

Table 4.9: NEPAL: SITC 3 DIGIT COMMODITY COMPOSITION OF EXPORTS IN US\$000

Product code	productdescription	2000	2009	2010	2011
001	Live animals except fish	344	589	557	1295
011	Beef, fresh/childd/frozn	-	127	210	3610
023	Butter and cheese	38327	1361	1553	1956
046	Flour/meal wheat/meslin	-	2995	746	2214
048	Cereal etc flour/starch	3119	6599	6114	10481
054	Vegetables,frsh/chld/frz	14564	79257	51596	25197
057	Fruit/nuts, fresh/dried	9	4336	6647	11294
059	Fruit/veg juices	-	28929	14662	33899
074	Tea and mate	361	16031	16356	19448
075	Spices	5673	23120	22937	36614
081	Animal feed ex unml cer.	6433	17591	11671	12364
223	Oil seeds-not soft oil	597	211	177	219
264	Jute/bast fibre raw/retd	-	15	-	334
265	Veg text fibre ex cot/ju	1	75	55	66
269	Worn clothing etc	9	788	1845	1760
273	Stone/sand/gravel	1304	28718	16830	15660
292	Crude veg materials nes	764	23411	28406	25897
532	Dyeing/tanning extracts	2796	2096	2628	400
553	Perfume/toilet/cosmetics	32460	14756	11723	17487
554	Soaps/cleansers/polishes	15245	6247	5410	3210
598	Misc chemical prods nes	2626	12658	7252	11686
611	Leather	2688	6353	8042	11761
634	Veneer/plywood/etc	424	2565	1839	2014
642	Cut paper/board/articles	1865	5038	3594	5011
651	Textile yarn	8891	58968	63965	79221
652	Cotton fabrics, woven	1	1221	1571	2787
654	Woven textile fabric nes	3756	8160	9343	13111
657	Special yarns/fabrics	8402	13572	21338	20340
658	Made-up textile articles	14812	31203	38595	41058
659	Floor coverings etc.	146356	72653	60612	77109
673	Flat rolled iron/st prod	-	328	212	578
676	Iron/steel bars/rods/etc	-	235	76	34
678	Iron/steel wire	-	18082	20369	28538
679	Iron/steel pipe/tube/etc	104	24245	19639	23262
682	Copper	354	11314	15384	18508
696	Cutlery	-	57	242	2096
697	Base metal hhold equipms	485	13529	9876	8020
841	Mens/boys wear, woven	63918	24669	16555	15523
842	Women/girl clothing wven	61890	15136	22481	27201
845	Articles of apparel nes	33061	8802	4136	8357
846	Clothing accessories	42032	26868	21964	29653
848	Headgear/non-text clothg	2231	3894	5915	12412
851	Footwear	14	6656	8383	14619
893	Articles nes of plastics	210	8424	13341	12701
896	Art/collections/antiques	4345	16006	7678	6048
Total Exports		708774	885999	834017	907634

Note: Total Exports include other products without comparative advantage too. "-" refers product not exported.
Source: Compiled from World Bank (2012c) database.

Table 4.10: EXPORTS OF NEPAL:RCA>1 SITC REVISION 2 DATA

Productcode	Product Description	2000		2011	
		RCA	Share in Exports (%)	RCA	Share in Exports (%)
<i>Dynamic products</i>					
023	Butter and cheese	148.39	7.00	4.01	0.22
048	Cereal etc flour/starch	2.40	0.57	4.10	1.15
054	Vegetables,frsh/chld/frz	7.89	2.65	8.41	2.78
074	Tea and mate	1.24	0.07	50.27	2.14
075	Spices	23.17	1.03	93.34	4.03
081	Animal feed ex unml cer.	3.31	1.17	3.04	1.36
223	Oil seeds-not soft oil	8.71	0.11	1.49	0.02
273	Stone/sand/gravel	3.69	0.24	29.80	1.73
532	Dyeing/tanning extracts	33.90	0.51	3.39	0.04
553	Perfume/toilet/cosmetics	14.90	5.92	4.03	1.93
554	Soaps/cleansers/polishes	12.41	2.78	1.43	0.35
611	Leather	2.03	0.49	9.95	1.30
651	Textile yarn	3.30	1.62	26.71	8.73
654	Woven textile fabric nes	4.54	0.68	20.84	1.44
657	Special yarns/fabrics	4.61	1.53	7.65	2.24
658	Made-up textile articles	9.41	2.70	14.21	4.52
659	Floor coverings etc.	174.41	26.68	89.10	8.50
678	Iron/steel wire	37.56	3.14	4.19	2.56
841	Mens/boys wear, woven	16.99	11.65	4.50	1.71
842	Women/girl clothing wven	16.35	11.28	6.65	3.00
845	Articles of apparel nes	6.20	6.03	1.24	0.92
846	Clothing accessories	36.67	7.66	17.87	3.27
848	Headgear/non-text clothg	1.96	0.41	7.48	1.37
896	Art/collections/antiques	5.63	0.79	6.36	0.67
<i>Emerging products</i>					
001	Live animals except fish	0.40	0.06	1.11	0.14
011	Beef, fresh/chlld/frozn	-	-	1.60	0.40
046	Flour/meal wheat/meslin	-	-	6.42	0.24
057	Fruit/nuts, fresh/dried	0.00	0.00	2.80	1.24
059	Fruit/veg juices	-	-	36.06	3.73
264	Jute/bast fibre raw/retd	-	-	137.00	0.04
265	Veg text fibre ex cot/ju	0.02	0.00	1.21	0.01
269	Worn clothing etc	0.06	0.00	6.87	0.19
292	Crude veg materials nes	0.57	0.14	11.49	2.85
598	Misc chemical prods nes	0.75	0.48	1.58	1.29
634	Veneer/plywood/etc	0.26	0.08	1.00	0.22
642	Cut paper/board/articles	0.70	0.34	1.52	0.55
652	Cotton fabrics, woven	0.00	0.00	1.51	0.31
665	Glassware	0.00	0.00	1.47	0.23
673	Flat rolled iron/st prod	0.11	0.06	26.20	9.68
676	Iron/steel bars/rods/etc	0.01	0.00	37.56	3.14
679	Iron/steel pipe/tube/etc	0.05	0.02	4.19	2.56
682	Copper	0.12	0.06	2.23	2.04
696	Cutlery	-	-	3.22	0.23
697	Base metal hhold equipms	0.50	0.09	4.90	0.88
851	Footwear	0.00	0.00	2.48	1.61
893	Articles nes of plastics	0.05	0.04	1.70	1.40

Note: "-" indicates the products were not exported, RCA refers to Revealed comparative advantage, Dynamic products refers to those with RCA in both periods, Emerging products refer to those with RCA in the later year only.

Source: World Bank (2012c).

Table 4.11: COMMODITIES EXPORTED TO INDIA FROM NEPAL

2000			2005			2010		
<i>Productcode</i>	<i>Product Description</i>	<i>Share % in total exports to India</i>	<i>Productcode</i>	<i>Product Description</i>	<i>Share % in total exports to India</i>	<i>Productcode</i>	<i>Product Description</i>	<i>Share % in total exports to India</i>
001-408	Agriculture	25.2			21.17			9.82
511-899	Manufacturing	74.51			78.38			89.78
553	Perfume/toilet/cosmetics	15.5	651	Textile yarn	7.0	674	Rolled plated m-steel	14.3
651	Textile yarn	10.9	674	Rolled plated m-steel	6.1	651	Textile yarn	11.0
554	Soaps/cleansers/polishes	6.2	553	Perfume/toilet/cosmetics	5.2	893	Articles nes of plastics	11.0
682	Copper	5.3	679	Iron/steel pipe/tube/etc	4.5	658	Made-up textile articles	5.2
542	Medicaments include vet	4.3	893	Articles nes of plastics	4.4	678	Iron/steel wire	3.7
679	Iron/steel pipe/tube/etc	2.9	654	Woven textile fabric nes	3.5	532	Dyeing/tanning extracts	3.6
893	Articles nes of plastics	2.8	575	Plastic nes-primary form	3.2	679	Iron/steel pipe/tube/etc	3.4
634	Veneer/plywood/etc	1.5	684	Aluminium	3.2	657	Special yarns/fabrics	2.9
899	Misc manuf articles nes	1.3	581	Plastic tube/pipe/hose	3.1	682	Copper	2.9
657	Special yarns/fabrics	1.0	598	Misc chemical prods nes	2.5	654	Woven textile fabric nes	2.5
653	Man-made woven fabrics	1.0	657	Special yarns/fabrics	2.2	598	Misc chemical prods nes	2.1
522	Elements/oxides/hal salt	0.9	513	Carboxylic acid compound	2.1	553	Perfume/toilet/cosmetics	1.5
532	Dyeing/tanning extracts	0.8	653	Man-made woven fabrics	1.9	851	Footwear	1.4
684	Aluminium	0.7	655	Knit/crochet fabrics	1.8	582	Plastic sheets/film/etc	1.2
674	Rolled plated m-steel	0.7	532	Dyeing/tanning extracts	1.5	697	Base metal hhold equipms	1.2
773	Electrical distrib equip	0.7	582	Plastic sheets/film/etc	1.4	841	Mens/boys wear, woven	1.1
641	Paper/paperboard	0.7	542	Medicaments include vet	1.2	542	Medicaments include vet	1.0
691	Iron/stl/alum structures	0.6	773	Electrical distrib equip	1.2	554	Soaps/cleansers/polishes	1.0
851	Footwear	0.6	678	Iron/steel wire	1.2	611	Leather	0.7
846	Clothing accessories	0.5	634	Veneer/plywood/etc	1.0	655	Knit/crochet fabrics	0.7
Total in US\$ 000		258462.8			385461.2			505696.6

Source: Compiled data from World Bank (2012c)

Table 4.12: MAJOR PRODUCTS EXPORTED TO INDIA AND IMPORTED FROM WORLD US\$000

Productcode	Products	2000		2010	
		Import from World	Export to India	Import from World	Export to India
532	Dyeing/tanning extracts	166.251	2795.949	477	742
542	Medicaments include vet	43554.71	5306.684	152431	5972
674	Rolled plated m-steel	1782.865	-	1704	85713
678	Iron/steel wire	258.316	-	2705	20810
679	Iron/steel pipe/tube/etc	3775.289	-	6267	22474
682	Copper	4575.624	-	21445	16319
684	Aluminium	1384.676	-	28159	5125
692	Metal store/transpt cont	1651.681	-	4748	378
697	Base metal hhold equipms	1516.585	473.485	7364	8478
699	Base metal manufac nes	2465.682	-	16738	134

Source: Compiled data from World Bank (2012c)

4.5 Determinants of Export Performance

In this section, I conduct an econometric analysis of product level export flows from Nepal to its trading partners using the gravity modelling framework. The first subsection explains the model and describes the data, the second subsection explains the econometrics, and the third subsection presents the results and discussion.

4.5.1 Model, Estimation Method and Data

The original gravity model is specified as in equation (4.1):

$$LEXPORT_{ij,t} = \alpha + \beta_1 LGDP_{i,t} + \beta_2 LGDP_{j,t} + \beta_3 LDIS_{ij,t} + \epsilon_{ij,t} \quad (4.1)$$

In equation (4.1), α is a constant term, subscripts i and j refer to Nepal and its trading partners, respectively, t is time and L denotes the natural log. The last term, ϵ_{pjt} is the stochastic error term and β_s are the coefficients of individual explanatory variables. In this model, the variables of interest and policy implication are included. Hence, the augmented gravity model specification is given in (4.2):

$$\begin{aligned} LEXPORT_{jp,t}^N = & \alpha + \beta_1 LGDP_t^N + \beta_2 LGDP_{j,t} + \beta_3 LDIS_j^N + \beta_4 LREER_{j,t}^N \\ & + \beta_5 LVWT_{jp,t}^N + \beta_6 LFDI_t^N + \beta_7 TARIFF_t^N \\ & + \beta_8 INDIA + \beta_9 INDTBLOCK + \beta_{10} MCFAC + \epsilon_{pj,t}^N \quad (4.2) \end{aligned}$$

The error components structure is:

$$\epsilon_{pj,t}^N = \mu_{pj,t}^N + \theta_t + v_{pj,t}^N \quad (4.3)$$

where, Superscript N refers to exporting country-Nepal, subscript p refers to the products exported from Nepal to its trading partners, and the error component in equation (4.3) includes the fixed effect, time effect and error term. Variables in equation (4.2) are defined with the expected sign of the coefficients in parentheses below. All variables other than tariff (TARIFF), tariff differentials (TDIFF), India dummy (INDIA), Indian trade blockade dummy (INDTBLOCK) and the Maoist's city-focused armed conflict dummy (MCFAC) are measured in natural logarithms.

EXPORT	Export from Nepal to its trading partners	Dep. variable
GDP	Real gross domestic product of Nepal and partners	(+)
DIS	Distance between business city of Nepal and partners	(-)
REER	An index of bilateral real exchange rate with partners	(+)
VWT	Value to weight ratio of products	(+)
FDI	Foreign direct investment inflow	(+)
TARIFF	Tariff rates of Nepal	(+)
INDIA	Intercept dummy variable for India	(+)
INDTBLOCK	Indian Trade Blockade to Nepal	(-)
TDIFF	Tariff differential between the rates of Nepal and India, used only for estimation with India	(+/-)
MCFAC	A binary dummy for years-city focused armed conflict by CPN-Maoist	(-)

The dependent variable is the product level exports from Nepal to its partner countries. Mirror export (the imports into other countries from Nepal) is used as it mostly captures the real situation of exports for two reasons. First, the general assumption that imports are recorded more accurately than the exports. Second, underreporting of exports is generally a common phenomenon in developing countries.

The exports are measured based on SITC revision 2 digits 3 product levels and then converted into real value by deflating the US import price.

Some applications of the gravity framework for modelling trade flows have measured the dependent variable (trade) in nominal export/trade values in US\$ with a time trend as an additional variable to capture the price change (for example Baldwin & Taglioni 2006). However, the time trend not only captures the price change but is also directly associated with various domestic and internal shocks to macroeconomic variables. If the exports are not directly connected with those shocks, mostly in the least developing countries' case, including the time trend in the estimation creates a colinearity problem. Also, measuring exports in US\$ captures the price level difference, but can not fully capture the change/fluctuation in the price level in the international market over a long period. Because of this, an appropriate practice is to use exports in real terms (that is, nominal exports deflated by a suitable price index) and to include a time dummy to capture the impact of various time specific effects (Rose 2000, Athukorala & Yamashita 2009, and Athukorala 2012). Hence, the exports are deflated by the US import price index of non-oil commodities base year 2000.

The three explanatory variables — GDP of Nepal and its partners, and distance (DIS), are the standard gravity variables and are explained widely in the literature, so do not require further discussion here. The widely used variable in gravity models, border, is replaced by the "INDIA" dummy to check whether the Gulliver effect is found in Nepal in an alternative specification.

Being a landlocked country, Nepal is facing the problem of comparatively higher transportation costs. The products, which can be transported via air cargo or in large value-quantity via land transport minimising the negative impact of landlockedness, may be a significant feature of product lines. Therefore, it is hypothesised that Nepal would do better by exporting high value-to-weight goods (lighter prod-

ucts) compared to low value-to-weight goods. The discussion of the emerging export pattern of Nepal (Section 4.4) also suggests that growth rates are generally higher for lighter products, such as garments, tea and coffee, spices, floor coverings. One of the major concerns of this study is to identify product lines in which Nepal can do better in terms of exports. For this purpose, a variable, value-to-weight ratio (VWT) is used as an explanatory variable. I calculated the ratio of value to weight for all products in SITC revision II classification 3 digits data. This value varies in different countries. This ratio has been calculated for almost 97 percent of commodities exported from Nepal in different years. In constructing this variable I followed Kravis & Lipsey (1971) , Helleiner (1973) and Hummels (2007). This variable covers more than 88 percent of total products exported from Nepal in 2010. FDI is included to capture the impact of foreign direct investment and its proper management. This variable is proxied by FDI inflows from the world.

The REER captures the impact of the relative profitability of exporting compared to selling in the domestic market. This variable is constructed based on the bilateral exchange rate index of Nepal with its trading partners. This bilateral exchange rate index is deflated by the ratio of the partner's and domestic price levels. The selected price level is GDP deflator of partner countries and of Nepal (GDP deflator is used as a proxy for price level in partner countries as the wholesale price data are not available, and CPI is dominated by non-tradable goods) to find the REER index.

To test the impact of Nepal's trade reform, TARIFF, the import tariff rate applied, weighted mean, for all products is used as an explanatory variable. The negative sign would mean reducing Nepalese tariff rates (being more open in trade) promotes Nepalese exports as postulated by the Lerner symmetry theorem. This theorem postulates that the import tariff acts as an export tax by reducing relative

profitability of exporting compared to selling in the domestic market.⁸ Nepal and India have a strong trade relationship and have maintained an open border policy guided by “Trade and Transit Treaty 1950”. Therefore, differences in tariff rates may have a significant impact on trade between the two countries. For this reason, the differential is used in a separate specification, when the export to India is estimated. A negative sign of this variable would imply the situation of trade deflection-exports via Nepal, not the real Nepalese output exported case. This means the exported items from Nepal to India are not produced and imported into Nepal to export to India taking advantage of the benefits of the bilateral trade relationship between Nepal and India. In doing this, Nepal does not lose anything directly but creates the illusion of exports.

As a landlocked country surrounded by a giant neighbour, India, Nepal’s trade is based on its relationship with India. Due to some differences in political interest, India imposed a trade blockade on Nepal in 1989/1990. This had a significant adverse impact on Nepalese export performance. To capture this scenario, INDTBLOCK dummy variable is included in the model.

Nepal has been in political turmoil for a long period but there were particular years when massive political crises occurred. The major political instability that caused to a loss of confidence by business community was the city-focused armed conflict by CPN-Maoists. The CPN-Maoists had engaged in armed conflict since 1996 but this covered the entire nation, particularly the urban areas of the country, where industries were affected after 2001. So, MCFAC is introduced to capture this impact in the model. This is measured by a dummy (0 for the period from 1980 to 2000 and 1 for that year onward, when the armed conflict run by CPN-Maoists influenced the whole country, focusing on the cities and urban areas).

⁸See Lerner (1936) for detail about the Lerner’s symmetry theorem.

The export equation is estimated for total merchandised exports, manufacturing excluding garment exports, agricultural exports and manufacturing exports using annual data over the period 1980-2010. For each product category, estimates are also undertaken for exports to the world, exports to India and exports to the rest of the world (excluding India as a partner). These three samples are: exports to the world, exports to India, and exports to the world excluding India for all products, excluding garments, agricultural products and manufacturing products for each sample. Therefore, some variables are replaced with suitable alternative measures. TARIFF, the tariff variable is also used in two ways: the Nepalese tariff rates; and the tariff differential between the tariff rates of Nepal and India. When export to India is used as a dependent variable, the tariff differential was used, and in the remaining cases, Nepalese tariff rates are used.

The data are compiled into an unbalanced panel for partner countries, products and year. There is some variation in Nepalese exports to these partners but more than 95 percent of exports are focused in 20 countries.⁹ Therefore, I opt to include 20 partner countries at this stage. In the second stage, the largest trading partner's, India's, exports are estimated. In the third stage, partners other than India's exports are estimated for all subsamples of products.

The details of the data, their compilation methods and sources are summarised in Table 4.13.

⁹These 20 countries are: India, USA, UK, Germany, France, Switzerland, Italy, Japan, Canada, Belgium, Turkey, Luxemburg, Bhutan, Sri Lanka, Singapore, China, Austria, Spain, Pakistan, and Netherland.

Table 4.13: VARIABLE CONSTRUCTION AND DATA SOURCES

Variables	Sources	Description
EXPORT	WITS-COMTRADE	Exports value in US\$, deflated by US import price index (2000=100).
GDP	WDI, World Bank	Real GDP of Nepal and partners base year 2000 measured in US\$
DIS	CEPII gravity database	Distance between business cities of Nepal and it's partners measured in Kilometres
REER	WDI, World Bank	Bilateral real exchange rate index with partner, $REER = NERI * PW / PD$, where, PW and PD are GDP deflators and NER=Nepalese Rupees/partner currency
VWT	WITS-COMTRADE	Export value per Kg. in US\$
FDI	UNCTAD	FDI inflow into Nepal, converted into real deflating GDP deflator http://unctadstat.unctad.org accessed on 11/10/2012
TARIFF	WDI, World Bank	Tariff rate, applied, weighted mean, all products for Nepal
INDIA	Dummy variable	1 if trading partner is India, 0 otherwise, used only in the global sample
INDITBLOCK	Dummy variable	1 for year 1989 and 1990, and 0 otherwise
TDIFF	WDI, World Bank	The difference between Nepal and India import tariff
MCFAC	Dummy Variable	A binary dummy for years city focused armed conflict by CPN Maoist

4.5.2 Econometrics

The estimation method should capture the country, partner and product specific effects that impact on the export performance of a country. Fixed effect estimation (FE) would be the most appropriate method, but it can not estimate the coefficients for time-invariant variables such as distance, border and other dummies. Because of this context, random effect (RE) estimation is used in most of the empirical estimations in the literature when time-invariant variables are important for the study (for example: McCallum 1995, Anderson & Wincoop 2004, Athukorala & Yamashita 2009).

Another option would have been to use System GMM as developed by Arellano & Bond (1991), but this is also not suitable as this study covers a time period of more than 15 years. Roodman (2009) suggests that the system GMM is not suitable and gives unreliable results if the time length is more than 15 years. The HT estimation used in the first chapter is not credible here because it could not pass the test for over identification and this situation suggests the results are doubtful (Shin & Serlenga 2007). The PPML estimation used in Chapter 3 is also not a suitable method in this case because the data are disaggregated to product levels, that method would be more appropriate in the case of many missing variables or with the problem of log linearization as suggested by Silva & Tenreyro (2006). Thus, the model is estimated using two different methods: POLS and RE estimation techniques. One general question may be the potential endogeneity issue caused by the possible reverse causality from GDP to exports as the GDP variable is of Nepal. However, the exports in this study are measured at product level and the GDP is measured in the country level so there is a minimal risk of reverse causality. Thus, the endogeneity in this case is not powerful enough to impact on the credibility of the results.

4.5.3 Results

Descriptive statistics and correlation matrix tables are presented in Appendix 4A (Table 4A.2 and Table 4A.3). The preferred estimation (RE estimation) results are presented in Table 4.15 to Table 4.17. The POLS results are presented for comparison in Table 4A.4 to Table 4A.6. The post estimation statistics are presented in the lower panels of the tables.

The time trend was not included in the final estimation of the model because it was highly correlated with the reporting country's (Nepal's) GDP. This is a common problem encountered in estimating the gravity equation using data for a single reporter country (Athukorala & Yamashita 2009). Therefore, to decide whether to retain the time trend or the GDP in the final equation, Table 4.14 presents the estimation disaggregating the exports to the world and exports to the rest of the world (excluding India as a partner) for total products including and excluding the year effect. The first and second columns present the results for the estimation of Nepalese exports to the world without year effect and with year effect. The third and fourth columns present the same results but exclude India as a partner. When year effects are added, Nepal's GDP is dropped from the estimation. The rest of the variables of interest are almost similar except for the Nepalese tariff rate and the Indian trade blockade. If India as a partner is excluded, the results with time effect seem more credible due to the coefficient of the Indian trade blockade and tariff rates. Therefore, the rest of the estimations are done with year effect.

Table 4.14: DETERMINANTS OF EXPORT PERFORMANCE 1980-2010 (RANDOM EFFECT-YEAR)

<i>Dependent Variable: Exports-log</i>	Export to World		Exports excluding India	
	(No Year Effect)	(Year Effect)	(No Year Effect)	(Year Effect)
Nepal's GDP	0.072 (0.192)		0.275 (0.207)	
Partner's GDP	0.467*** (0.038)	0.493*** (0.038)	0.420*** (0.038)	0.429*** (0.038)
Distance (DIS)	-0.524*** (0.104)	-0.578*** (0.105)	-0.443*** (0.104)	-0.462*** (0.105)
Real Exchange Rate (REER)	0.270*** (0.051)	0.472*** (0.058)	0.273*** (0.061)	0.457*** (0.081)
Value-weight ratio (VWT)	0.061*** (0.014)	0.062*** (0.014)	0.105*** (0.015)	0.108*** (0.015)
FDI	0.114*** (0.039)	-0.941 (1.651)	0.102** (0.041)	-0.013 (0.041)
India (Dummy)	1.258*** (0.245)	1.129*** (0.246)		
Nepalese Tariff Rate % (TARIFF)	-0.039*** (0.014)	0.763 (1.544)	-0.036** (0.015)	-0.062* (0.035)
Indian Trade Blockade (INDTBLOCK)	-0.382*** (0.075)	0.701 (2.397)	-0.377*** (0.074)	-0.622*** (0.135)
Maoist Movement (MCFAC)	0.076 (0.049)	5.209 (9.508)	-0.078 (0.053)	-0.075 (0.093)
<i>Number of observations</i>	13,978	13,978	11,898	11,898
<i>Group-partner & products</i>	2,105	2,105	1,898	1,898
<i>Wald Statistic</i>	1,471	39,137	1,171	1,184
<i>R-squared</i>	0.11	0.12	0.11	0.12

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Prior to January 2005, Nepalese garment exports were significantly influenced by the country-specific export quotas imposed under the Multi-Fibre Arrangement (MFA) (Athukorala 2013). Noting this point, the estimations are made removing the entire garment product from the sample and the results are reported in the

second columns of all tables. Table 4.15 presents the estimations disaggregating exported products to the world into total exports, excluding garments, agriculture products and manufacturing products. The results show that the main variables of interest are statistically highly significant in most cases. It seems that excluding garment products does not change the results substantially. Apart from the gravity variables (GDP of partner countries, distance and border), the high value-to-weight products, real exchange rate, and India are the main determinants of Nepalese export performance.

Once the other determinants are controlled, a one percent increase in the partners' GDP causes the exports to increase on average by 0.5 percent. Distance, which is associated with trade costs, has a negative and statistically significant impact on exports. For the total exports of all products to the world sample, if the other variables are held constant, a one percent increase in distance causes exports to decline on average by about 0.60 percent. The results for distance are quite consistent with those of previous studies using the gravity model, for example, Anderson & Wincoop (2001), Athukorala & Yamashita (2009) and Chi (2010). If garment products are excluded from the sample, this impact seems to be about 0.8 percent. As most agriculture products are heavy in weight and do not belong to the high value-to-weight products category, the negative impact of distance is found to be about one and a quarter percent, which is huge compared to other cases. The negative impact of distance on manufacturing exports is found to be 0.4 percent, the lowest among the subsamples within the same condition.

The coefficients of the real exchange rate variable (REER) are statistically significant for total exports; excluding the garment sample suggests that the depreciation of NRe makes more export friendly environment and increases Nepal's international competitiveness. The results show that a one percent depreciation of the real exchange rate index causes an increase in exports on average of 0.47 percent

and 0.30 percent, respectively, for all products, excluding the garments sample. For agriculture products, it seem to have negative impact of about 0.33 percent, and for the manufacturing products, it is a positive but not statistically significant result.

Concerning the results for the value-to weight ratio (VWT), there is a strong evidence that Nepal has a better opportunity if it focuses on high-value to weight products, which are favourable to minimise the transportation costs and can be exported using air transport minimising the dependency on land transport. It also provides the way to deal with the major geographical problem, the landlockedness. The coefficient of this variable is highly significant and has a positive sign as expected. The results suggest that a one percent increase in this ratio causes to increase the exports by about 0.06 percent (six percentage points) for all products, 0.04 percent for excluding garments, and 0.12 percent for manufacturing products, conditional on other thing remains the same in the model.

The tariff rate (TARIFF) variable is not statistically significant except for agriculture products: on this sample, it has a positive sign, against my expectations. The tariff and the FDI variables suggest there is room to improve on the policy reform as many of the policy reform tasks are in limbo due to political instability in the country, especially since 2001. The Indian dummy variable is statistically significant except for agricultural products and the coefficients are large. Overall, India's role in Nepal's exports is significant as a majority of the exports go to the Indian market. If garment products are excluded from the sample, the Indian trade blockade has a significant negative impact. Specifically, the impact of this blockade is found for other than garment manufacturing products as export of some of the garment products to third countries was possible via air transport.

Table 4.15: EXPORTS TO WORLD 1980-2010 (RANDOM EFFECT)

<i>Dependent Variable: Exports-log</i>	(Total Exports)	(Excluding Garments)	(Agricultural Exports)	(Manufacturing Exports)
Partner's GDP	0.493*** (0.038)	0.526*** (0.039)	0.576*** (0.079)	0.505*** (0.043)
Distance (DIS)	-0.578*** (0.105)	-0.790*** (0.105)	-1.245*** (0.213)	-0.441*** (0.118)
Real Exchange Rate (REER)	0.472*** (0.058)	0.305*** (0.062)	-0.329*** (0.121)	0.122 (0.075)
Value-weight ratio (VWT)	0.062*** (0.014)	0.045*** (0.014)	-0.039 (0.033)	0.119*** (0.016)
FDI	-0.941 (1.651)	0.027 (0.109)	-4.147 (4.435)	-0.072 (0.109)
Nepalese Tariff Rate % (TARIFF)	0.763 (1.544)	-0.024 (0.090)	0.736* (0.408)	-0.111 (0.088)
India (Dummy)	1.129*** (0.246)	0.868*** (0.246)	-0.065 (0.461)	1.345*** (0.287)
Indian Trade Blockade (INDTBLOCK)	0.701 (2.397)	-0.736*** (0.239)	5.082 (6.322)	-0.208 (0.239)
Maoist Movement (MCFAC)	5.209 (9.508)	-0.425 (0.598)	15.934 (17.237)	1.159* (0.591)
<i>Number of observations</i>	13,978	11,889	2,629	11,349
<i>Group-partner & products</i>	2,105	1,978	496	1,609
<i>Wald Statistic</i>	39,137	37,150	207	1,184
<i>R-squared</i>	0.12	0.07	0.11	0.18
<i>Year Effect</i>	Yes	Yes	Yes	Yes

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 4.16 presents the estimation for exports to India with the same samples of products. The coefficients for partner's GDP are much larger and statistically highly significant, with the expected positive sign. The real exchange rate variable has a negative sign and is statistically significant, except for the agricultural product samples. This reflects the opposite story to that of exports to the world and exports to

the rest of the countries' samples. The results suggest that due to the peculiar trade situation with India, if the Nepalese Rupee is depreciated (increased) by one percent against the Indian Rupee, exports to India decline by 4.6 percent for total exports, and excluding garments, and 8.2 percent for manufacturing exports. This situation is related to trade deflection, that is, if the Nepalese Rupees is depreciated, those items listed in Table 4.12 become more expensive to import into India via Nepal, resulting a decline in Nepalese exports.

The value-to-weight ratio variable is highly statistically significant in total exports, excluding garment products and manufacturing products, with a negative sign. It seems that most of the high value-to-weight products are not exported to India due to the substantial difference in the price level between the Indian market and that of third countries. The FDI variable is significant at 10 percent level of significance only in the manufacturing products sample.

The tariff differential variable is statistically significant, with a negative sign as expected, and the results suggest that if Nepalese tariff rates are lower than those of India, it motivates trade deflection. One percentage point increase in the tariff differential (Nepal's tariff-India's tariff) between Nepal and India results in an increase in exports by on average 0.05 percentage points in all samples. This finding is consistent with the discussion on the commodity composition of Nepalese exports to India (see subsection 4.4.3). We noted in that section that manufacturing products such as iron and steel, copper and equipment are imported from third countries, and with some changes in packaging, are re-packaged to suit the market or without doing anything, and are then exported to the Indian market.

The Indian trade blockade imposed by India during 1989 had a statistically significant negative impact on Nepal's export performance. During this period, the level of exports was about 70 percent lower on average, after controlling for the

other variables. The Maoist movement had a positive impact on exports to India. The Maoist movement disrupted most industrial activity, with the result that many importers from overseas lost confidence in timely supply of goods from Nepalese exporters. Consequently, the Nepalese exporters had no option than to focus on the Indian market.

Table 4.17 presents estimations for the rest of the world (excluding India as a partner) for the same level of product disaggregation. Partners' GDP and distance have the expected sign and are highly statistically significant. The negative impact of distance is found to be the highest for agricultural products. The coefficient of the real exchange rate variable is statistically significant as expected and consistent with the other main results from the global sample. The high value-to-weight ratio has larger coefficients compared to other samples with a consistency of statistical significance level at one percent, with the exception of agricultural products. The coefficient of the Nepalese tariff rate is significant for total and manufacturing exports. The Indian trade blockade has a statistically significant negative impact on all exports except agricultural products. The role of the Maoist movement in total exports and excluding garments products, is found to be negative but not statistically significant.

To test the robustness of the results related to the value-to-weight variable (which is one of the main variables of interest), I re-estimated the trade equation after replacing that variable with an alternative measure of value-to-weight variable. To create this variable, I calculated the mean value per Kg. of the products, and then took it as the borderline to mark the products as high value-to-weight or low value-to-weight products. In this definition, if the value-to-weight ratio is greater than the mean value, those products are defined as light products (high value-to-weight products) and are marked 1 for dummy, and if the value-to-weight ratio is smaller than the mean value, marked as 0. I expect the positive sign of the dummy to conclude that the results are robust, that is, lighter products would improve exports from

Nepal. For this, RE estimation is undertaken. The results are presented Table 4.18 and Table 4.19 for exports to the world and exports to the world excluding India as a partner. The estimated coefficient of the alternative variable is statistically significant with the expected positive sign and the overall results are not substantially different from those reported in Tables 4.14 and 4.16, suggesting that the results are robust.

Table 4.16: EXPORTS TO INDIA 1980-2010 (RANDOM EFFECT)

<i>Dependent Variable: Exports-log</i>	(Total Exports)	(Excluding Garments)	(Agricultural Exports)	(Manufacturing Exports)
Partner's GDP	2.899*** (0.434)	2.861*** (0.442)	1.928*** (0.618)	3.545*** (0.606)
Distance (DIS)	dropped	dropped	dropped	dropped
Real Exchange Rate (REER)	-4.601*** (1.455)	-4.622*** (1.467)	-1.853 (1.716)	-8.236*** (2.631)
Value-weight ratio (VWT)	-0.183*** (0.042)	-0.207*** (0.042)	-0.061 (0.068)	-0.278*** (0.055)
FDI	-0.024 (0.086)	-0.003 (0.089)	-0.121 (0.124)	0.214* (0.121)
Tariff Differential Rate % (TARIFF)	-0.062*** (0.007)	-0.064*** (0.008)	-0.046*** (0.010)	-0.066*** (0.011)
Indian Trade Blockade (INDTBLOCK)	-1.107*** (0.363)	-1.337*** (0.402)	-0.702 (0.436)	-1.467** (0.618)
Maoist Movement (MCFAC)	0.428*** (0.141)	0.358** (0.149)	0.372 (0.228)	0.362** (0.180)
<i>Number of observations</i>	2,080	2,017	883	1,197
<i>Group-partner & products</i>	207	200	72	135
<i>Wald Statistic</i>	305	293	50	1,197
<i>R-squared</i>	0.15	0.15	0.07	0.26
<i>Year Effect</i>	Yes	Yes	Yes	Yes

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 4.17: EXPORTS TO REST OF WORLD (EXCLUDING INDIA)1980-2010 (RANDOM EFFECT)

<i>Dependent Variable: Exports-log</i>	(Total Exports)	(Excluding Garments)	(Agricultural Exports)	(Manufacturing Exports)
Partner's GDP	0.429*** (0.038)	0.458*** (0.039)	0.510*** (0.080)	0.444*** (0.043)
Distance (DIS)	-0.462*** (0.105)	-0.680*** (0.105)	-1.123*** (0.214)	-0.344*** (0.117)
Real Exchange Rate (REER)	0.457*** (0.081)	0.579*** (0.086)	-0.014 (0.179)	0.303*** (0.092)
Value-weight ratio (VWT)	0.108*** (0.015)	0.094*** (0.015)	-0.027 (0.038)	0.174*** (0.017)
FDI	-0.013 (0.041)	-0.152*** (0.044)	-1.581 (5.079)	0.057 (0.045)
Nepalese Tariff Rate % (TARIFF)	-0.062* (0.035)	0.146*** (0.037)	-0.342 (0.693)	-0.225*** (0.038)
Indian Trade Blockade (INDTBLOCK)	-0.622*** (0.135)	-0.760*** (0.150)	1.001 (7.375)	-0.525*** (0.143)
Maoist Movement (MCFAC)	-0.075 (0.093)	-0.055 (0.098)	2.941 (18.885)	0.070 (0.096)
<i>Number of observations</i>	11,898	9,872	1,746	10,152
<i>Group-partner & products</i>	1,898	1,778	424	1,474
<i>Wald Statistic</i>	39,137	-	122	-
<i>R-squared</i>	0.12	0.06	0.03	0.18
<i>Year Effect</i>	Yes	Yes	Yes	Yes

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 4.18: ROBUSTNESS CHECK RE RESULTS, EXPORTS TO WORLD 1980-2010

<i>Dependent Variable: Exports-log</i>	(Total Exports)	(Excluding Garments)	(Agricultural Exports)	(Manufacturing Exports)
Partner's GDP	0.488*** (0.038)	0.523*** (0.038)	0.583*** (0.079)	0.501*** (0.043)
Distance (DIS)	-0.554*** (0.104)	-0.778*** (0.105)	-1.273*** (0.211)	-0.403*** (0.118)
Real Exchange Rate (REER)	0.447*** (0.059)	0.275*** (0.062)	-0.340*** (0.121)	0.082 (0.075)
Value-weight Ratio (VWT)	0.162*** (0.032)	0.194*** (0.035)	-0.052 (0.087)	0.192*** (0.034)
FDI	-1.141 (1.651)	0.039 (0.109)	-4.122 (4.443)	-0.041 (0.109)
Nepalese Tariff Rate % (TARIFF)	0.952 (1.544)	-0.033 (0.090)	0.729* (0.409)	-0.134 (0.088)
India (Dummy)	1.092*** (0.245)	0.838*** (0.245)	-0.056 (0.458)	1.295*** (0.287)
Indian Trade Blockade (INDTBLOCK)	1.040 (2.397)	-0.696*** (0.239)	5.029 (6.333)	-0.144 (0.239)
Maoist Movement (MCFAC)	6.445 (9.510)	-0.401 (0.598)	15.787 (17.268)	1.126* (0.592)
<i>Number of observations</i>	13,978	11,889	2,629	11,349
<i>Group-partner & products</i>	2,105	1,978	496	1,609
<i>Wald Statistic</i>	39,370	37,376	209	31,776
<i>R-squared</i>	0.12	0.07	0.01	0.18
<i>Year Effect</i>	Yes	Yes	Yes	Yes

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 4.19: ROBUSTNESS CHECK RE RESULTS, EXPORTS TO OTHER THAN INDIA 1980-2010

<i>Dependent Variable: Exports-log</i>	(Total Exports)	(Excluding Garments)	(Agricultural Exports)	(Manufacturing Exports)
Partner's GDP	0.420*** (0.038)	0.450*** (0.038)	0.514*** (0.080)	0.438*** (0.043)
Distance (DIS)	-0.416*** (0.104)	-0.645*** (0.105)	-1.142*** (0.213)	-0.287** (0.117)
Real Exchange Rate (REER)	0.411*** (0.081)	0.524*** (0.086)	-0.024 (0.179)	0.244*** (0.092)
Value-weight Ratio (VWT)	0.244*** (0.033)	0.301*** (0.035)	-0.006 (0.107)	0.262*** (0.034)
FDI	0.007 (0.041)	-0.130*** (0.044)	-1.580 (5.083)	0.084* (0.045)
Nepalese Tariff Rate % (TARIFF)	-0.077** (0.035)	0.130*** (0.037)	-0.354 (0.693)	-0.242*** (0.038)
Indian Trade Blockade (INDTBLOCK)	-0.567*** (0.135)	-0.699*** (0.149)	0.997 (7.381)	-0.437*** (0.144)
Maoist Movement (MCFAC)	-0.029 (0.093)	-0.007 (0.098)	2.896 (18.900)	0.129 (0.096)
<i>Number of observations</i>	11,898	9,872	1,746	10,152
<i>Group-partner & products</i>	1,898	1,778	424	1,474
<i>Wald Statistic</i>	-	-	122	-
<i>R-squared</i>	0.12	0.07	0.01	0.18
<i>Year Effect</i>	Yes	Yes	Yes	Yes

Note:*** , ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

4.6 Conclusion

This chapter has examined Nepal's export performance, with a focus on the constraining effects arising from landlockedness. Following an overview of the policy context and trends and patterns of exports, determinants of exports are examined by estimating export equations within the standard gravity modelling framework.

The results demonstrate that partners' GDP, the real exchange rate, selection of high in value and low in weight (high-value-low-weight) products, trade reform and the Gulliver effect (the India factor) are the main determinants of Nepal's exports among the variables controlled in the model. As in other landlocked developing countries, the transport costs play a significant role in Nepal's export performance. The tariff differential with India seems to have caused significant trade deflection, resulting in an artificial increase in recorded Nepalese exports to India.

Being a landlocked country, Nepal does not directly control the land transportation costs. Therefore, the types of products that should be especially focused on is an important issue. Based on the econometric estimation, it is found that Nepal's exports performance can be improved by focussing export development policy on high value-to-weight products, which can be shipped by air or in large-value quantities via land transport. This would help for minimizing the trading disadvantage arising from its landlocked situation.

The main policy inferences drawn from this chapter are as follows: first, by focusing on high-value-low-weight products, Nepal could increase its exports to a higher level. Second, being a landlocked country and having India as its largest partner, Nepal's trade policies should be in line with those of India to benefit from the international trade.

Third, the results make a strong case for paying attention to the adverse implications of the current practice of pegging the Nepalese Rupee to the Indian Rupee for the diversification of exports to third country markets. This is an issue which needs further study given the administrative constraints and political economy considerations relating to the difficulties involved in delinking with the Indian Rupee. Botswana is a good example of a country locked in by a giant neighbour (South Africa); it manages the exchange rate aiming to maintain international competitiveness and exchange rate stability (see Masalila & Motshidisi 2003) which can be used as a comparator for probing this issue. Finally, trade deflection resulting from the tariff differential with India needs to be taken into account in future trade policy reforms in Nepal.

Appendix 4A

Table 4A.1: DISCRETIONARY CHANGE IN THE EXCHANGE RATE OF NRE VIS-À-VIS IRE

Date	Rate:NRe/IRe	Remarks
13 April, 1960	1.60	Fixation of the new rate after the establishment of NRB with the introduction of free and unlimited convertibility of IC
6 June 1966	1.01	A marked appreciation of about 37 percent of Rupee due to the decision of the government not to follow the Indian path of sharp devaluation of its currency.
8 November, 1967	1.35	Devaluation of the NRe to maintain the international competitiveness.
22 December, 1971	1.39	Following the realignment of currency on Dec 17, 1971 the exchange rate of NRe/IRe was also revised along with Pound Sterling, Deutsch Mark and Japanese Yen effective from Dec 22, 1971
22 March, 1978	1.45	Almost same reason as of 22 December, 1971
30 November, 1985	1.70	14.7 percent devaluation of NRe against foreign currencies.
31 May, 1986	1.68	It was also decided to include IRe in the currency basket system effective from June 1, 1983. The previous practice of setting the buying and selling rates of IRe on the basis of parity fixed by the government was done away with. NRB started to quote the buying and selling rates of IC also on a daily basis as in the case of other currencies.
July 1, 1991	1.65	-
Feb. 12, 1993	1.60	Adjustment due to change in India

Source: Adhikary (2005)

Table 4A.2: DESCRIPTIVE STATISTICS

Variables	Obs	Mean	Std. Dev.	Min	Max
Exports-log	13978	9.88	2.72	-0.1	19.0
GDP-log	13978	22.32	0.34	21.5	22.7
Partners' GDP-log	13978	27.20	1.54	19.7	30.1
Distance -log	13978	8.39	0.90	6.1	9.4
Real Exchange Rate-log	13978	4.44	0.57	2.1	8.6
Indian Trade Blockade	13978	0.04	0.19	0	1
Maoist movement	13978	0.45	0.50	0	1
Value weight ratio-log	13978	2.15	1.72	-6.8	10.6
FDI-log	13978	17.53	1.44	13.3	18.7
Tariff Differential	13978	-10.92	14.93	-38.1	7.1
Tariff of Nepal	13978	15.12	1.37	13.3	20.1
India	13978	0.15	0.36	0	1

Table 4A.3: CORRELATION MATRIX

	lexpor l	lgdp000	lp dp000	ldist	lbilat r	indiab k	mao	lvalw t	lrealfdi	tardiff	tariff l	india
Exports-log	1											
GDP-log	-0.06	1.00										
Partners' GDP-log	0.20	-0.02	1.00									
Distance -log	-0.14	-0.08	0.50	1.00								
Real Exchange Rate-log	-0.01	0.80	-0.08	-0.14	1.00							
Indian Trade Blockade	-0.01	-0.22	0.01	0.04	-0.17	1.00						
Maoist movement	-0.08	0.74	-0.05	-0.06	0.48	-0.18	1.00					
Value-weight ratio-log	-0.10	0.08	0.13	0.44	-0.04	0.01	0.08	1.00				
FDI-log	-0.05	0.97	-0.01	-0.08	0.80	-0.21	0.68	0.06	1.00			
Tariff Differential	-0.05	0.91	-0.03	-0.07	0.75	-0.35	0.64	0.08	0.84	1.00		
Tariff of Nepal	0.06	-0.53	0.05	0.03	-0.31	0.11	-0.70	-0.07	-0.44	-0.43	1.00	
India	0.28	0.01	-0.10	-0.80	0.13	-0.05	-0.01	-0.43	0.02	0.00	0.02	1.00

Note: For details of variables, see Table 4A.2

Table 4A.4: DETERMINANTS OF EXPORT PERFORMANCE TO WORLD 1980-2010 (POLS)

<i>Dependent Variable: Exports-log</i>	(Total Exports)	(Excluding Garments)	(Agricultural Exports)	(Manufacturing Exports)
Partner's GDP	0.505*** (0.020)	0.500*** (0.021)	0.504*** (0.048)	0.505*** (0.022)
Distance (DIS)	-0.404*** (0.057)	-0.659*** (0.060)	-1.385*** (0.127)	-0.145** (0.064)
Real Exchange Rate (REER)	0.244*** (0.065)	0.083 (0.069)	-0.661*** (0.127)	0.274*** (0.078)
Value-weight ratio (VWT)	0.034** (0.014)	-0.012 (0.014)	-0.085*** (0.031)	0.075*** (0.018)
FDI	-0.125*** (0.030)	-0.185*** (0.031)	-0.194*** (0.054)	-0.049 (0.038)
Nepalese Tariff Rate % (TARIFF)	-0.017 (0.022)	-0.021 (0.023)	-0.009 (0.049)	-0.018 (0.024)
India (Dummy)	1.587*** (0.125)	1.316*** (0.128)	0.080 (0.241)	2.024*** (0.147)
Indian Trade Blockade (INDITBLOCK)	-0.121 (0.118)	-0.050 (0.147)	0.004 (0.297)	-0.272* (0.152)
Maoist Movement (MCFAC)	-0.333*** (0.074)	-0.262*** (0.079)	-0.237 (0.177)	-0.370*** (0.083)
Number of observations	13,978	11,889	2,629	11,349
F-Statistic	230	228	80	161
R-squared	0.14	0.17	0.25	0.14

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 4A.5: DETERMINANTS OF EXPORT PERFORMANCE TO INDIA 1980-2010 (POLS)

<i>Dependent Variable: Exports-log</i>	(Total Exports)	(Excluding Garments)	(Agricultural Exports)	(Manufacturing Exports)
Partner's GDP	2.314*** (0.659)	2.228*** (0.667)	1.189 (0.934)	2.964*** (0.928)
Distance (DIS)	dropped	dropped	dropped	dropped
Real Exchange Rate (REER)	-1.064 (2.189)	-1.062 (2.193)	-1.221 (2.589)	0.967 (3.983)
Value-weight ratio (VWT)	-0.366*** (0.035)	-0.418*** (0.037)	-0.126* (0.067)	-0.589*** (0.050)
FDI	-0.175 (0.129)	-0.161 (0.131)	-0.100 (0.187)	-0.181 (0.182)
Tariff Differential % (TDIFF)	-0.035*** (0.011)	-0.034*** (0.012)	-0.032** (0.016)	-0.029* (0.016)
Indian Trade Blockade (INDTBLOCK)	-0.349 (0.552)	-0.290 (0.606)	-0.095 (0.664)	-0.446 (0.946)
Maoist Movement (MCFAC)	0.136 (0.212)	0.100 (0.224)	0.289 (0.342)	-0.012 (0.274)
Number of observations	2,080	2,017	883	1,197
F-Statistic	19	19	3	25
R-squared	0.06	0.07	0.01	0.13

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Table 4A.6: DETERMINANTS OF EXPORT PERFORMANCE TO REST OF WORLD 1980-2010 (POLS)

<i>Dependent Variable: Exports-log</i>	(Total Exports)	(Excluding Garments)	(Agricultural Exports)	(Manufacturing Exports)
Partner's GDP	0.503*** (0.020)	0.499*** (0.021)	0.486*** (0.047)	0.501*** (0.021)
Distance (DIS)	-0.461*** (0.056)	-0.726*** (0.058)	-1.343*** (0.124)	-0.200*** (0.063)
Real Exchange Rate (REER)	0.414*** (0.075)	0.372*** (0.080)	-0.359** (0.158)	0.456*** (0.084)
Value-weight ratio (VWT)	0.118*** (0.015)	0.073*** (0.015)	-0.059* (0.035)	0.183*** (0.018)
FDI	-0.189*** (0.038)	-0.314*** (0.040)	-0.307*** (0.081)	-0.125*** (0.042)
Nepalese Tariff Rate % (TARIFF)	-0.002 (0.024)	-0.010 (0.025)	0.032 (0.060)	-0.011 (0.025)
Indian Trade Blockade (INDTBLOCK)	-0.168 (0.119)	-0.036 (0.129)	-0.188 (0.257)	-0.195 (0.131)
Maoist Movement (MCFAC)	-0.425*** (0.080)	-0.310*** (0.083)	-0.432** (0.210)	-0.394*** (0.085)
Number of observations	11,898	9,872	1,746	10,152
F-Statistic	140.501	115.588	43.525	147.949
R-squared	0.086	0.086	0.167	0.104

Note:***, ** and * indicate 1%, 5% and 10% level of statistical significance, respectively. The figures in parentheses are standard errors.

Conclusion

5.1 Findings

This thesis investigates the determinants of economic growth and export performance of landlocked developing countries (LLDCs). The first two core chapters (Chapter 2 and 3) examine the impacts of landlockedness on economic growth and export performance, respectively, through analysing differences between LLDCs and non-landlocked developing countries, and among LLDCs. The third core chapter (Chapter 4) examines the determinants of export performance of a selected landlocked country, Nepal.

The empirical analyses presented in these chapters have yielded a number of findings which are of considerable policy relevance for landlocked developing countries (LLDCs). The main finding of this thesis suggests that landlockedness imposes the binding constraints but there are ways to minimize the negative effects of those constraint via improving the quality of the governance and making a more trade friendly environment. Thus, landlockedness is not necessarily destiny.

The findings of Chapter 2 confirm the negative impacts of landlockedness on economic growth. It is also noted that the magnitude of this impact is sensitive to alternative estimation methods. Further, it was found that good governance

and sound policies can help lower the negative impacts of the constraints imposed by landlockedness. However, LLDCs will still be disadvantaged relative to other, non-landlocked countries with similar policies. The role of trade is significant for economic growth in LLDCs, although these countries face additional hurdles for trade. The results also suggest that the market size of the neighbours of a landlocked country is important for economic growth.

The empirical results of Chapter 3 reveal that the LLDCs have been making some progress in export expansion over the past four decades, but their export performance remains poor compared to other developing countries. While landlockedness remains a binding constraint, there are opportunities for these countries to improve their export performance by creating a more trade-friendly environment. This can be achieved by lowering tariffs, reforming exchange rates and involving themselves in regional trade agreements. The results also suggest that, unlike the export performance of African developing countries compared to other developing countries, African landlocked countries as a group have an export level which is about 30 percent higher than those of the other landlocked developing countries. In addition, this chapter found evidence that the magnitude of the negative effect of geographic distance on export performance is much bigger in LLDCs compared to other developing countries.

One of the most important findings from the Nepalese case study (Chapter 4), which is relevant to LLDCs' export performance is that the high value-to-weight products, which can be transported via air cargo or in large value-quantity via land transport thus minimising the negative impact of landlockedness, contribute to foster export growth. Further, the results suggest that export competitiveness measured by the real exchange rate is a significant determinant of export performance; this also indicates that pegging LLDCs currency with their giant neighbour's currency creates a big neighbour bias in international trade. As Nepal is a landlocked country, narrow-

ing the tariff differential with India may be a way to improve the exports. In addition, evidence was found that that Nepal's export performance is determined by its partners' GDP. Apart from distance, the unstable political situation resulted from various political movements and the city-focused activities of the CPN-Maoists continued to making export growth stagnant. However, the impact of the city-focused activities of the CPN-Maoists was not consistent over the alternative estimation methods.

5.2 Policy Inferences

A number of policy inferences can be drawn from the findings of the thesis. The first set of policy inferences from Chapter 2 is that improvements in a neighbour's infrastructure may be a useful means of improving the development prospects of a LLDC. Attempts to develop infrastructure in a given landlocked country in isolation is not as effective as when such projects are properly coordinated with the infrastructure development programs of neighbouring countries. Strengthening the quality of governance and creating a more trade-friendly environment in LLDCs would also help in overcoming or minimising the constraints imposed by landlockedness.

Based on the analysis in Chapter 3, it can be said that the immediate policy challenge faced by LLDCs in promoting exports, is to improve the quality of infrastructure and the logistic environment. The empirical results suggest that even though landlockedness is a constraint, landlocked developing countries can improve their export level by creating a more export friendly environment and maintaining an export friendly exchange rate system. Benefits can be gained from trade liberalisation in LLDCs too but when compared to other developing countries, the benefits are low because of high trade costs. Thus, the LLDCs may need to focus on specific product lines to reduce trade costs; in particular, selecting transportation costs effective (low costs) product lines.

The main policy inferences from Chapter 4 are as follows: first, focusing on high-value-low-weight products, a landlocked country like Nepal can raise its exports to a higher level as these products are cost (transportation costs) effective, that is, they are less sensitive to shipping-based transportation costs. Nepal's international competitiveness (measured by real exchange rate) exchange rate is a significant determinant of export performance; therefore, an export friendly exchange rate policy is essential. Nepalese policy makers also need to pay attention to the adverse implications of the current practice of pegging the Nepalese rupee to the Indian rupee for the diversification of exports to third country markets. In addition, Nepal can gain more benefits in exports from appropriate trade reforms, which need to be in line with India's trade policies. This includes narrowing the tariff differential to avoid distortion and negative impacts of trade deflection.

5.3 Limitations and Suggestions for Further Research

This thesis has some limitations; mostly they emerge from the lack of data, as is always the case when working on developing countries. The short time series for which proxies for governance and tariff rates were available constrained the time span employed for the study. Further, due to lack of information for many countries, the Sachs-Warner index is updated only for 197 countries; this could be extended to cover more countries in the future. The credibility of the empirical findings would be improved substantially by using a richer set of data and policy variables in the future. This thesis also has the potential to be extended with more disaggregated data, covering regional specific or income level specific groups to make a more detailed study.

Chapter 2 explained the growth determinants of LLDCs and found one new variable relevant to LLDCs context, that is, market size of a neighbour. This could be

used in other contexts, as a distinct control variable in studies of trade and growth to make more credible findings.

The analysis in Chapter 3 on the determinants of export performance could be extended by using product-level data disaggregated into many sectors and just focusing on 34 LLDCs only. The measurement of value-to-weight ratio for this group of countries could be included to confirm the nature of the products most suitable for these countries, but the lack of availability of data has compelled to exclude this variable in the chapter. There is also the potential for research on this topic using alternative methods of estimation to investigate whether trade helps to reduce poverty in these countries.

An important missing variable in the analysis of Nepal's exports in Chapter 4 is logistic quality. Time series data of Nepal's logistic quality for the period under study are not currently available. Further research is needed to fill this gap. There is also need for firm-level analysis of determinants of export performance in order to supplement the product-level analysis undertaken in this study. As other studies, this study also has its limitations arising from the unbalanced panel data such as distortion from data measurement errors and gap.

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