

Universidade De Lisboa  
ISEG-Lisbon School of Economics and Management



**Institutions, Geography and Economic Prosperity:  
The Case of Landlocked Countries**

Subarna Basnet

Orientador(es): Professor Doutor Alexandre José Germano de Abreu

Thesis specially designed to obtain the doctor's degree in Development Studies.

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# Institutions, Geography and Economic Prosperity: the Case of Landlocked Countries

## **Abstract:**

*This study engages with, and contributes to, the debate around the determinants of economic growth and prosperity, with special reference to the case of landlocked developing countries. Two main lines of explanation are confronted, summed up by the headings ‘geography’ – landlocked countries are poorer because of the geographical constraints to their participation in international trade – and ‘institutions’ – landlocked countries are poorer because they happen to have worse economic and political institutions, not because of landlockedness per se.*

*The study adopts a cross-country empirical approach combining two main methods, both of which draw on institutional data from the Center for Systemic Peace, Freedom House, The Heritage Foundation and World Governance Indicators. In the first part of the empirical analysis, a comparative-descriptive examination is undertaken of the political and economic institutions in various regional groups of landlocked countries. This confirms the hypothesis that European landlocked nations have better economic and political institutions than non-European landlocked countries, but also finds that several institutional variables are non-significantly or even significantly but negatively associated with GDP per capita across the various regional groups of landlocked countries.*

*The second part of the empirical analysis adopts an econometric panel data approach, including a series of alternative models (namely Pooled Least Squares, Fixed Effects, Random Effects and Correlated Random Effects Models) and different specifications, to look at the impact of seventeen institutional variables, in interaction with alternative proxies for landlockedness, upon the (log) level of GDP per capita. We find that several institutional variables are significant predictors of the level of prosperity, but others are non-significant and others still are significantly but negatively associated with GDP per capita. By contrast, landlockedness appears as a powerful predictor of the income level even after controlling for the effect of institutions.*

*We conclude that institutions probably do matter for economic growth and long-term prosperity, but some institutions probably have more complicated and complex relationships with growth than usually assumed, and the question of which institutions to consider and how to properly assess and measure them is not straightforward. Landlockedness, by contrast, seems to be an unequivocal obstacle to economic prosperity.*

## **Resumo:**

*Esta tese situa-se e procura contribuir para o debate em torno dos determinantes do crescimento económico e da prosperidade das economias no longo prazo, com especial referência ao caso dos países em desenvolvimento sem litoral (“landlocked”). São exploradas e confrontadas duas explicações principais para as dificuldades destes países, as quais dão prioridade respetivamente à ‘geografia’ – a ideia de que os países sem litoral são mais pobres devido aos constrangimentos geográficos à sua participação no comércio internacional – e às ‘instituições’ – os países sem litoral são mais pobres porque se dá o caso de terem instituições económicas e políticas piores e não devido ao facto de não terem acesso ao mar.*

*A análise efetuada baseia-se numa abordagem empírica que combina dois conjuntos principais de métodos, ambos os quais assentam em dados institucionais produzidos pelo Center for Systemic Peace, Freedom House, The Heritage Foundation e World Governance Indicators. Na primeira parte da análise empírica, é levada a cabo uma análise comparativa-descritiva das instituições económicas e políticas de diferentes grupos macroregionais de países sem litoral. Esta análise corrobora a hipótese de que os países sem litoral europeus possuem instituições políticas e económicas superiores aos países sem litoral não-europeus, mas conclui também que diversas variáveis institucionais possuem associações não significativas, ou significativas mas negativas, com o PIB per capita em diferentes grupos macroregionais de países sem litoral.*

*A segunda parte da análise empírica é de carácter econométrico, adotando um conjunto de modelos distintos (Pooled Least Squares, Fixed Effects, Random Effects e Correlated Random Effects) e diferentes especificações a fim de estimar o impacto de dezassete variáveis institucionais, em interação com diferentes variáveis proxy representativas da ausência de litoral, sobre o nível (em logaritmo) do PIB per capita. Conclui-se que algumas variáveis institucionais constituem preditores significativos do nível de prosperidade económica, mas algumas outras são não-significativas e outras ainda têm associações significativas mas negativas com a variável dependente. Em contrapartida, a ausência de litoral constitui um preditor significativo e robusto do nível de rendimento per capita mesmo após consideração do efeito das instituições.*

*Conclui-se que, de uma forma geral, as instituições são provavelmente determinantes importantes do crescimento económico e da prosperidade de longo prazo, mas também que algumas instituições mantêm provavelmente relações mais subtis e complexas com o crescimento económico do que é habitualmente considerado, para além de que a escolha de quais as instituições que devem ser consideradas e de qual a forma adequada de medidas coloca os seus próprios desafios. A ausência de litoral, em contrapartida, parece constituir um obstáculo inequívoco à prosperidade económica.*

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## **Acronyms and Abbreviations**

CAR – Central African Republic  
CEPII – Centre d’Études Prospectives et d’Informations Internationales  
CIA – Central Intelligence Agency  
CREM – Correlated Random Effects Model  
CSP – Center for Systemic Peace  
CV – Civil Violence  
CW – Civil War  
DR – Democratic Republic (of Congo)  
EV – Ethnic Violence  
EW – Ethnic War  
F – Free  
FEM – Fixed Effects Model  
FH – Freedom House  
GDP – Gross Domestic Product  
GDPpc – Gross Domestic Product per capita  
GNI – Gross National Income  
HDI – Human Development Index  
HF – Heritage Foundation  
HIE – High Income Economies  
HHDI – High Human Development Index  
HHM – Hausman-Taylor hybrid model  
IMF – International Monetary Fund  
IT – Information Technologies  
IV – International Violence  
IW – International War  
LDC – Least Developed Country(ies)  
LHDI – Low Human Development Index  
LIC – Low Income Country(ies)  
LIE – Low Income Economy(ies)  
LLC – Landlocked Country(ies)  
LLDC – Landlocked Developing Country(ies)  
LMIE – Lower Middle Income Economy(ies)  
LPI – Logistics Performance Index

MdF – Moderately Free  
MF – Mostly Free  
MoUF – Mostly Unfree  
MHDI – Middle Human Development Index  
N/A: Not Available  
NF – Not Free  
NIE – New Institutional Economics  
OIE – Old Institutional Economics  
PDR – (Lao) People’s Democratic Republic  
PF – Partly Free  
POLS – Pooled Ordinary Least Squares  
PPP – Purchasing Power Parity  
REM – Random Effects Model  
R&D – Research and Development  
S.D. – Standard deviation  
TOT – Terms of Trade  
UK – United Kingdom  
UMIE – Upper Middle-Income Economies  
UN – United Nations  
UNCTAD – United Nations Conference on Trade and Development  
UN-OHRLLS – United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States  
USA – United States of America  
USSR – Union of Soviet Socialist Republics  
VHHDI – Very High Human Development Index  
WGI – Worldwide Governance Indicators  
WWII – World War II

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I take sole and full responsibility for this dissertation and its conclusions, but I would like to thank in advance the readers for sending any comments, corrections and suggestions to the email address indicated below.

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# CHAPTER I: INTRODUCTION

## 1.1 Introducing the Topic

In the decades since the Second World War, theoretical and empirical studies of economic growth have sought to identify the latter's key determinants, and focused especially on physical capital, human capital, technology, and valuable natural resources. Around 70 years of post-WWII economic development have left in place huge differences in terms of economic welfare between the frontier nations (such as the USA and European Union countries) and the so-called least developed countries, or LDCs<sup>1</sup>. Most nations in Africa, Asia, and Latin America have experienced more modest and unstable growth in per capita income and continue to be exposed to much greater human and economic vulnerability than the frontier countries. One of the key historical facts of growth is therefore the continuing divergence between the First World and the poorest countries of the Third World<sup>2</sup>. If we take a geographical perspective, however, it is striking to notice that out of 46 least developed countries in the world, about 37% are landlocked<sup>3</sup>, meaning that they have no access to the

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<sup>1</sup> The United Nations has defined a list of (currently) 46 Least Developed Countries based on their combined levels of income (gross national income per capita), human assets (indicators of nutrition, health, school enrolment and literacy) and economic vulnerability (indicators of natural and trade-related shocks, physical and economic exposure to shocks, smallness and remoteness). Since Vanuatu's graduation in December 2020, there are 46 LDC countries in total.

<sup>2</sup> First World and Third World, concepts with their roots in the history of development, are understood in this context as equivalent to, respectively, the group of countries in the Very High Human Development Index (VHHDI) and High Human Development Index (HHDI) categories; and those in the Medium Human Development Index (MHDI) and Low Human Development Index (LHI) categories. The Human Development Index, as is well-known, is a composite indicator which represents average achievements in income per capita, life expectancy and education.

<sup>3</sup> Landlockedness is the geographical condition of not having access to the sea or to a seaport. 45 landlocked nations, plus the territory of the West Bank, are identified in the CIA World Fact Book. This thesis proposes to investigate to what extent landlockedness is a determining geographical constraint (more on this in Chapter 2).

sea or a seaport. This is a significantly greater proportion than for the countries of the world in general. The question thus naturally arises: to what extent does landlockedness itself constrain economic growth? What is its place and significance among the key determinants of economic growth and development, particularly for least developed countries?

Scholars have long argued over the fundamental reasons why some countries consistently fail to perform better in terms of economic growth and to pull themselves out of poverty. Accordingly, a long-standing tradition of empirical and theoretical research has looked at the key determinants of economic growth, and at what causes the lack of such growth. Within this literature, two main strands may be identified, with their focus on geography and institutions<sup>4</sup> respectively: whether geographical features such as latitude, climate, and landlockedness<sup>5</sup> or the human-devised rules of the economic game (institutions) are more fundamental determinants of growth. This discussion is especially relevant in the case of landlocked developing countries, because while these countries experience many of the same institutional challenges and insufficiencies as other developing countries, they face an especially binding geographical constraint: the fact that their lack of direct sea access creates a significant additional burden in terms of costs and uncertainty, as a consequence of their imports and exports having to cross transit countries<sup>6</sup> to access the world market. The

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<sup>4</sup> Institutions consist of rules, whether formal (Constitution, rule of law, regulations, contracts, etc.) or informal (values and norms). The quality of institutions refers to such questions as to what extent they ensure the rule of law, civil liberties, press freedom, private property and so forth (more on this in Chapter 3).

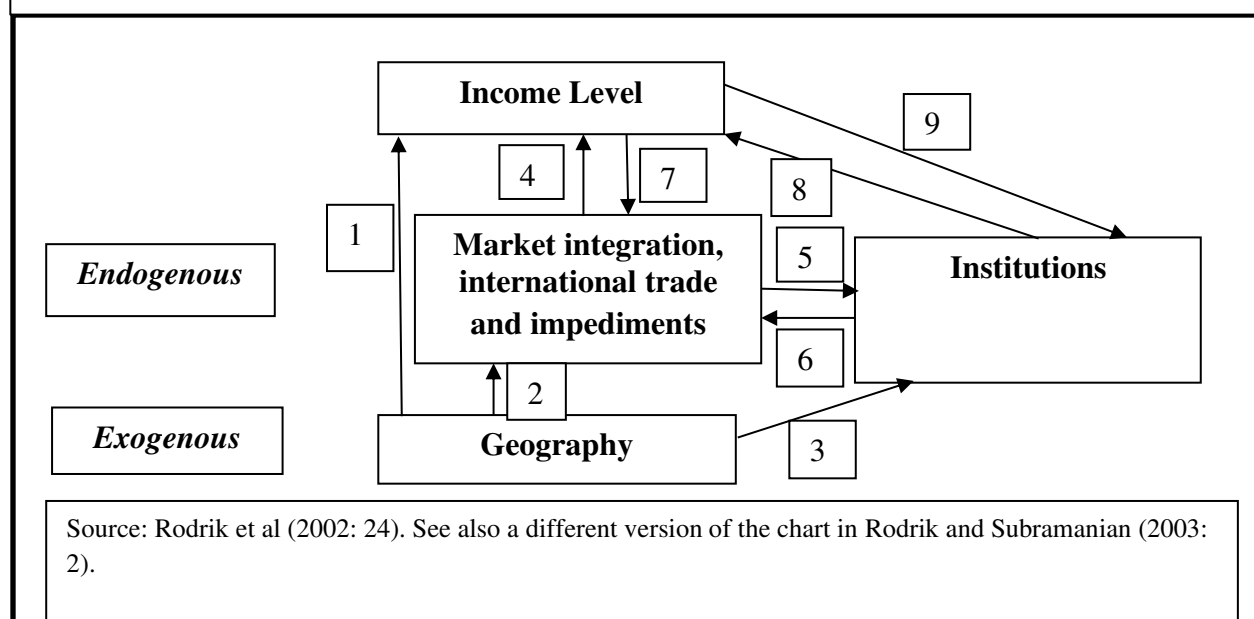
<sup>5</sup> While a variety of geographical factors have been hypothesized as determinants of growth and development (e.g., ecological zone, remoteness, disease prevalence, land productivity, etc), this study focuses exclusively on the narrow question of landlockedness: the lack of direct access to a seaport and the distance to the nearest seaport.

<sup>6</sup> Transit countries serve landlocked countries by providing them with land transit corridors to ports, thus giving them access to the sea and to world markets (UNCTAD 2013). In other words, transit countries are those which surround landlocked nations so that the latter must pass through the former to access the sea, a seaport and the world market.

fundamental general question on the primacy of geography vs. institutions therefore becomes even more crucial in the case of landlocked developing countries: even if both sets of factors are important, which of the two is the predominant one for these countries? And what are the implications for development policy?

An influential paper by Rodrik et al (2002) has argued that there exist some fundamental causal relationships between income, geography, and institutions, as well as some reverse causality mechanisms operating from institutions to income, both directly and via trade integration. The same paper depicts institutions as essentially endogenous (i.e., determined by its relationships with other variables within the model) and geography as operating exogenously (i.e. in a manner determined outside the model), whether directly (via agricultural productivity and morbidity) or indirectly (in the case of distance or sea access). The key linkages between geography, institutions and income according to these authors are as shown below:

Chart 1: The “Deep” Determinants of Income



The chart represents a triangular set of direct, indirect and reverse causality linkages between geography, institutions and the income level of a country. The numbers 1-9<sup>7</sup> each represent a specific causal linkage. Geography has a direct impact upon income through agricultural productivity and morbidity, and indirect effects through trade integration (e.g. by affecting transport costs) and institutions. In their turn, institutions (e.g. property rights, rule of law and other institutional factors) also have an impact upon income both directly and indirectly (via market integration and trade).

<sup>7</sup> Description of the effects: (1) agricultural productivity and morbidity; (2) distance to the market; (3) effect of natural resources on institutions; (4) direct impact of integration upon income (efficiency and dissemination of technology); (5) openness and transparency; (6) capacity to trade; (7) demand for foreign goods and services; (8) institutional factors (e.g. rule of law, property rights) as independent determinant of income; (9) demand for good institutions.

Institutions such as property rights and the rule of law are thus regarded as having a direct impact upon the level of income and an indirect one through market integration (via international trade and other factors). According to Rodrik and Subramanian (2003: 32), “(...) institutional quality always has a positive significant effect on integration, while integration also has a positive impact on institutional quality – suggesting that trade can have an indirect effect on incomes by improving institutional quality”. This line of reasoning and investigation, which we seek to explore in this thesis, suggests that institutions are a primary factor of economic growth and may even supersede the constraining effect of geography.

## **1.2 Identification of the Problems**

It is a common development policy cliché that the economic prosperity of landlocked countries is constrained by their physical geography limitations. Landlockedness adversely affects international trade and this in turn prevents or constrains export-led growth and development. Theoretically, this argument is backed by the gravity model of trade, which portrays bilateral trade as a positive function of the GDP of the trading partners and a negative function of the distance between them, with transport costs often standing in as a proxy for the latter. However, to the extent that the landlocked status of a country may affect its per capita income through other channels, it may not be possible to conclude that trade alone is the mechanism through which landlocked nations are constrained in their economic development.

According to the classical interpretation, as based on Adam Smith (1776), the landlocked status of a country is likely to constrain its economic development by increasing its long-distance transport costs and reducing the size of bilateral output. In practical terms, it also constrains access by landlocked nations to the sea and to a variety of natural resources. The

idea that the export-led mechanism alone is the only one that matters is a misleading one, as argued by Rodrik et al (2002). These authors have found that trade is but an integrating factor which exerts a lesser influence than institutions. Similarly, the idea of a ‘landlocked curse’ discards the possibility that economic growth and development can be successfully achieved through alternative ways of pursuing export-led growth and other possible channels for economic improvement.

In other words, the debate around the constraints of landlockedness and the landlocked curse seems to be missing out on two possibilities. The first one is that export-led growth may be pursued *in spite of* landlockedness, by seeking to reduce travel time and cross-border time, adopting advanced means of transport and infrastructure development, and improving trade facilitation, trade diversity and improved port management. The second is that the quality of institutions (rule of law, democracy, political and civil rights, property rights, transparency, etc.) may be even more decisive than geography.

Thus, beyond the narrow issues of transport costs and seaport access, the literature points to a variety of mechanisms which may in fact be more relevant to the pursuit of economic growth and development than landlockedness itself. These mechanisms may be usefully grouped into four areas: institutions; transit neighbors and location; the use of natural resources; and transport infrastructure.

First, a cursory inspection of data sources on institutional quality (such as the Worldwide Government Indicators or the Heritage Foundation) suggests that almost all landlocked developing nations suffer from bad governance, poor rule of law, high corruption, insecure private property rights, weak civil and political rights, poor human rights, absence of an independent judiciary system and gender inequality. This is especially important if we adopt

the view that institutions matter more than geography, as argued by a variety of authors (North 1991; Hall and Jones 1999; Rodrik 2000; Easterly and Levine 2003; Acemoglu and Robinson 2008).

Second, the main constraint in practice for many landlocked nations is not landlockedness per se, but rather the fact that they may be at war with their neighbors, or that the transit nations may be experiencing civil war or insurgency, or that the transit countries seek to exercise a hegemonic role in politics, economy and society by exploiting the seaport dependency of others. These are all political issues which are analytically distinct from the narrow question of landlockedness.

Thus, for example, European landlocked nations such as Switzerland, Austria or Luxembourg are clearly not constrained in their growth and development prospects by virtue of geography. Rather, their location is a factor which facilitates growth and development, by providing them with access to a prosperous regional market and relatively easy access to the sea despite their landlocked condition.

Third, the availability of valuable natural resources such as diamonds, oil, coal, etc, if exploited in a competent and sustainable manner, can constitute a key factor of economic growth, making it possible to supersede the challenges and constraints of landlockedness. A typical example is that of the Southern African landlocked nation of Botswana, which has managed to raise itself to the status of an upper-middle income country through its reliance on airborne diamond export trade.

Fourth, landlocked countries may seek to improve their integration into the world economy despite their lack of direct sea access by improving their transport infrastructure. Evidence from both the World Bank and the United Nations Office of the High Representative for

Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS) shows that most landlocked developing nations have poor quality transport networks, mostly comprised of basic and/or seasonal roads. Again, this is analytically distinct from landlockedness itself, and may be improved upon through adequate investment in transport infrastructure.

Thus, the literature on the deep determinants of growth and development is broadly divided into those who argue that geographical factors (such as latitude, market distance or soil characteristics) are predominant, and those who view institutions (private property rights, rule of law, government form, corruption, civil liberty, press freedom and so forth) as more fundamental determinants of the income and growth levels. This is still largely an ongoing and unresolved debate, within which landlocked countries constitute a special case: is landlockedness an especially binding geographical constraint, or are the other determinants of growth and development, particularly institutions, what matters the most even in the case of these countries?

From the discussion above, it seems apparent that landlockedness is never the sole barrier to the economic growth and development of any nation. Many other issues are also relevant, both domestically and in terms of bilateral relations with neighbouring countries. It is certainly plausible that, irrespective of landlockedness, poor institutions not only hinder international trade but also constrain growth and development in many other ways. This suggests that it is worth investigating what other possible determinants may be affecting the economic performance of landlocked countries, beyond the fact of their being landlocked. The institutions hypothesis may also provide an explanation for the very different economic performances of landlocked developed countries (mostly located in Europe) and landlocked developing countries (mostly outside of Europe).

Against this background, the main objective of this thesis is to contribute to the debate on the predominance of institutions versus geography as determinants of economic prosperity, with special reference to the case of landlocked countries, by undertaking novel empirical analyses which shed new light on this discussion. This is a relatively unexplored, and certainly unsettled, field of study, despite its obvious relevance to the countries in question and to our broader understanding of economic growth and development.

### **1.3 Research Gap**

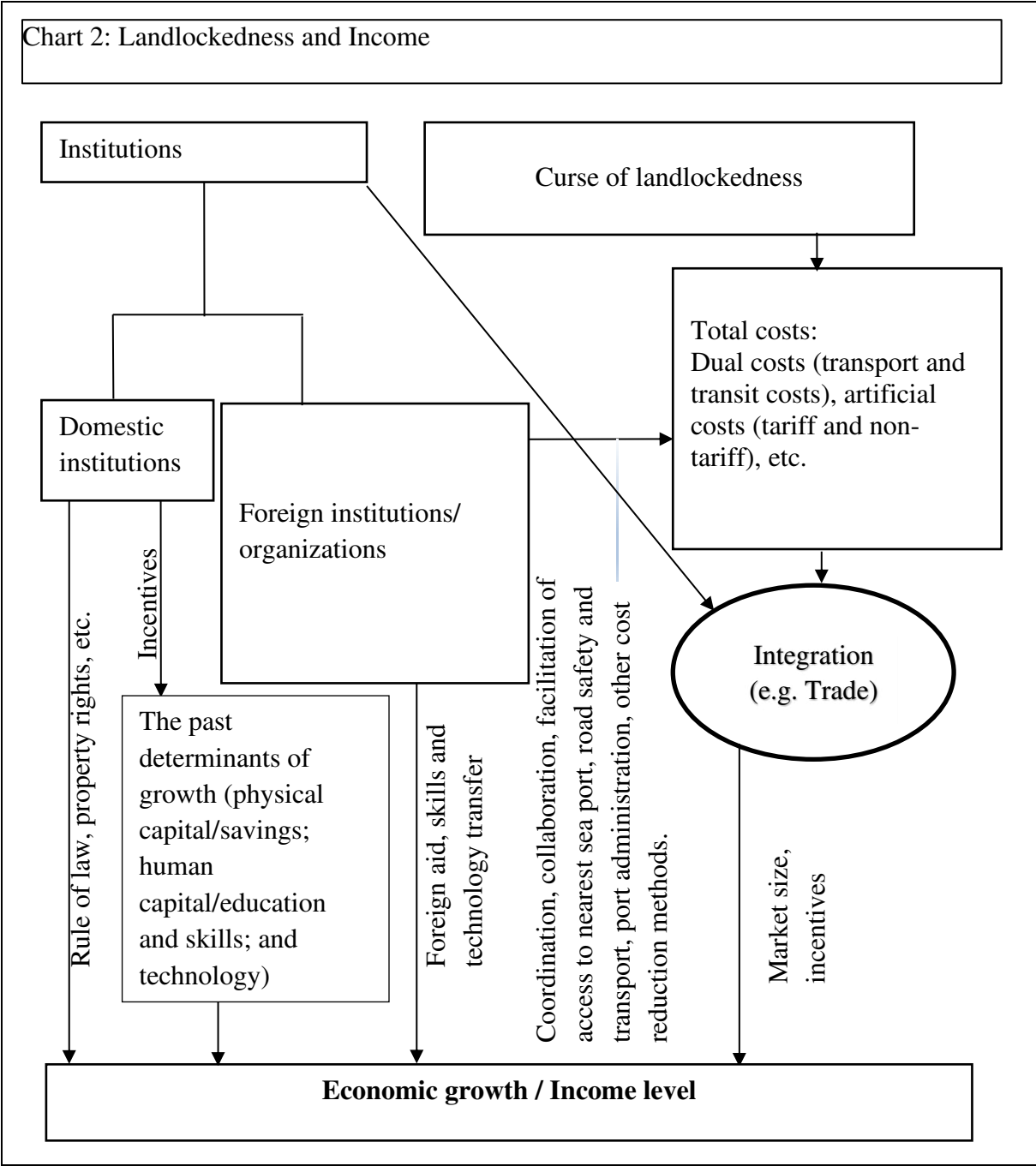
International trade is both about cooperation and about competition, which is why international trade organizations and international trade rules play a vital role in it. Every country wants to participate in international trade, to capture a greater market share and to make as much gains as it possibly can. When we look at the historical trajectory and the rapid development success of the East Asian Tigers (Hong Kong, Singapore, South Korea and Taiwan) and the subsequent newly industrialized nations (China, India, Indonesia, Malaysia and the Philippines), we find that international trade has been a key determinant of that success. In all these cases, access to international markets provided a springboard for export-led growth and development. Observing this fact, one may ask the following questions: Can this trade mechanism similarly benefit all nations? If so, why has this not materialized in the case of non-European landlocked nations (and many coastal developing nations) after such a long time? What is the most promising development path for these geographically laggard nations? What differences are there in this respect between European and non-European landlocked nations? Why is that European landlocked countries exhibit levels of prosperity and development which are amongst the highest in the world, while almost all non-European landlocked countries are in a critical condition?

For some researchers, geography, in the sense of distance cost, is the main barrier to international trade, and therefore indirectly to growth and development (see chapter II, 2.4). Consequently, landlocked nations are inherently disadvantaged and unable to compete even with coastal developing nations. Their inability to integrate their economy into international market is seen as a direct result of their lack of access to the sea and the fact of having to face dual transport costs (land distance to its own border and across the transit country). The theoretical foundation for this view of the consequences of higher trade/transport costs is the gravity model of trade, which indirectly posits that landlocked countries, by virtue of their higher transport costs (economic distance), find themselves unable to fully benefit from regional and international trade and hence economic development. In a nutshell, distance and the lack of sea access decisively constrains the performance of these economies.

In their turn, other scholars highlight the importance of other issues and costs beyond mere transport costs (see chapter II, 2.5). Often, other tariff and non-tariff costs are involved in trade, and transport costs alone provide a very incomplete picture of the constraints to participation in trade. For example, trade costs also depend on port management competences and technologies, trade facilitation procedures, the types of goods involved, infrastructure, currency variations, regulations, red-tape and many other factors and institutions.

Against this background, this thesis seeks to contribute to meeting two partial gaps in the existing research on the economic development of landlocked economies. First, the fact that the gravity model of trade is most often operationalized in a way which does not consider the full set of costs that affect international trade. Second, the fact that the landlocked hypothesis leaves out many key aspects which decisively influence the economic performance of these countries, especially their institutional characteristics. Broadly speaking, then, this thesis proposes to explore a revised model of the economic performance of landlocked nations in

which landlockedness itself is just one piece of the explanation, with institutions playing a more decisive direct and indirect role (Chart 2).



Under such a view, as shown in this Chart, landlockedness exerts a negative indirect impact upon economic growth and the income level of a nation by increasing trade costs (dual transport and transit costs and other tariff and non-tariff costs) and thereby constraining the

gains from trade and creating disincentives to investment. In its turn, the quality of domestic institutions has a positive impact on income in three ways: directly through the role of the rule of law, property rights, etc. in the economic growth process; indirectly via the influence of institutions upon international integration; and indirectly through its incentives to the proximate factors of economic growth (physical capital, human capital and technology). Finally, foreign institutions, including foreign and international organizations, also exert a dual impact on economic performance: directly through the transfer of aid, skills and technology; and indirectly by influencing the total costs associated with landlockedness through coordination, collaboration and trade facilitation (or the lack thereof).

Implicit in this Chart is the idea of the primacy of institutions over landlockedness. Beyond the mere inexorable fact of landlockedness or other physical geography constraints, it is hypothesized that the quality of domestic institutions, alongside adequate coordination with transit neighbours and the international community, can not only exert a countervailing positive effect upon international trade but also promote economic growth and development in a variety of other ways. If that is the case, quality institutions can make up for an adverse physical geography as far as the economic growth and development of landlocked economies is concerned.

While it is not easy to explore, let alone to test, all the multifaceted causal effects that drive such a complex process as economic growth, this thesis attempts to shed light on these processes by undertaking novel statistical and econometric analyses of empirical data, including by testing the causal associations and interactions between institutions, landlockedness and per capita income.

#### **1.4 Research Questions**

The traditional argument around landlockedness is that landlocked developing countries face higher trade costs than coastal nations, and for that reason their ability to benefit from trade and use it to pursue economic growth and development is inherently constrained. As we have already seen, however, some scholars consider this to be an incomplete rendering of the story, which leaves aside many issues and factors that may be even more fundamental for economic growth and development.

Thus, beyond the question of whether landlockedness matters, this thesis is also about whether and how institutions matter, in the tradition of institutionalist authors such as North (1991), Hall and Jones (1999), Rodrik (2000), Easterly and Levine (2003) and Acemoglu and Robinson (2008). In this context, it is hypothesized that institutions are a more important determinant than geography, with the potential implication for landlocked countries that it is the presence of quality institutions, i.e. institutional reform, which will ultimately determine their economic performance and convergence (or the lack thereof) vis-à-vis more advanced nations.

Specifically, this thesis seeks to answer the following two main sets of research questions, plus an additional linking question:

- ❖ How different are European and non-European landlocked nations with respect to their institutional characteristics? And are those institutional characteristics systematically associated with higher per capita income across the various macroregional groups of landlocked countries?
- ❖ Is there a causal relationship between institutions and the per capita income level after controlling for landlockedness? Or in other words, can the impact of institutions upon economic prosperity supersede that of landlockedness?

And the linking question:

- ❖ What kind of institutions matter the most (in the sense of having the greatest association with per capita income) for landlocked developing nations?

## **1.5 Research Methods**

This study involves the use of two main sets of research methods: comparative-descriptive analysis and econometric analysis. The combination of methods adopted aims at shedding light on the problems under investigation while considering the problems of counterfactuals which often affect empirical analysis (including due to unobserved variables and endogeneity).

Cross-country comparative analysis is used to explore the similarities and differences between two groups of landlocked nations: European and non-European. This analysis tries to answer the question of why European landlocked countries are prosperous while non-European landlocked countries are poor, by exploring the hypothesis that it is institutions which account for that difference. In its turn, the subsequent econometric analysis explores the causal relationship between institutions and the level of income per capita, controlling for the effect of landlockedness through the addition of independent landlockedness proxies. Institutions are not a static term and instead vary over time and space, which creates several econometric difficulties such as unavailable data points, non-linearity, unobserved variables and reverse causality. To address these difficulties, this thesis draws on a panel data approach, organized into a set of different regression models: baseline Pooled Ordinary Least Squares (OLS) model; Fixed Effect Model (FEM); Random Effects Model (REM); and finally, a Correlated Random Effects Model (CREM) based on Wooldridge (2010). Importantly, the analysis tries to remove the effect of different measurement scales by standardizing all variables except for the landlocked dummy variable. Therefore, it adopts a variety of

strategies aimed at mitigating the problems that typically affect cross sectional and panel data, namely unobserved variables, time invariant variables, unmeasured variables and the problem of scale effects.

## **1.6 Research Hypotheses**

This study hypothesizes that there is a positive causal relationship between (political, economic and social) institutions and the economic prosperity of landlocked nations insofar as ‘good’ institutions make it possible to overcome the impact of other disadvantages, namely in terms of lack of direct access to the sea. The theory behind this hypothesis is that institutions have a direct impact on the per capita income level through the rule of law, property rights, etc. and an indirect one through the promotion of international integration (trade), as we have seen above.

Therefore, this thesis hypothesizes that bad institutions, not landlockedness itself, are ultimately the cause of the lack of prosperity and underdevelopment of landlocked developing nations, while the opposite is true for good institutions. In another words, it is hypothesized that landlocked developing nations are poor because of an "institutions trap", not a “landlockedness curse”: or in other words still, institutions matter more than geography.

The following two hypotheses are associated with this:

- ❖ European and non-European landlocked nations have different types and forms of institutions. The former tend to have institutions which are very conducive to growth and prosperity, while the latter tend to have institutions which are inimical to growth and prosperity.

- ❖ There is a primacy of institutions over landlocked barriers when it comes to accounting for economic growth and the long-run per capita income level. The quality of institutions can make it possible to overcome other geographical and non-geographical barriers to prosperity.

### **1.7 Research Objectives**

The overall objective of this study is to investigate the causes of the low income and poor economic performance of landlocked developing nations by contrasting a geographical determinism hypothesis and an alternative institutionalist hypothesis. The specific objectives are the following:

- ❖ This study seeks to fill some existing knowledge gaps on why European landlocked nations are rich and non-European landlocked nations are poor. Specifically, it does this by observing and analysing some key differences and similarities between these groups of countries in terms of their institutions.
- ❖ This study also applies a variety of econometric models, including a new type of model in this context (Correlated Random Effects Model, or CREM, based on panel data), to the analysis of the causal relationship between institutions and the per capita income level. In doing this, it seeks to address some of the main usual criticisms in this context, such as the issues of missing variables and scale effects. Finally, the study seeks to ascertain which institutions have the greatest impact upon the per capita income level of landlocked countries.

### **1.8 Relevance of the Study**

Directly or indirectly, the transport and transaction costs of landlocked nations can be minimized through adequate internal and external institutions. Internal institutions help to

increase per capita income directly and indirectly, through the various effects of the rule of law, property rights, transparency, accountability, etc. upon the economic and business environment. For instance, transport costs can be reduced through the introduction of new technologies such as IT, better infrastructure, trade diversification and the pursuit of service sector activities (which do not need to be physically shipped). To seize these opportunities, an economy needs to have appropriate institutions in place, otherwise the new technologies, facilities and activities are fruitless. The general hypothesis is that institutions trump all other factors when it comes to determining economic performance and prosperity. Researching whether this is the case has considerable policy implications, in addition to contributing to advancing our knowledge of economic growth and development.

Other relevant intended contributions of this study are as follows:

- ❖ The cross-country institutional comparison between developing and developed landlocked economies meets a specific knowledge gap. No such institutional comparison between developing and developed landlocked countries could be identified in the existing literature. Thus, the study is intended to provide a novel empirical basis to support policy reformulation in landlocked developing countries aimed at long-term economic growth and development.
- ❖ The panel data analysis of the effect of institutions upon per capita income, after controlling for the effect of landlockedness proxies, illuminates the causal relationships between these variables, thus casting further light on the long-term policy implications for landlocked developing countries. The specific inductive approach adopted, including some new econometric methods, constitute an additional contribution to this academic field. The relevance of the findings comes from the

contribution to illuminating the degree and direction of the causal linkages between geography, institutions, and income, as well as the question of which institutions matter the most and the least.

- ❖ The study of the relationships between landlockedness, institutions and economic development is an especially difficult task because of the many challenges associated with operationalizing these concepts. Proposing ways to address these challenges is another way in which this study contributes to future research on this topic of special importance for the most vulnerable nations in the world.

### **1.9 Structure of the Thesis**

The rest of this thesis is organized as follows. After this Introduction, the second chapter discusses the questions of economic growth, convergence and divergence, in addition to introducing the issue of landlockedness and its associated challenges. Chapter 3 explores the question of institutions and how they affect economic growth. The fourth chapter explains and discusses the specific methods used in the empirical component of the research, as well as the question of data sources and limitations. Chapters 5 and 6 present and discuss the empirical findings: first an institutional comparison between European and non-European landlocked economies, followed by an analysis of the correlation between institutions and the per capita income level; and then the econometric analysis of the causal linkages between institutions, income and landlockedness. The seventh and final chapter presents the main conclusions and wraps up.

## CHAPTER II: ECONOMIC GROWTH, CONVERGENCE AND LANDLOCKEDNESS

### 2.1 Economic Growth and its Determinants

Explaining and accounting for economic growth and development is one of the most central, but also one of the most debated and controversial, subfields of economics. Its relevance is clear: the study of economic growth is concerned with the expansion of a nation's welfare and prosperity. The variable most typically used for analysing economic growth is, of course, income or output (usually Gross Domestic Product) in per capita terms, which represents the average output of goods and services per unit of a given population. Strictly speaking, economic growth consists of the variation, or rate of change, of that variable. When we are concerned with long-run welfare and development, however, it makes most sense to look at the *level* of income or output per capita as a representation of a nation's prosperity, because it reflects the accumulated effect of past economic growth. Needless to say, this indicator may be, and often is, usefully complemented by a variety of indicators which reflect other (broader social and welfare) dimensions of development, such as employment, inequality (both interpersonal and in terms of gender), education, health (life expectancy rate, infant and mother mortality rate, etc.), poverty, safety and security, etc., which are not the object of this thesis.

Throughout the history of economic thought, a variety of explanations for economic growth, based on different key ideas and determinants, have been put forward. The following table summarizes some of the main ones, their key ideas and the time in history and main authors associated with their emergence.

<b>Table 1: Summary of the Main Theories and Concepts of Economic Growth</b>		
<b>Concepts/Models of Economic growth</b>	<b>Key Ideas/Determinants of Economic Growth</b>	<b>Historical Origins/Key Authors</b>
Mercantilism	Accumulation of gold and ornaments. Focus on surplus trade and government intervention (increase exports)	15 <sup>th</sup> Century
Physiocrats	High value of agricultural goods, importance of natural processes	Second half of 18 <sup>th</sup> Century
Classical	Labour productivity, division of labour, accumulation of capital, specialization and trade;  Invisible hand of the market (equilibrium D=S)	Adam Smith (1776) among others
Harrod-Domar	Growth determined by savings rate (S=I) and capital-output ratio	Harrod (1939)  Domar (1946)
Neo-Classical (Exogenous Model)	Capital accumulation drives growth until the steady state. Growth is driven by technological progress (TFP, exogenous) thereafter.	R. Solow (1957)
New Growth Theory (Endogenous)	Knowledge accumulation or technological progress, explained endogenously by people producing ideas, drives economic growth.	Romer (1986)  Lucas (1988)
Institutions	Formal and informal rules (rule of law, property rights, etc.)	North (1991) among others

Mercantilism emerged in the 15<sup>th</sup> Century and was very influential as a doctrine until the 18<sup>th</sup> Century. Its concept of prosperity was not concerned with productive potential but rather with the accumulation of wealth (gold, valuable ornaments) in the sovereign's coffers, and

the way to achieve this was through trade surpluses, based on active government intervention aimed at increasing exports and limiting imports. In turn, Physiocracy emerged in late 18<sup>th</sup> Century France and was most remarkable for its seminal understanding of the economy as an integrated system, although its emphasis on natural processes and agricultural products as the source of all value has a clear pre-industrial character.

Of greater relevance to our contemporary understanding of economic growth is classical theory, especially (in this respect and others) the contributions of Adam Smith (1776). For Smith, the key factors accounting for economic growth were specialization, the division of labour and the size of the market. He believed in the “invisible hand” which brought about market equilibrium through equating the forces of demand and supply. Smith and other classical authors also introduced the ideas of conceptualising economic growth as a function of production factors (land, labour and capital) and of capital accumulation as central to increasing labour productivity. Under constant capital and land, merely increasing labour inputs leads to diminishing marginal returns, thereby compromising the prospects of future economic growth. The classical view therefore tended to embrace the idea of a Malthusian population trap and a somewhat dismal view of the future, which technological improvement was not enough to overcome.

Modern 20<sup>th</sup> Century economic growth theory had its first main milestone with the independent but largely equivalent contributions of Roy F. Harrod in 1939 and Evsey Domar in 1946, who sought to adapt the static macro-economic model, following Keynes, into an analysis of the long-run growth process. Drawing on the ex-post Keynesian equivalence between savings and investment ( $S=I$ ), Harrod and Domar pointed out that the rate of growth equals the ratio of the savings (i.e. investment) rate and the incremental capital

output ratio ( $g=s/v$ ). In this framework, the key to boosting economic growth is to increase the savings rate so as to increase investment in order to produce more output.

The neoclassical growth model similarly picked up on the idea of physical capital accumulation as a driver of economic growth, but instead of a constant capital-output ratio hypothesized a variable one, reflecting diminishing marginal returns. In his seminal contribution entitled “A Contribution to the Theory of Economic Growth”, Robert Solow (1956) confirmed that under those assumptions physical capital is indeed a source of economic growth in the short run, but in the long run it can no longer function as such due to the nature of diminishing returns, which causes the economy to converge to a steady state level of income. From that point onwards, increases in the productivity of labour and capital depend on technological progress, which is determined exogenously to the model.

Also linked with neoclassical growth theory and the Solow model is the idea of growth accounting, which seeks to empirically account for how variations in the various inputs or production factors (particularly labour and physical capital) account for changes in output and income (i.e. economic growth). From an early stage, it was clear that in most contexts the residual that was left after accounting for the variations in the inputs, called Total Factor Productivity or TFP, constituted a very significant part, even representing the greater part of economic growth. The concept of total factor productivity was first developed by Tinbergen (1942) and Stigler (1947), but the key theoretical reference framework was proposed by Solow (1957), who conceptualised total factor productivity as a residual attributable to innovation and to technological and organizational improvement which cannot be explained by changes in inputs.

Neoclassical growth theory has been associated with at least three types of limitations in the literature. First, it does not explain the differences in investment rates between different nations. Second, it is unable to account for the structural reasons (corruption, lack of infrastructure, etc.) why some nations succeed in attracting investment while others do not. And third, it does not explain how to improve the rate of technological progress to increase the capital stock and achieve greater prosperity. It was partly in reaction to these limitations, especially the latter, that Romer (1986) emphasized the accumulation of knowledge as the key to achieving increasing returns to scale and overcoming the steady state proposed by Solow. Shortly after, Lucas (1988) proposed investment in human capital (measured by aggregate skills) as his own alternative approach making it possible to achieve increasing returns to scale. These models are jointly known as new growth theory or endogenous growth theory, and are characterized by endogenizing economic growth through proposing ways to achieve increasing returns to scale, thus overcoming the diminishing returns to scale proposed by previous scholars, which inevitably led to a steady state. These authors thus propose that economic growth is broadly determined by internal forces, rather than the external (exogenous) forces emphasised by the neoclassical model. Their key insights are that ideas, human capital, technology and R&D are themselves the result of economic activities and decisively influence productivity, hence economic growth. More people mean more ideas (which are non-rival), and more ideas mean higher productivity and greater incentives to economic growth.

More recently, other authors have opted for various ways of moving beyond the concepts and sources of growth discussed above. Many scholars have shifted their attention from the question of the proximate sources of growth, such as physical and human capital, to “deep” integrating factors like geography or institutions (Rodrik et al 2002, North 1991, Acemoglu

and Robinson 2008). There is a burgeoning literature which focuses on these two factors, geography and institutions, with a key controversy around which of the two is the most fundamental determinant of long-run income level. That is precisely the topic of this thesis: the relationship between geography, institutions and income under particular geographical conditions (landlockedness).

Drawing on the empirical experience of economic growth across all nations, C.I. Jones (1998: p. 5-17) has identified the following seven stylized facts of growth: there is enormous variation in per capita income level between rich and poor countries; growth rates also vary substantially across countries; growth rates are not necessarily constant over time; some rich countries have become poor and vice-versa; in the case of the United States, there is no sign of an upward or downward trend in the real rate of return of inputs (capital and labor) in the century up to the year 2000; output growth and the volume of international trade are closely related; and both skilled and unskilled workers migrate from poor to rich nations.

The historical experience of developed nations shows that high growth rates sustained over long periods are the key to successful economic development. According to Jones (2015, p.2) “for nearly 150 years, GDP per person in the U.S. (frontier) economy has grown at a remarkably steady average rate of around 2 percent per year. Starting at around \$3000 in 1870, per capita GDP rose to more than \$50000 by 2014, a nearly 17-fold increase”. Similarly, Japan became the world’s second largest economy between 1978-2010 thanks to its post-war economic miracle growth rates of 10% in the 1960s, 5% in the 1970s and 4% in the 1980s. In Europe, the Republic of Ireland is known as the Celtic tiger due to its rapid growth rate (average 5.9%) between the years 1995 to 2008. Hong Kong, South Korea, Singapore and Taiwan are known as the four Asian Dragons thanks to their high economic growth rates (above 7% on average) between the 1960s and 1990s. China became the second

largest economy in the world in the year 2010 due to 30 years of growth averaging 10% between 1978-2007. India is also poised to be a future global economic powerhouse thanks to its high economic growth rates in recent times, including an average of 8.2% between 2006-2011.

Rodrik (2014, p. 24-25) states that there have been 24 distinct instances of growth miracles throughout history. The ones which took place after the 1950s can be divided into two groups: those with an industrial/manufacturing base, which can be further divided into whether they drew on locational or non-locational benefits, and those whose miracle was based on a resource boom. In addition to late boomer Ireland, other peripheral Western European countries like Spain, Portugal, Greece and Italy have benefited from their location in the context of the reconstruction and integration processes immediately after World War II. In their turn, East Asian and South Asian nations such as Japan, South Korea, Taiwan, Singapore, Hong Kong, Malaysia, Indonesia and China, while mostly devoid of such geographical benefits, have built their economies on the basis of highly competitive manufacturing industries. The second group of “growth miracles” comprises countries such as Saudi Arabia, Iraq, or Botswana, which benefited from sustained booms in natural resources such as oil or diamonds.

One of the most developed nations in the world, Switzerland, which is a role model for landlocked countries, was once called the “sick man of Europe”. The story of the economic success of this country, sometimes labeled the Swiss miracle, is discussed by Studer (2008). This author discusses three major stylized tales and the progress of living standards in this country. The three major stylized tales are: first, a long and steady process of “protestant ethic (interaction between various religious ideas and economics)”, which started before the industrial revolution in the context of the reformation movement and built the bases for

Geneva and Zurich to become industrial hubs. Second, free economic policies and institutional settings which promoted economic growth. Third, a dividend from Switzerland's neutral foreign policy (armed neutrality or nonintervention during World War I and II), political stability, and especially, strong financial institutions. Finally, this author concludes that while the Swiss living standards have long been among the highest in Europe, the "Swiss Miracle" in the sense of the rise to the top of the world income scale is really a 20<sup>th</sup> Century phenomenon.

All these episodes show that high growth rates sustained over long periods of time are the key to moving up the development ladder: compounded economic growth is what makes it possible for poor economies to converge vis-à-vis the economic frontier. Interestingly, the pace of convergence for many newly growing economies seems to be facilitated by the development of global communications and the sharing of knowledge and technology: the adoption of technology and innovations has become easier than it used to be in the past, which is a fortunate development from the point of view of the economic convergence of developing economies.

In sum, this brief overview of the literature on economic growth and development shows that countries have at their disposal a variety of strategies to grow and prosper: from investment in physical and human capital to the promotion of economic openness (privatization or liberalization model), from technological progress to output and trade diversification – all of which against the background of such 'deep' determinants of income and growth as geography and institutions.

## **2.2 Convergence and Divergence in History**

The theory of economic convergence states that backward (or low-income) economies have a number of advantages, including in terms of being able to adopt existing technologies, the ability to specialize and diversify their production of goods and services for the international market (benefits from globalization and privatization), as well as possible support from international financial markets making it possible to meet the investment gap. These advantages, it is stated, should facilitate their pursuit of economic convergence towards the frontier. However, many of these nations have yet to show any signs of convergence. A vital question therefore remains unanswered: why have so many countries in Asia and Africa been struggling for so long at the bottom of the development scale?

Observing the converging trend of many East Asian economies, the World Bank (1993) published a report which focused on the period 1965-1990 and found that the twenty-three economies in East Asia grew faster than all other regions of the world in the same period. In particular, eight of those economies exhibited seemingly miraculous economic growth (in the sense of being both very high and sustained): Japan, the four Asian Tigers (Hong Kong, the Republic of Korea, Singapore, and Taiwan), and the three newly industrializing economies (NIEs) of Indonesia, Malaysia, and Thailand. The supporters of the convergence hypothesis thus frequently point to the example of this “East Asian miracle”.

By contrast, however, Dani Rodrik (2014: p. 20-27) argues that “convergence has been the exception rather than rule”. Despite their purported advantages in terms of access to advanced technologies, global markets and international financial markets for investment, most backward developing economies do not seem to reap any benefits from that position. Most likely, we need to qualify our view of convergence as conditional on a set of variables such as human capital, investment, institutional quality, exposure to trade and macroeconomic

stability. As Rodrik also points out, industrialization and manufacturing for export markets have been the most reliable levers for rapid and sustained growth.

On the question of convergence and divergence, Maddison (1997, p.2) has argued that, statistically, “[t]he overall long run pattern of income spreads has been strikingly divergent. The interregional spread was less than 3:1 in 1820 and grew steadily larger at each successive benchmark. In 1870, it was 5:1, 1913 9:1, 1950 11:1, 1973 12:1, 1992 16:1. If we turn from regional spreads to look at the range between individual countries, the long-term divergence is even more marked. In 1820 the intercountry range (i.e., the distance between the lead country and the worst performer) was over 3:1, in 1870 7:1, in 1913 11:1, in 1950 35:1, in 1973 40:1, in 1992 72:1”. If this tendency is to continue unaltered, the resulting differences between poor and rich countries will become both colossal and even more appalling.

Collier (2007) also analyzed the patterns of economic growth between the 1970s and the 1990s and similarly found an alarming divergence between developed and developing nations. His conclusion was that the economies of the so-called ‘bottom billion’ diverged from the rest of the world’s developing nations by 2% a year in the 1970s, 4.4 % in the 1980s and 5% in the 1990s.

The historical comparison of the estimated average GDP and GDP per capita growth rates for several available countries and groups of countries over the years 0-1998 suggests that there is some periodical evidence of both divergence and convergence at different times and in different regions. This is the case for two European landlocked countries (Austria and Switzerland), for instance, as well as for parts of Latin America, Asia and Africa (see Appendix C). Most of these countries and groups of countries achieved their highest economic growth rates in the years prior to 1973, after which they exhibited a slowdown in

growth in the context of the economic crisis and oil price hikes of the 1970s. During these golden economic years, 1950-1973, Austria became a top growing country. Total Asia excluding Japan, however, grew even faster on average in the period 1973-1998 than in the period 1950-72. In its turn, Switzerland shows an interesting trend of continuous rising economic growth even in the period between the two great wars (1913-1950), a time when most other countries experienced an economic slowdown.

The USA experienced largely continuous GDP growth above 3 percent per year in the years between 1820 and 1998, whereas the UK mostly fluctuated around 1 and 2 percent per year on average, depending on the periods. Latin American countries showed rapid and rising economic growth in the period between 1820 and 1973 – better even than Switzerland, the USA and most other countries and regions.

African and Asian economies also experienced accelerating economic growth prior to 1973, but their pace was generally lower than Europe's until 1913. Surprisingly, these two regions managed to grow considerably in the inter-war period. Up until the year 1913, Africa's growth pace was lower than the world and Asian averages. Interestingly, however, Africa's high average economic growth rates in 1913-1950 surpassed those in Europe, Asia and the three individual nations represented in the table (Switzerland, Austria and the UK).

Maddison (2005) broadly divided the international growth patterns after 1820 into five phases:

- ❖ 1820-1870 was the period with the slowest growth, in which economic progress was largely confined to European countries, Western offshoots and Latin America.
- ❖ The old liberal order (1870-1913) was also characterized by relatively slow per capita income growth.

- ❖ In the interwar period (1913-1950), economic growth was significantly below its potential.
- ❖ In the Golden Age (1950-73), world per capita income grew nearly 3 percent per year, world GDP rose annually by nearly 5 percent, and exports by almost 8 percent. This was by far the best period in terms of economic growth.
- ❖ The neoliberal period (1973-2000) was characterized by a slowdown relative to previous period, but it was still the second-best phase in the period under consideration (1820-2000).

In terms of per capita income, Latin America kept accelerating its average growth rates up until 1973 and decelerated thereafter. Asia, Africa and the World as a whole exhibited mostly similar trends, with greater or lesser fluctuations, but performed systematically below Europe and Latin America until about 1950. Remarkably, the “Total Asia excluding Japan” group experienced negative per capita income growth in two periods (1820-1870 and 1913-1950), while the African continent is estimated to have done so in the period 1000-1500. While Asian economies grew less in per capita income terms than Africa and the world average up until 1950, they widely surpassed both latter groups of countries in recent decades. After 1973, all groups and countries were relatively sluggish in their per capita income growth rates, which ranged from a minimum average rate of 0.01% per year in Africa and a maximum of 3.54% per year in Asia (excluding Japan).

### **2.3 Defining and Characterizing Landlockedness**

As shown by its etymology (the combination of the words ‘land’ and ‘locked’), landlockedness is characterized by a lack of direct access to the sea and the need to pass through other countries to reach the sea or a seaport. The Oxford Dictionary defines it as “a

country or region almost or entirely surrounded by land”. Landlocked countries are often referred to in other synonymous ways, such as countries “without a seacoast”, “locked by maritime neighbors”, “locked by transit neighbors”, or “without a seaport”. Throughout this thesis, “landlockedness” is used as the noun form of the original adjective word “landlocked”.

As stated by UNCTAD (n.d.), “[l]andlocked developing countries (LLDCs) face special trade and development challenges, arising from their lack of territorial access to the sea and geographical remoteness from international markets”. Dairabayeva (2015), writing in the World Bank blog, similarly states that “LLDCs, by definition, lack direct access to the sea and are therefore marginalized from major transportation and services networks. This means that any product these countries try to import or export relies on transit through another country. LLDCs experience much higher costs of trade than their transit neighbors, reducing their ability to trade”.

Landlocked countries (LLCs) are very heterogenous in a number of respects, however: (i) they can be found in different regions of the world (Asia, Africa, Europe and Latin America); (ii) they exhibit different per capita income levels (low, lower-middle, upper-middle and high); (iii) some have navigable rivers, while others do not; (iv) they vary in terms of the number of countries which lock them (one, two, three and more; in addition to the fact that two countries, Liechtenstein and Uzbekistan, are twice landlocked, in the sense that they are landlocked by countries which are themselves landlocked); (v) by size (small, medium and large); (vi) in terms of their colonial history (colonized and non-colonized); (vii) availability of resources (greater or lesser); (viii) distance to the nearest port (near, medium and far); (ix) by ecological zone; etc.

Excluding the territory of the West Bank, there are 45 landlocked countries around the world identified in the CIA World Factbook: 15 landlocked nations in Europe<sup>8</sup>, 2 in Latin America<sup>9</sup>, 12 in Asia<sup>10</sup> and 16 in Africa<sup>11</sup>. Many landlocked nations became independent in the wake of the fall of the Berlin Wall in 1989: nine landlocked countries (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, and Uzbekistan) became independent with the dissolution of the USSR in 1991, while Macedonia (1991) and Serbia (1992) became independent after the collapse of former Yugoslavia. In 1993, Czechoslovakia dissolved and formed two independent landlocked nations: Czech Republic and Slovakia. Serbia and Montenegro split in 2006 and Kosovo unilaterally declared independence from Serbia (dispute ongoing) in 2008. The latest landlocked nation to come into existence was South Sudan, which declared its independence from Sudan in 2011.

#### **2.4 Why Landlockedness Matters**

Most of the literature on landlockedness is influenced, at least indirectly, by Adam Smith's (1776) seminal view that trade plays a vital role for economic performance in a free-market situation if there is free or easy access to a sea route. This view clearly points at the difficulties that landlocked nations face in terms of their trade links.

The influential gravity model of trade argues that the volume of bilateral trade is mostly determined by two factors: the income or GDP of the countries involved and the distance

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<sup>8</sup> Andorra, Austria, Belarus, Czech Republic, Hungary, Liechtenstein, Luxembourg, Kosovo, Macedonia, Moldova, San Marino, Serbia, Slovakia, Switzerland, and Vatican City.

<sup>9</sup> Bolivia and Paraguay.

<sup>10</sup> Afghanistan, Armenia, Azerbaijan, Bhutan, Laos, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Tajikistan, Turkmenistan, and Uzbekistan.

<sup>11</sup> Botswana, Burundi, Burkina Faso, Central African Republic, Chad, Ethiopia, Lesotho, Malawi, Mali, Niger, Rwanda, South Sudan, Swaziland, Uganda, Zambia, and Zimbabwe.

between them. The former factor is directly proportionate, and the latter inversely proportionate, to the volume of trade between the two countries. The adaptation and application of this theory to the case of landlocked nations is based on the consideration that these economies are subjected to dual distance costs (domestic and transit distance) in order to access a seaport – hence they are constrained in their ability to participate in international trade.

The United Nations officially recognized the problems of landlocked nations for the first time in its 1957 meeting of the General Assembly and passed its resolution 1105(XI), which establishes the right for landlocked nations to access the sea – although in practice that access continues to this day to depend on the cooperation and goodwill of transit countries.

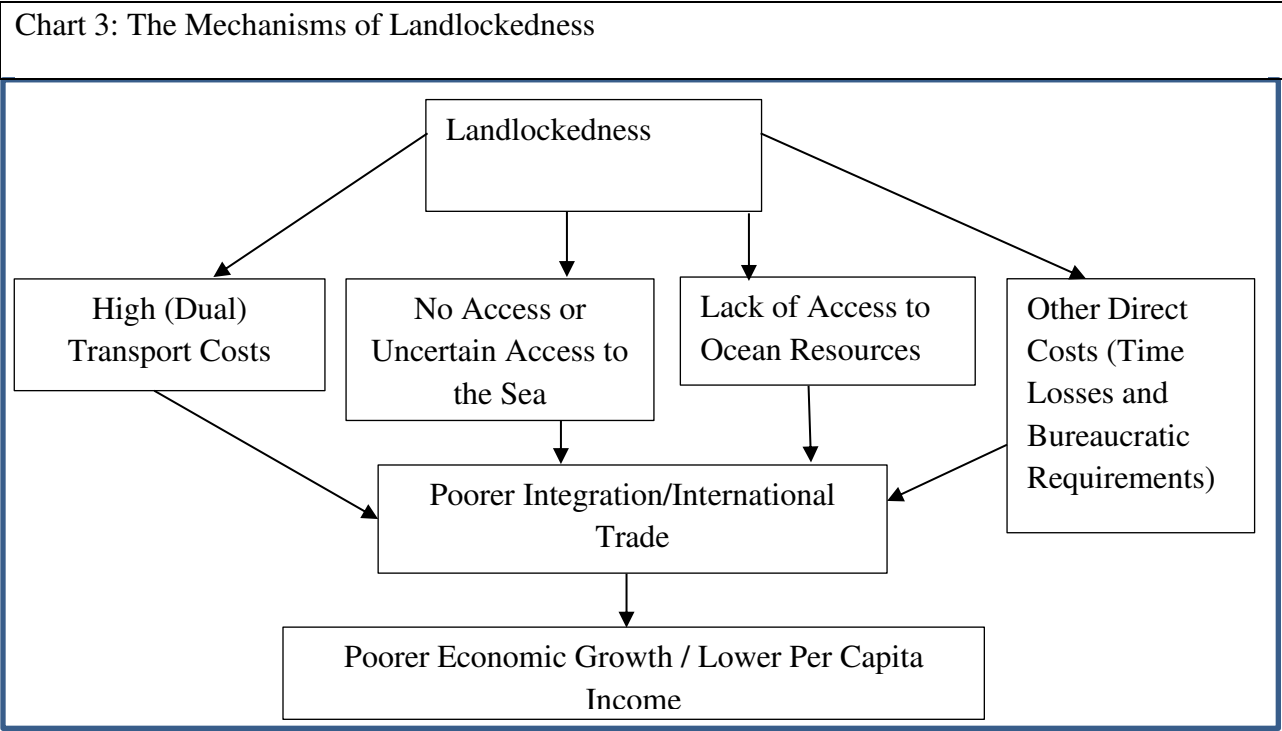
Reitsma (1980) states that landlocked countries face three interrelated but distinct difficulties. First, they are not located on the coast. Second, they are located relatively far from the sea. Third, they are usually unsuccessful in their attempts to use the facilities of neighboring countries to participate in international trade. In his turn, Bowen (1986) specifies that most landlocked states face two main problems. First, and most critical for economic development, they lack access to a seaport, which causes them to incur excessive additional transportation and processing costs and introduces a cost disadvantage relative to coastal states. The second consequence of landlockedness is the lack of access to the living and non-living resources of the sea. For Gallup et al. (1998, p.11), “landlocked economies may be particularly disadvantaged by their lack of access to the sea, even when they are no farther than the interior parts of coastal economies, for at least three reasons: (1) cross-border migration of labor is more difficult than internal migration; (2) infrastructure development across national borders is much more difficult to arrange than similar investments within a country; and (3)

coastal economies may have military or economic incentives to impose costs on interior landlocked economies”.

Along similar lines, Ozmanczyk and Mango (2003) make the case that landlocked countries are at a disadvantage because “at least some of the goods they export and import must pass through other countries (transit countries), incurring extra costs and delays. This is particularly true of developing countries, whose transit neighbors often lack adequate transport facilities and infrastructure; as consequences, bottlenecks occur and transit costs skyrocket”. In his turn, Carcamo-Díaz (2004) argues that landlockedness matters because of the higher total transport costs associated with it (transportation within the country’s borders, transportation through transit countries, and sea transportation to the final destination). Additionally, the countries in question are more exposed to negative shocks that are exogenous, in the sense of determined outside the country, such as natural disasters, civil disturbances (e.g., docker’s strikes, road blockades), or greater exchange rate risk. These increased costs and uncertainty reduce the exports of LLCs, limit their gains from trade and constitute a disincentive to foreign investment.

The UN-OHRLLS (2013) states that landlockedness has a large negative impact on international trade due to the long distance from the sea, remoteness from markets, extra border crossings, inadequate physical infrastructure, and other logistic and institutional hurdles. These factors may be summarized as adding up to greater transport costs, jeopardizing the competitiveness of landlocked nations and their participation in international trade. As a consequence, Chowdhury and Erdenebileg (2006) point out that landlocked developing countries are even more vulnerable than poor coastal nations. They have no direct link to international markets and global economic activities, and therefore suffer from severe geographical frictions and constraints to their growth and development.

The key ideas around landlockedness introduced in the previous paragraphs are summarized in the Chart below:



As depicted in the Chart above, most landlocked nations face several similar disadvantages. They bear higher transport and transit costs, in addition to other direct costs in terms of time and bureaucracy; they do not have access to the ocean and its resources, including food and tourism-related activities; and they are dependent, for access to international markets and resources, on the cooperation and goodwill of transit neighbours with which they may not be on good terms politically, economically and militarily.

MacKellar et al (2000) assume that the key disadvantage from the lack of sea access is higher transport costs, which causes a deterioration of landlocked countries' terms of trade (TOT)<sup>12</sup>

<sup>12</sup> TOT: price of export basket / price of import basket \*100

and a reduction in (or lower growth of) their per capita income. The income effect of the TOT deterioration reduces the volume of imports, while the substitution effect reduces the export surplus. Additionally, geographical isolation and the lack of a seaport make it harder to attract high-growth industries, which may add to possible problems like excessive levy taxes, transport monopolies, quota systems, political unrest, violent international conflict, natural disasters and fraught political relations with transit countries. Empirically, these authors find that the share of trade in GDP is positively associated with the rate of economic growth through investment. Based on a simple cross-sectional analysis over the period 1960-92, they estimate that in the case of landlocked countries, average per capita income growth is reduced by 1.5 percent per year.

Gallup et al (1998, p.19) develop an econometric model<sup>13</sup> which estimates the relationship between transport costs and economic growth. The resulting modified growth equation is inversely related to the cost of transport, because raising the costs of imported capital goods causes growth to be reduced. These authors note that landlocked countries are especially affected by large transport costs – a special case of geography compromising economic progress.

Other important empirical studies have sought to estimate the impact of landlockedness on trade and development. Among them, Sachs and Warner (1997) have estimated that the income elasticity of trade in landlocked nations is more than half as low (-0.58) as in transit or coastal nations. Raballand (2003), based on a sample of 46 countries with 10,000

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<sup>13</sup>  $Y = (sA/\alpha) (Pm^*) - (1-\alpha) \tau - (1-\alpha) - \delta$ , where  $\tau$ =transport cost,  $Pm^*$  is the world market price of the imported goods,  $\delta$  is the rate of depreciation,  $s$  is saving rate,  $A$  is the level of productivity.

observations, estimates that landlockedness reduces trade by 80%. In turn, Gallup et al (1998, p. 39) find that “[l]andlocked countries (...) experienced 1.2% points slower growth than costal economies” and that “average incomes per capita are reduced by an estimated (...) \$5,190 for being landlocked.”

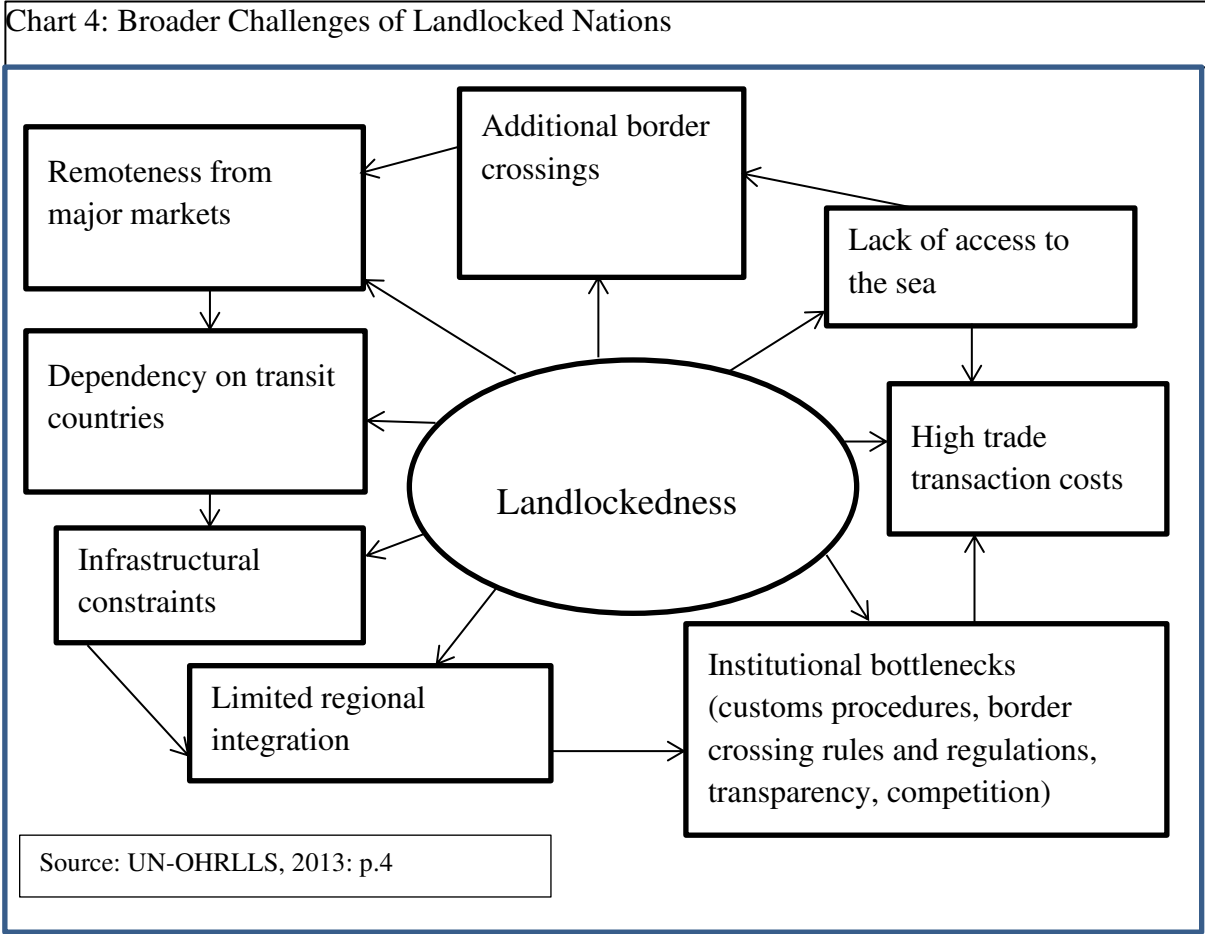
This is related with the fact that global trade is currently extremely dependent on transport by sea, which is much cheaper than alternative means such as overland transport by truck or railway, or air transport by plane. Clark et al. (2004) found that shipping a standard container from a landlocked country increases transport costs by \$2,170, an almost 50% increase relative to the average cost and equivalent to being located 10,000 km farther away from markets.

From the literature mentioned above, we conclude that landlocked nations face direct and indirect disadvantages in terms of their prospects for export-led economic growth and expansion. Their limited market access causes them to be isolated from global trade and limits their ability to benefit from commerce. Landlockedness penalizes the cost structure of exports and imports, increases economic vulnerability and therefore compromises these countries' potential for economic growth, development and convergence.

## **2.5 The Challenges of Landlockedness**

As we have seen, landlocked nations face a double distance problem when it comes to international trade: the distance within its own territory and that across the transit neighbours required to reach a seaport to access international markets. This hinders regional and international trade by ramping up costs, causes the country's output to become less competitive and tends to limit the growth and income levels of these landlocked nations.

Beyond this basic mechanism, however, landlocked nations face many other difficulties and obstacles when it comes to their participation in international trade. The following chart shows these broader challenges faced by landlocked nations:



Thus, not only do landlocked nations lack direct sea access and face higher transaction costs, they also tend to be farther removed from major markets, more dependent on neighbouring countries and subjected to a greater number of border crossings. Furthermore, they tend to face greater infrastructural constraints and to experience greater institutional bottlenecks (more on which below), leading to more limited regional integration.

Landlocked states generally have little control over the availability of transport routes (Arvis et al 2011, Borchert et al 2012). As explained by Srinivasan (1986), landlocked nations face

higher transport costs because of their dependence on their neighbors' transportation networks and custom duties, over which those neighbours exert what essentially amounts to monopolistic control. Moreover, according to UNCTAD (n.d.) , “[t]he geographical challenges of LLDCs are often compounded by weak transit-transport infrastructure, inefficient customs operations, and over-dependence on the exports of primary commodities.”

In her analysis of the African continent, Napier (2011) concluded that sea access and the sectoral pattern of economic activity (agriculture, industry and services) constitute key determinants of economic prosperity in this region. In order to overcome the neighborhood problems faced by landlocked nations and improve market access across the continent, this author recommends investing in improving and managing transnational and transcontinental land transport.

For some scholars, it is not landlockedness *per se*, but its associated challenges, that really matter. For instance, they argue that landlocked developing nations are poorer because they tend to face greater trading times (up to the final destination), logistic costs and political barriers, in addition to being at the mercy of transit neighbors and cross border corruption. Nordås et al (2006, p. 7), for example, argue that the total trading time for export/import trade is the most important competitiveness factor, and estimate that for every 10% increase in export time there is a 5-25% reduction in trade value, depending on the sector and export destination. In other words, for these authors it is not geography by itself (distance, island or landlocked status) that are at the root of the problem, but the fact that exports and imports take longer to reach their destinations.

According to the World Bank (2008), landlocked countries are especially hit by high transport costs, but also by trade delays and issues related with port access, clearance processes and corruption at border crossings. They estimate that, on average, goods shipped from landlocked nations take 28-42 days to reach their destination. Such goods are subjected on average to 3-4 types of clearance processes, while goods shipped from costal countries often pass just one type of clearance process. These delays (time) and additional clearance processes (logistic costs) increase total costs and the uncertainty of delivery, bringing about a reduction in trade on the part of landlocked countries.

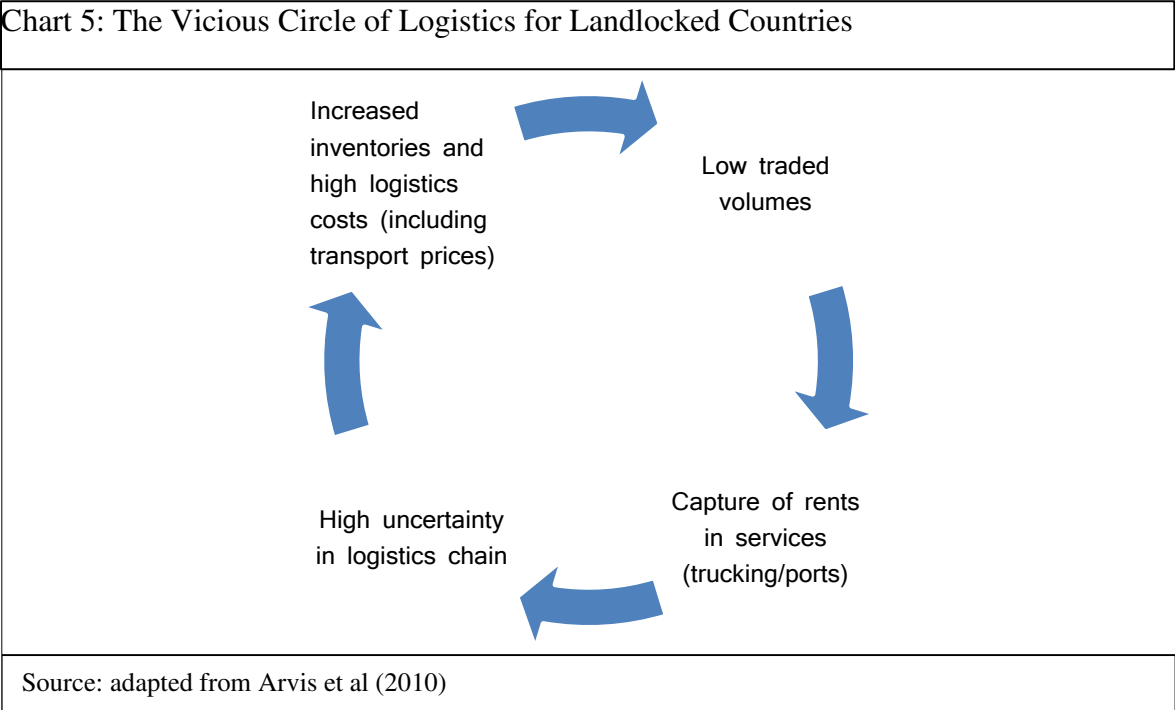
International trade operations are thus more costly and problematic for landlocked nations due to the cost and time penalties involved. Landlocked countries tend to score systematically poorer than coastal nations in terms of their Logistics Performance Index (LPI)<sup>14</sup>, a World Bank-designed benchmarking tool created to help countries identify the challenges and opportunities they face in their performance on trade logistics and what they can do to improve their performance. On average, trade services and processes in landlocked countries are about 10% less efficient than in costal countries.

According to Arvis et al (2010, p.7) “[i]nfrastructure improvement mostly impacts direct transport costs, which are only a portion of the total costs faced by exporters or importers in LLDCs; and its impact may be further diluted if one takes a broader view of logistics costs, incorporating overheads and supply chain efficiency”. This implies, as pointed out by Borchert et al (2012), that landlocked nations need not only to focus on the development of transport and communications infrastructure, but also on putting in place appropriate policies and procedures for international trade and cooperation.

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<sup>14</sup> <https://lpi.worldbank.org/>

Arvis et al (2010) consider that, in this respect, landlocked nations face a spiral trap of inefficiency: the uncertainty that characterises logistics chains in landlocked countries leads to greater inventories and logistics costs, including transport prices, which in turn reduces the competitiveness and the volume of international trade for landlocked countries, incentivizing rent-seeking in trade-related services (trucking and ports) (Chart 5).



# CHAPTER III: INSTITUTIONS, LANDLOCKEDNESS AND ECONOMIC DEVELOPMENT

## 3.1 Institutions and Economic Development

It is not easy to identify the precise moment when the concept of “institutions” was first used in the social sciences, even though Hodgson (2006) suggests that its first known usage may have been by Giambattista Vico in 1725. Similarly, it is very difficult, if not impossible, to find a universally accepted definition of institutions, because different authors and different approaches have defined them differently over time. This is certainly the case for different disciplinary approaches to the question of institutions, but even within the same discipline, as in the case of economics.

Such differences in how to conceptualize institutions are especially apparent when we contrast the two main institutionalist traditions in the history of economic thought: the so-called “old” institutional economics (OIE) and the New Institutional Economics (NIE). OIE had its heyday in the late 19<sup>th</sup> Century and early 20<sup>th</sup> century and is associated with such authors as Thorstein Veblen, known as the father of institutional economics, and J.R. Commons. These authors argued that institutions emerge through evolutionary processes, so that history matters for economic development. According to them, institutions constitute a stabilizing factor in the economic system, in contrast to technological change, which is a disruptive force. Thorstein Veblen (1857-1929) claimed that to understand institutions, one must focus on the evolutionary process at the societal level, not at the level of the individual. He focused mostly on informal institutions like habits and customs as having a decisive role in economic development. Another OIE scholar, J.R. Commons (1862-1945), identified two

main types of institutional mechanisms: the market, which is ruled by the invisible hand of demand and supply, and the legal system, which is ruled by the visible hand of the courts.

The older strand of institutionalism argues that institutions influence individuals by causing them to act in regularized ways, thus ensuring predictability and maintaining social stability. This institutionalism is thus of a more sociological and historical character, in contrast to the so-called rational choice institutionalism, which presupposes that “individuals have fixed preferences and act rationally to maximize their preferences” (Friel 2017). This latter view, which is also significantly more in tune with neoclassical economics, is characteristic of the New Institutional Economics (NIE), first introduced by Ronald Coase and subsequently developed in the second half of the 20th Century by such authors as Douglass North, Oliver Williamson, Mancur Olson and others.

This latter strand of institutionalism favours methodological individualism over holism, and regards institutions as facilitating the pursuit of (pre-ordained) human preferences, not as constitutive of those preferences. For both currents of thought, though, institutions play a key role in societal and economic development. They exert a pervasive influence on human behavior through rules, norms, and other frameworks. They do this insofar as institutions, as defined by North (1991), can be understood as “[t]he rules of the game: the humanly devised constraints that structure human interaction. They are made up of formal constraints (such as rules, laws, constitutions), informal constraints (such as norms of behavior, conventions, self-imposed codes of conduct), and their enforcement characteristics”.

It is worth noting the similarities and differences relative to the earlier definition by Commons (1931, p.1), typical of the OIE: “an institution as a collective action in control, liberation and expansion of individual action. Collective action ranges all the way from

unorganized custom to the many organized going concerns, such as the family, the cooperation, the trade association, the trade union, the reserve system, the state. The principle common to all of them is greater or lesser control, liberation and expansion individual action by collective action.”

Searle (2005) states that there is no straightforward definition of institution since it depends on different conditions and different real-life situations. However, his preliminary definition of an institution is “any collectively accepted system of rules (procedures, practices) that enable us to create institutional facts”. Another influential institutionalist scholar, Geoffrey Hodgson (2006), defines institutions as “a system of established and prevalent social rules that structure social interactions.”

Broadly in line with the NIE view, an IMF (2003) paper proposes to regard institutions as “establishing ‘the rules of the game’”, viewing “good institutions” as those which establish “an incentive structure that reduces uncertainty and promotes efficiency”. In his turn, Ha-Joon Chang, who in the present day endorses a view closer to the older institutionalist tradition, recognizes the diversity of historically-existing institutions and proposes to classify them according to their function (coordination and administration; learning and innovation; and income redistribution and social cohesion) as well as their forms (institutions serving multiple functions; institutions serving the same function; and the same function served by different institutions under different names) (Chang 2006).

While acknowledging the contributions from these various institutionalist approaches and their associated definitions, the approach taken in this thesis is closest to view proposed by Douglass C. North (1991) according to which institutions are the human-devised constraints that constitute the ‘rules of the economic game’, and can be divided into formal rules

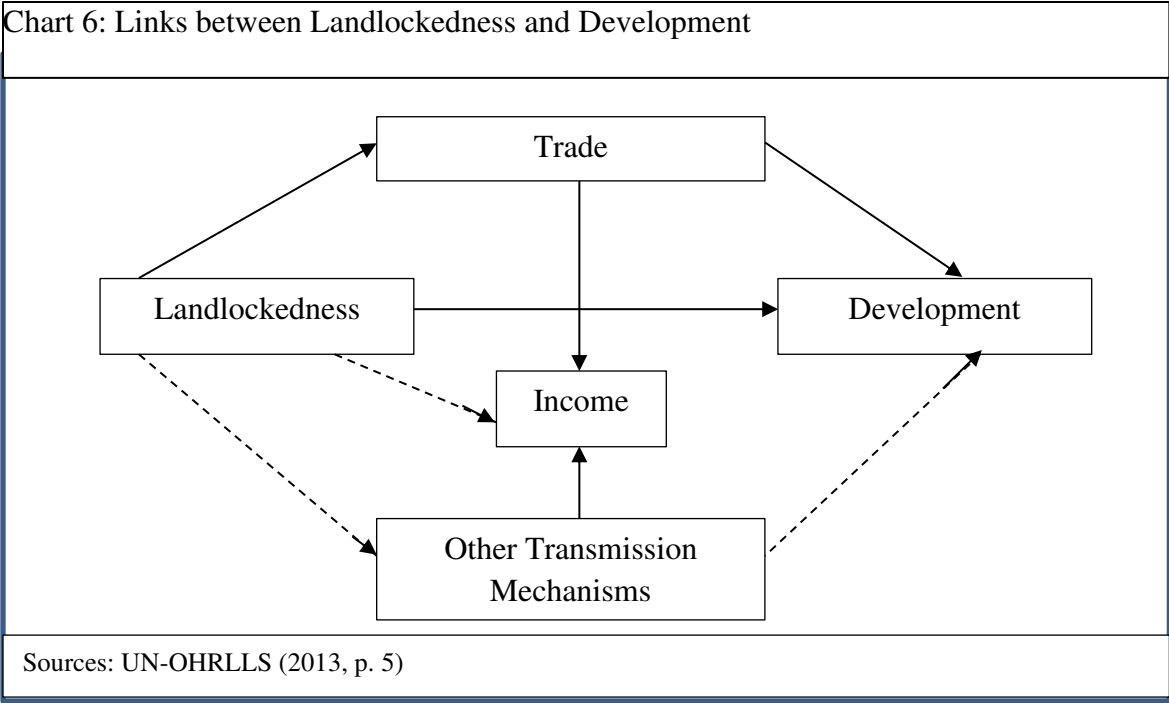
(codified laws, regulations, organizational structures, etc) and informal rules (constraints created by custom, tradition, taboos, etc.). Of these two types of institutions, it is furthermore considered that the formal ones are most important for economic processes, in addition to being more amenable to policy design and influence (as well as easier to map in a cross-country analysis). Therefore, the central focus of this thesis is on formal institutions, from a perspective largely aligned with the NIE.

### **3.2 Institutions and Landlockedness**

While there is no single determinant of economic growth and development, the last few decades have seen a gradual shift from the emphasis on the well-known exogenous and endogenous growth models, which focus mostly on the proximate causes of growth and income, to paying greater attention to geographical and institutional factors as deeper determinants of growth and development. As we have also mentioned above, within this latter approach two polarized groups can be found: those who argue that geographical factors are most important, and those who claim that institutions are the real key to economic growth and development. As a working hypothesis, this thesis explores the hypothesis that institutions matter the most, because of the idea that adverse geographical barriers can be reduced or compensated through adequate institutional (re)design, both in relation to international trade and many other channels.

Specifically in the case of landlocked nations, the excessive emphasis on the trade channel linking landlockedness with (the lack of) development is itself outdated, because it fails to consider several other important drivers of economic development. According to UN-OHRLLS (2013, p.5), “[t]here are dynamics that fundamentally drive development without necessarily impacting trade or economic integration. They are circulation of ideas, recurrent

conflict and income, as well as institutional quality”. This idea is represented in Chart 6 below, taken from UN-OHRLLS (2013):



The key idea in this chart is that there are other mechanisms besides the trade channel which connect landlockedness with (the lack of) development: landlockedness is also likely to affect the access and degree of exposure to ideas, religious values, culture and technology from other countries, in addition to likely influencing the incidence or recurrence of conflict, the historical pattern of colonization experienced by the country, its ability to benefit from tourism, etc. These additional transmission mechanisms need to be adequately taken into consideration, both theoretically and in any empirical estimation exercises.

North (1991) considered that institutions are “the key determinant of economic growth and development”, by not only decreasing the cost of transactions, supporting the division of labour and solving human cooperation problems, but also by providing incentives for

investment. Supporting North's argument, Hall and Jones (1999) have found that countries characterized by different institutions and different sets of government policies exhibit robust differences in terms of per capita income.

Several convenient "natural experiments" in this respect are discussed by Jones (2015), showing that "rules matter" when it comes to accounting for the differences between poor and rich nations. The examples include North and South Korea after 1953, East and West Germany after World War II, Hong Kong and Southeastern China, and Mexico and Texas on the two sides of the Rio Grande. Based on a cross-sectional study, Rodrik (2000) similarly concludes that the quality of institutions trumps everything else, while Jones and Romer (2010) consider institutions to be one of the four pillars of endogenous growth, along with ideas, population and human capital.

According to Acemoglu and Robinson (2008, p.6) "[e]conomic institutions matter for economic growth because they shape the incentives of key economic actors in society. In particular, they influence investments in physical and human capital and technology and the organization of production. Economic institutions not only determine the aggregate economic growth potential of the economy, but also the distribution of resources in society." The same authors argue that to get successful economic results, countries should change their economic and political institutions (de jure political power) together with the distribution of political power in society (de facto political power), so as to overcome persistent instability and pull themselves out of economic doldrums.

Institutions constitute the system of rules and beliefs of a nation. According to Helpman (2004), different institutional structures determine different development paths even if two nations start with similar resource endowments. This author believes that institutions affect

the incentives to innovate, to develop new technologies, to reorganize production and distribution, to exploit new opportunities, and to accumulate physical and human capital.

Fosu (2013) also concludes that institutions are a prime determinant of economic growth. His study ingeniously separates the effect of total factor productivity and concludes that anti-growth syndromes are often linked with such factors as state control, adverse redistribution, sub-optimal intertemporal resource allocation, state breakdown (civil war) and ethnic division, which tend to constrain the economic growth of a country.

Jeffrey Sachs and Andrew Warner (1995) argue that for laggard countries to converge vis-à-vis developed nations, they must adopt appropriate measures in four domains: reasonable sets of economic and political policies, civil peace, political and civil rights, and a free economy. William Easterly and Ross Levine (2003) find that the quality of institutions is more important than resource endowments and policies. Empirically, these authors find that resource endowment and policies do not show any independent effect upon economic development after controlling for institutional factors.

Specifically in the case of landlocked nations, Carmignani (2012), using a structural equations model, concludes that institutional quality is the main transmission channel for landlockedness, rather than trade openness as usually believed, and estimates that landlockedness has a residual negative effect on income after controlling for institutional quality. Similarly, Nordås et al (2006) look at four case-studies of key export sectors in Bulgaria, the Dominican Republic, Kenya, and Kyrgyzstan, and find that the three non-landlocked nations face significant costs due to the lack of competition in areas such as logistics, packaging and testing, but the landlocked Kyrgyzstan suffers even more from other multifaceted costs “such as high-level administrative corruption and state capture, poor

quality of physical infrastructure and relative services, inefficient institutional arrangements and non-tariff trade barriers". In other words, this landlocked country is most penalized by institutional factors, not by its geography.

Broadly speaking, institutions, especially the rule of law and private property rights, exert direct and indirect impacts upon the income level, economic growth and economic development of a country. Most of these impacts are generic, while others are specific to landlocked developing countries. The generic effects include the following:

- ❖ The protection of private property rights promotes investment in physical and human capital, hence fostering economic growth and development.
- ❖ Good institutions allow for greater efficiency in terms of resource allocation, which also leads to more economic growth and development.
- ❖ Educational institutions such as schools, colleges and universities and health institutions such as hospitals, healthcare centres, health insurance, etc, decisively influence the development of human capital, hence economic prosperity.
- ❖ Appropriate institutions provide an environment conducive to new ideas, innovation and technological progress, increasing productivity and therefore promoting economic growth and development.
- ❖ Good institutions also help to bring about more equitable income distributions and to stabilise the political environment, thus supporting economic growth and development.

Additional effects of special relevance in the specific case of landlocked developing countries include:

- Domestic institutions help to mobilize resources and provide an environment conducive to investment on quality infrastructure, reducing transport costs for both landlocked countries and transit neighbours.
- National and foreign institutions facilitate coordination and cooperation between nations, and help landlocked nations to overcome some of the obstacles to their international integration.
- Suitable institutions facilitate the transfer and adoption of new technologies, particularly in support of international trade and development.
- More generally, good institutions decrease the isolation of landlocked countries and help to search for growth channels beyond international trade.

Another important debate in the case of landlocked countries concerns the relative primacy of three factors: neighbours, infrastructure and natural resources. For authors such as Ades and Chua (1997), the quality of a landlocked country's transit neighbours is what matters the most for trade, growth and economic development. According to these authors, bad neighbours, which are characterized by war or political unrest, reduce economic growth in two ways: first, they make trade highly risky and challenging, so that foreign trade is either completely halted or it is forced to follow different and more expensive routes. Second, they require exporting countries to increase their defence expenditure in order to defend themselves from their war-torn neighbours, taking away scarce resources from physical and human capital accumulation. Empirically, these authors estimate that "an increase of one per decade in the average annual number of revolutions and coups in neighbour countries reduces steady-state per capita income by about 17.6%."

Paul Collier (2007) similarly argues that bad neighbours are key to the poor economic performance of most landlocked nations. For this author, while good neighbours are

important as transport corridors to international markets as well as directly as markets, bad neighbours are those transit neighbours which, whether due to conflict or political instability, both discourage transport access by landlocked countries and do not buy goods from the latter.

Against this background, Lahiri and Masjidi (2012), based on a game theoretical analysis, argue that landlocked countries should adopt a strategy of bilateral cooperation and negotiate concessions from their transit neighbours, so that both the landlocked country and its coastal neighbour benefit from cooperation. They show that landlocked countries which depend on a single transit country and a single route to international markets are in a more vulnerable position, whereas those with more neighbours have greater bargaining power and are able to make fewer concessions to elicit similar responses from their neighbours. This conclusion is in line with the recommendations of the United Nations' (2003) Almaty Programme of Action, which highlights the importance of landlocked nations maintaining good coordination, cooperation and collaboration relations with transit neighbours.

The impact of neighbours on connectivity is well illustrated by Snow et al (2003), who highlight the contrasting examples of Kazakhstan and Malawi. They show that, among the group of landlocked countries, Kazakhstan was the one farthest from the nearest seaport, but it enjoyed the second lowest freight cost. By contrast, Malawi bore the highest freight cost of all within the group of landlocked countries despite being only 803km away from the nearest port, because its primary trade route at the time was blocked by the civil war in Mozambique.

For other authors, the quality of infrastructure is what matters the most for landlocked countries. Two empirical studies are cited most often in this respect. Limão and Venables

(2001) find that infrastructure is a central determinant of landlocked nations' degree of economic integration. They estimate that "poor infrastructure accounted for 60% of transport cost for landlocked nations and 40% for coastal nations. An improvement in its own and transit countries' infrastructure from the 25th percentile to 75th percentile overcomes more than half of the disadvantage associated with being landlocked". Based on an analysis of country case-studies in Central Asia, Grigoriou (2007, p.30) identifies three main factors which are especially important for landlocked countries to alleviate the burden of landlockedness: "overland transportation costs, bargaining power with transit countries and the infrastructure of the latter."

Finally, other scholars argue that valuable natural resources (such as gold, coal, oil, etc.) and location-related factors (latitude, proximity to favourable markets, temperate zones, etc.) matter more than either neighbours or infrastructure for landlocked nations. According to this argument, abundant natural resources and a favourable location are by themselves able to support industrialization and economic development, making it possible to overcome the challenges of landlockedness. According to Paul Collier (2007), landlocked nations with valuable natural resources do not really face any unsurmountable barriers to prosperity. Indeed, this author argues that resource-rich landlocked nations and coastal nations are faced with similar opportunities.

However, a considerable theoretical and empirical literature has developed the argument that natural resources are not a sufficient condition for economic growth. Mehlum et al (2005), for example, put forth a 'resource curse equation' according to which institutional quality makes it possible to overcome the 'curse':

$$\frac{d[\text{Growth}]}{d[\text{Resource Abundance}]} = -14.34 + 15.40[\text{Institutional Quality}]$$

In other words, resource abundance can be both a curse or a blessing, depending on the availability of quality institutions (rule of law, bureaucratic quality, low corruption in government, low risk of expropriation and low risk of government repudiation of contracts). It is a curse in the presence of what this author calls “grabber-friendly institutions”, but a blessing in the case of “producer-friendly institutions”.

Whatever the relative primacy of the three factors discussed above, it seems clear that institutions play a decisive role. Transit neighbours, infrastructure, valuable natural resources and location have often been cited as relevant independent variables determining the income level and growth performance of landlocked countries. However, we find that bad neighbours and poor infrastructure can be addressed or alleviated through high-quality institutions, and that whether a rich natural resource endowment is a blessing or a curse largely depends on a country’s institutions to deal with that endowment. For example, Gylfason (1999) shows that Nigeria’s misguided investment and poor policy choices in the 1970s and 1980s led to its economic stagnation despite the abundance of oil. It would therefore be unfair and inconsistent to argue that valuable natural resources were the key to the prosperity of landlocked and diamond-rich Botswana, but detrimental in the case of non-landlocked and oil-rich Nigeria.

In its turn, the location argument has been discredited by Acemoglu et al’s (2002) finding that development exhibits a “reversal of fortune” pattern: some of today’s richest nations, including the United States, Canada, New Zealand and Australia, were among the poorest regions in 1500, while some of the richest territories of that time, such as the Mughal empire in India and the Aztec and Inca empires in the Americas, correspond to relatively poor countries today. If that is the case, then there is nothing especially relevant about either group

of countries' locations when it comes to accounting for their prosperity level. Ultimately, we are led back to the conclusion that all these factors can be important in different ways, but the quality of institutions is the most decisive factor.

### **3.3 Challenges Against the Institutional Perspective**

Institutions (political, economic and social) frame, influence and constrain the choices and actions of both private agents and the government, coordinating and nudging those choices and actions in ways which can be either favourable or inimical to growth and development. The precise ways in which this comes about, however, are neither well understood nor undisputed. Tracing the impact of institutions on economic development is a difficult task for several reasons, including the unclear definition of the former, the difficulty of measuring their quality, and the empirical questions of reverse causality and endogeneity.

Some of the key questions which are still unresolved include whether institutions trump all other factors when it comes to accounting for economic growth and development, and which institutions matter the most in this context. The empirical difficulties include how to measure and operationalize some rather abstract institutional concepts/constructs (e.g. the rule of law, bureaucratic efficiency, etc.) and how to deal with the problem of reverse causality and endogeneity: it is not only possible but indeed very likely that the causality runs from development to institutions in addition to the other way around. All these questions considerably complicate the empirical assessment of the seemingly simple questions of whether and how institutions matter, and make it possible to challenge the view that that is the case.

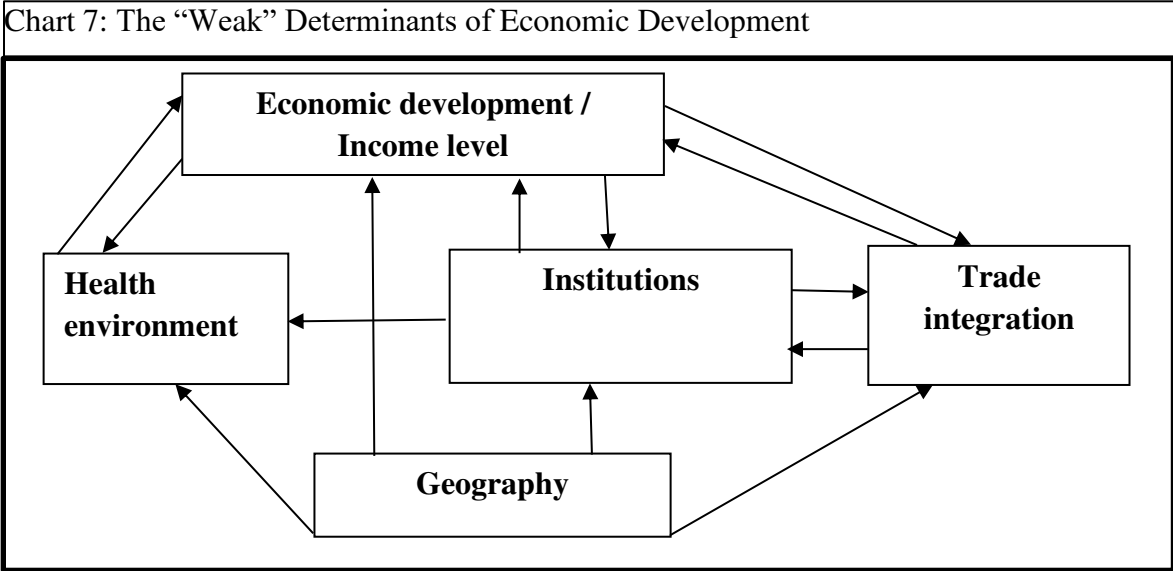
Ha-Joon Chang (2006) argues that the neoinstitutionalist view espoused by North and others does not fully describe the relationship between institutions and economic growth, and he

has three main objections to make. First, the causality is not one-way, from institutions to growth and development, but also the other way around (reverse causality). Second, those institutions viewed as most central in the liberal neoinstitutionalist view (private property rights and intellectual property rights) are not a one-size-fits-all recipe for success in all countries and all contexts (in some contexts, other institutional mixes and configurations may work better). And third, he fundamentally disagrees with the validity of the inferences from cross-country analyses due to the heterogeneous character of the countries and institutions in question. For this author, institutions do not have a static nature and a linear relationship with growth and development: instead, he views them as dynamic and non-linear in their effects. Therefore, for Chang, the new institutional economists are only partially correct in their view that institutions matter for economic growth and development: this may well be the case, but not necessarily in the way that the neoinstitutionalists argue.

Eicher et al (2006) hold a similarly cautious, though positive, view of the impact of institutions. They revisit Hall and Jones' (1999) model of economic growth and conclude that the latter authors exaggerated the impact of institutions on economic output. The conclusion of Eicher et al's augmented model is that institutions have only about 15% explanatory power when it comes to accounting for cross-country income differences.

Presbitero (2006) proposes a revised version of the causal mechanisms put forth by Rodrik et al (2002) (See Chart 1 above), in which institutions appear as "weak", endogenous determinants of economic development, alongside trade integration and the disease ecology of a region or nation (Chart 7). For this author, "[g]eography is the only exogenous factor, while disease ecology, institutions and trade are endogenous variables. They positively affect the degree of development but, at the same time, the relation of causality could go in the

opposite direction”. In empirical terms, an implication of this is that institutions account for less than expected after we consider the interaction of the health environment and trade integration as additional variables.



Beyond the formal aspect of institutions, Guiso et al (2006) highlight the importance of culture for economic development. Their argument is that culture plays an indirect role through trust in the quality of the legal system as well as in the context of interpersonal interactions, in addition to having a direct role by influencing people’s preferences (e.g. degree of patriotism, propensity to invest, female labor market participation, dominance of cultural heritages, fertility choices, etc.) and institutional arrangements (religious make-up of society, social mobility arrangements, redistribution mandated by the political system, tolerance for uncertainty, etc.).

Douglass North (2003) highlights three important issues that need to be considered when one sets out to improve the functioning of societies through institutional improvement. The first

one is that of the three classes of institutional elements in society (formal rules, informal norms and enforcement characteristics), only the first one can usually be changed more or less easily and deliberately. However, the other two are equally important, though very difficult to change. Second, institutional issues are often political issues, and politics often blocks the ability to improve economic performance. Third, we live in a dynamic, evolving, constantly changing world, in which our ability to solve problems is often very limited. We may be able to identify the problems that we face, but it may be much harder to identify how to deal with them. There are no precise or unique answers to questions about suitable institutional arrangements, because finding out the answers often requires processes of trial and error - what North (*ibid*) calls 'adaptive efficiency'.

Along similar lines, two other prominent scholars of institutions, Daren Acemoglu and James Robinson (2008, p. 19), while noting that economic institutions are collective choices which lead to conflicts of interest among different groups and individuals, argue that "[j]ust as reforming economic institutions without changing the political equilibrium may not improve the institutional equilibrium, so changing *de jure* power, while leaving the sources of *de facto* power intact, may have little impact on economic performance".

In his turn, Rodrik (2008) develops the well-known argument that markets cannot possibly function without the support of legitimate sets of rules. The increasing awareness of this led mainstream development policy to move from an emphasis on "getting prices right" to "getting institutions right". Even so, however, the appropriate set of institutions may vary substantially from one setting to the next, especially between the developing and developed worlds. Developing economies face more challenges and constraints than do advanced

nations. Consequently, the choice of appropriate institutions should be based on a pragmatic and empirical assessment of their impact on operational practices, rather than the mere transplantation of the institutional configurations that meet the particular preferences of the World Bank, the International Monetary Fund or the World Trade Organization.

Still on the question of formal vs. informal rules, Licht et al (2007) maintain that there is a strong relationship between culture and social institutions (government norms, rule of law, absence of corruption, and accountability), such that consideration of the cultural context is very helpful in assessing legal systems and economic mechanisms. Likewise, Tabellini (2010) states that “if the same formal institutions function very differently in different economic or social environments, the economic and institutional outcomes are jointly determined, and the view that institutions have an independent causal effect on economic development becomes more tenuous”. After controlling for education, urbanization rates around 1850 and national effects, this author finds empirical evidence in support of the idea that culture, a fundamental channel of historical legacy, is an exogenous factor which is strongly correlated with current regional economic development.

It is also clear that external institutions (including diplomatic relations) promote friendship, collaboration and coordination between landlocked nations and their transit neighbours, reducing or compensating for the problems of administrative cost, port delays, custom fees and uncertain seaport access. For example, establishing and maintaining positive relations between landlocked and transit countries through embassies, consulates and trade chambers can be very beneficial to landlocked and transit nations alike. It fosters good long-term bilateral relations and allows for more certain seaport access, thereby promoting exports, investment, and economic development (see chart 2, above).

According to Rose (2007), ambassadors, commercial attachés and other members of the diplomatic corps can play a key role in developing and maintaining export markets. Empirically, this author finds that the presence of foreign missions, particularly consulates, is indeed positively correlated with exports: this author's point estimate is that such a presence is associated with 6-10% higher exports, which is statistically significant and economically plausible in magnitude. Similarly, Neumayer (2007) points out that "[t]hrough diplomatic representations, states promote their political and economic interests, they negotiate, co-ordinate and solve problems, they gather information that is not otherwise publicly available, they convey messages to foreign representatives, protect their own citizens, facilitate scientific and tourist exchange and do many other things". Moreover, van Veenstra et al (2010) and Yakop and van Bergeijk (2009) concur that commercial diplomacy through export promotion agencies and foreign missions play a very significant role in the development of bilateral trade relationships by developing countries.

To conclude, it is worth recalling Hodgson's (2006, p. 21) argument that there is "considerable debate over whether institutions should be regarded essentially as equilibria, norms, or rules". While this interpretative debate is largely inevitable, and while numerous questions will continue to arise when it comes to specifying exactly which institutions matter, why they matter and how they matter, it is hardly in question that they do matter for economic growth and development. After all, as Hodgson (ibid) also points out, institutions "are not simply the 'environment' in which the (rational) actor must decide and act; they are also internalized in the preferences, and replicated through the behavior, of the individual. Repeated, conditional, rule-like behavior acquires normative weight as people accept the customary as morally virtuous and thus help stabilize the institutional equilibrium. Once we

see the effect of individuals upon institutions, the three aspects of institutions [as equilibria, norms and rules] become entwined”.

## **CHAPTER IV: RESEARCH METHODOLOGY, DESIGN AND DATA**

The overall aim of this study is to investigate the causes of the relatively low prosperity of landlocked developing nations through an empirical analysis which considers landlockedness itself and poor economic and political institutions as alternative explanations for these countries' low per capita income levels. The pursuit of this aim involves the following two specific objectives: (1) to contribute to filling the knowledge gap about why European landlocked nations are rich and non-European landlocked nations are poor, and to what extent this may be due to institutional differences; (2) to estimate the causal relationship between institutions and the per capita income level, in interaction with additional explanatory proxy variables representing landlockedness and distance to the sea. With those objectives in mind, this study is divided into two parts, characterised by different but complementary methodological approaches: a cross-national comparative-descriptive analysis; and an econometric analysis.

The first part of the empirical component of this thesis adopts a cross-country comparative approach to explore institutional similarities and differences between two groups of nations: European landlocked and non-European landlocked. This analysis seeks to provide answers to the question of why European landlocked countries are rich and non-European landlocked countries are poor. The key hypothesis under investigation is that those income differences are largely due to differences in terms of institutions, although the findings need to be taken with caution due to the potential problems that characterize this type of analysis, especially endogeneity and the effect of unobserved variables.

To partially overcome those potential problems, the second component of the empirical analysis adopts a variety of complementary econometric approaches and looks at the question of the causal relationship between institutions and per capita income, in interaction with independent landlocked proxies. In this analysis, institutions are not a static term and instead vary over time and from one nation to the other, which raises several econometric difficulties such as missing data points, cross-sectional data issues, non-linearity, unobserved variables, and reverse causality. The analysis is based on a balanced panel dataset (through the exclusion of those years for which there were missing date points) and the use of different regression models: baseline Pooled Ordinary Least Squares regression (POLS); Fixed Effects Model (FEM); Random Effects Model (REM); and, finally, a Correlated Random Effects Model (CREM) based on Wooldridge (2010).

Importantly, the problems originated by the use of different measurement scales for the institutional variables is addressed by standardizing (i.e. applying equal scaling to) all of those variables with the exception of the landlocked dummy variable (in other words, standardized regression coefficients are used). This makes it possible to mitigate some of the problems associated with unobserved variables, cross-sectional issues, and scale effects.

#### **4.1 Data Sources and Functional Relationship**

This study draws on quantitative data from a variety of secondary sources. Specifically, the comparative-descriptive part of the analysis draws on the Human Development Data Center, the World Bank Databank and World Development Indicators, the Maddison Historical Statistics, Center for Systematic Peace, Freedom House (FH) and Heritage Foundation (HF). For the second (econometric) part of the analysis, the data sources for the institutional variables are HF, FH and the Worldwide Government Indicators (WGI), while geographical

data (landlocked dummy variables, distance, etc) are collected from the CIA World Fact Book and the data base of the CEPII (Centre d'Études Prospectives et d'Informations Internationales). The dependent variable in all the models is the logarithm of real Gross Domestic Product (GDP) per capita, as drawn from the World Bank on-line dataset.

The selection of the base period depends upon the objective in each case. For the first part of the empirical analysis, data for 1950 to 2014 are used; in some cases, historical data dating even further back are used. The reasons for this are as follows:

- ❖ Most African landlocked nations were colonized in the past, and 1960 was a watershed year in the decolonization process, marked by the UN's declaration of decolonization under General Assembly resolution 1514 (XV), 14 Dec. 1960.
- ❖ 1957 was the year in which the UN General Assembly, realizing the specific problems and challenges of landlocked nations, passed a resolution proclaiming the right of LLCs to access the sea.
- ❖ Using a larger sample allows for greater power of estimation and prediction than in the case of a smaller sample (as stated by the Central Limit Theorem and Large Number Theory).

Unfortunately for the empirical analysis, due to the limitations of some of the data sources only 16 years have fully available data. Additionally, 15 landlocked nations only became independent after 1990 (see 2.3, above), which increases the robustness of the findings from the 1990s onwards. Thus, the panel data matrix used in the econometric analysis covers the shorter period 1996-2014 and includes a set of relevant variables drawn from the data sources indicated above. Missing observations of nations and/or variables were excluded from the study. In particular, the years 1997, 1999 and 2001 were excluded from the data matrix

because of missing observations from one of the sources: WGI. In total, the panel data includes 2144 observations:  $(i=134)*(t=16)$ .

The analysis is based on the following general functional form:

$$\text{Log Gross Domestic Product Per Capita} = f(\text{Institutional Quality, Geography})$$

, with “Geography” including (i) Landlockedness and/or (ii) Distance in kilometres from the centre of the country to the nearest seacoast or navigable river leading to the sea (CENC).

It is further hypothesized that  $f'(\text{Institutional Quality}) > 0$ ;  $f'(\text{Landlockedness}) < 0$ ; and  $f'(\text{Distance to nearest seacoast/river}) < 0$ .

Mathematically,

$$\text{GDPPC} = f(\sum_i^{17} X_i, \text{LLC})$$

, with GDPPC = Log Gross Domestic Product Per Capita, i.e. a proxy for the income level or the level of economic development; LLC = a Dummy Variable that takes the value 1 in the case of landlocked countries and 0 otherwise; and  $X_i$  = the independent institutional variables. In an alternative specification, the dummy variable LLC is replaced by distance in km to the nearest seacoast/river leading to the sea. All the variables vary across units of analysis (individual countries) and over time (different years), with the exception of geographical variables (landlockedness dummy and distance to sea/river), which varies only across units of analysis.

Seventeen institutional variables are considered in the analysis:

$X_1$  = Control of Corruption, Estimate (ccest);

$X_2$  = Government Effectiveness, Estimate (geest);

$X_3$  = Political Stability and Absence of Violence, Estimate (pvest);

X<sub>4</sub> = Regulatory Quality, Estimate (rgest);

X<sub>5</sub> = Rule of Law, Estimate (rlest);

X<sub>6</sub> = Voice and Accountability, Estimate (vaest);

X<sub>7</sub> = Political Rights (polr);

X<sub>8</sub> = Civil Liberty (civl);

X<sub>9</sub> = Property Rights (pror);

X<sub>10</sub> = Freedom from Corruption (corf);

X<sub>11</sub> = Fiscal Freedom (fiscf);

X<sub>12</sub> = Government Spending (govs);

X<sub>13</sub> = Business Freedom (bisf);

X<sub>14</sub> = Monetary Freedom (monf);

X<sub>15</sub> = Trade Freedom (traf);

X<sub>16</sub> = Investment Freedom (invf);

X<sub>17</sub> = Financial Freedom (finf);

The source of the data for variables X<sub>1</sub> to X<sub>6</sub> is WGI; for X<sub>7</sub> and X<sub>8</sub>, FH; and for X<sub>9</sub> to X<sub>17</sub>, HF. The LLC dummy draws on the definition put forth in the CIA World Fact Book, while CENC data are taken from the CEPII database.

## **4.2 Econometric Model**

In the econometric part of the empirical analysis, two basic specifications are proposed, reflecting two different views of the hypothetical effect of geography upon economic performance, as based on Acemoglu et al (2002, pp. 1259-60). These are what the latter authors call, respectively, the “geography hypothesis” and the “sophisticated geography

hypothesis". The two specifications differ according to whether the effect of geography is viewed as time-invariant or time-varying. Formally, we have:

$$Y_{it} = \alpha_0 + \alpha_1 G_i + \alpha_2 V_t + \epsilon_{it} \quad (\text{Geography Hypothesis})$$

$$Y_{it} = \alpha_0 + \alpha_1 G_{it} + \alpha_2 T_t G_{it} + V_t + \epsilon_{it} \quad (\text{Sophisticated Geography Hypothesis})$$

, where:

$Y_{it}$  = Economic performance in country  $i$  at time  $t$

$G_i$  = a measure of geographical characteristics

$V_t$  = a time effect

$\epsilon_{it}$  = other country time specific factors

$T_t$  = a time-varying characteristic of the world as a whole or of the state of technology.

According to the simple geography hypothesis, geographical features  $G_i$  (alongside other country-specific factors  $\epsilon_{it}$ ) affect prosperity (income or output at time  $t$  in country  $i$ ,  $Y_{it}$ ) in a time-invariant way, with the implication that countries with different relevant geographical features will exhibit different relative levels of prosperity. Under the sophisticated geography model, by contrast, it is assumed that the effect of those geographical features on prosperity may itself vary over time depending on  $T_t$ , a variable which may reflect e.g. evolving technology which may cause certain geographical areas to become more amenable to prosperity. According to this latter view, the main impact of geography on prosperity may be felt through  $\alpha_2$  rather than  $\alpha_1$ .

Choosing the best model specification and estimating coefficients which are unbiased and efficient is an inherently difficult task because of the various issues which may give rise to model misspecification (especially omitted variables and inclusion of spurious variables). In this study, an attempt is made to estimate such efficient and unbiased coefficients through

panel data analysis. One of the questions that this type of analysis involves is the choice between Fixed Effect Models (FEM) versus Random Effect Models (REM). In general, whenever the analysis is interested in analyzing the impact of variables that change over time and not over entities, then FEM is usually chosen over REM. On the contrary, REM is usually chosen over FEM if there is an interest in variation across entities, which is assumed to be random and uncorrelated with the independent variable.

Alongside the dummy variable representing landlockedness, the omitted time-invariant fixed effect of geography on prosperity is the most important variable in this analysis. Therefore, the FEM, REM and Pooled Ordinary Least Square (POLS) models are used as benchmark models, while the model deemed appropriate is the Correlated Random Effects Model (CREM) based on Mundlak (1978, cited by Schunck 2013), Allison (2009, cited by Schunck 2013) and Wooldridge (2010), which relaxes the issue of omitting the fixed effect time-invariant variable in the fixed effects model. A Hausman-Taylor hybrid model (HHM), which combines characteristics of the fixed and random effects models, is not presented here because it turned out to be largely redundant in this case. The estimation of all the models, including the CREM specification and the benchmark models, was undertaken using STATA.

We are thus faced with estimation of a linear random-intercept model of the following form (here in the case of two variables, x: independent variable and z: fixed effect time-invariant variable, but easily generalizable to the case of multiple independent variables):

$$y_{it} = \beta_0 + \beta_1 x_{it} + \dots + \beta_2 z_i + \dots + \mu_i + \varepsilon_{it} \dots \dots \dots (*)$$

, where,  $x_{it}$  is an explanatory independent variable which is time-variant between and within clusters,  $z_i$  is a fixed effect time-invariant variable varying only between clusters,  $\beta_i$  are the

unbiased and efficient coefficients to be estimated,  $\mu_i$  is an unobserved fixed effect error and random intercept, and  $\epsilon_{it}$  is a white noise error term. The strong assumptions of this model are  $(\mu_i/x_{it}, z_i) \sim N(0, \sigma^2_\mu)$ ,  $E(x_{it}, z_i) \neq 0$  and  $E(\mu_i/x_{it}, z_i) = 0$ .

The estimation of the unbiased and efficient coefficients is done through a mean difference approach (FE), collapsing the fixed-effect time-invariant variables  $z_i$  together with the fixed effect error term  $\mu_i$  (unobserved). The intercept is random because it is equal to the sum of the intercept  $\beta_0$  plus unobserved random fixed-effect variables  $\mu_i$ . The model is transformed by decomposing the assumed correlated explanatory variables  $x_{it}$  into a between ( $\bar{x}_i = n_i^{-1} \sum_{t=1}^{n_i} x_{it}$ ) and a cluster ( $x_{it} - \bar{x}_i$ ) component as suggested by Allison's hybrid model. The transformed model (with a single time-variant and a single time-invariant variable, but again generalizable) thus becomes:

$$y_{it} = \beta_0 + \beta_1(x_{it} - \bar{x}_i) + \beta_2 z_i + \beta_3 \bar{x}_i + \mu_i + \epsilon_{it} \dots \dots \dots (1)$$

, where the  $\beta_1$  coefficient constitutes an estimate of the fixed effect (within-effect exactly the same with FE) and  $\beta_2$  is unbiased estimated coefficient of the effect of  $z_i$ , a time-invariant observed variable. The coefficient  $\beta_3$  is for the between effect. The model assumes  $(\mu_i/x_{it}, z_i) \sim N(0, \sigma^2_\mu)$  and  $E(\mu_i / x_{it}, z_i) = 0$ .

Finally, the correlated random effects model, which is closely related to the hybrid model, relaxes the assumption of zero correlation between the time-invariant error term and the time-variant variables  $x_{it}$ . It takes on the following form:

$$y_{it} = \beta_0 + \beta_1 x_{it} + \beta_2 z_i + \pi \bar{x}_i + v_i + \epsilon_{it} \dots \dots \dots (2)$$

, where  $\mu_i = \pi \bar{x}_i + v_i$  and  $\pi$  is not the equivalent of model (1) (i.e. between effect), but it is equal to the difference of between effect and within effect model i.e.  $(\beta_3 - \beta_1)$ .

These simple cases were in practice made more complicated through the use of multiple independent variables representing different aspects of a country's institutional quality, in addition to two main proxy variables for landlockedness: a landlocked vs non-landlocked dummy variable and a distance-to-sea variable). Additionally, all variables (except for the landlocked dummy variable) were standardized prior to the analysis, addressing the question of the use of different measurement scales.

## **CHAPTER V: COMPARATIVE-DESCRIPTIVE ANALYSIS**

This chapter undertakes a systematic comparison between two groups of landlocked countries (European and non-European) with respect to their economic performance, major economic indicators, and HDI rank and trend (section 5.1), followed by a similar comparison on several institutional aspects (political and civil rights, economic freedom indicators, etc. (5.2). Finally, section 5.3 analyses the association, across the various macroregional groups of landlocked countries, between GDP per capita and the political and economic institutions considered in the analysis (democracy/autocracy, property rights, etc).

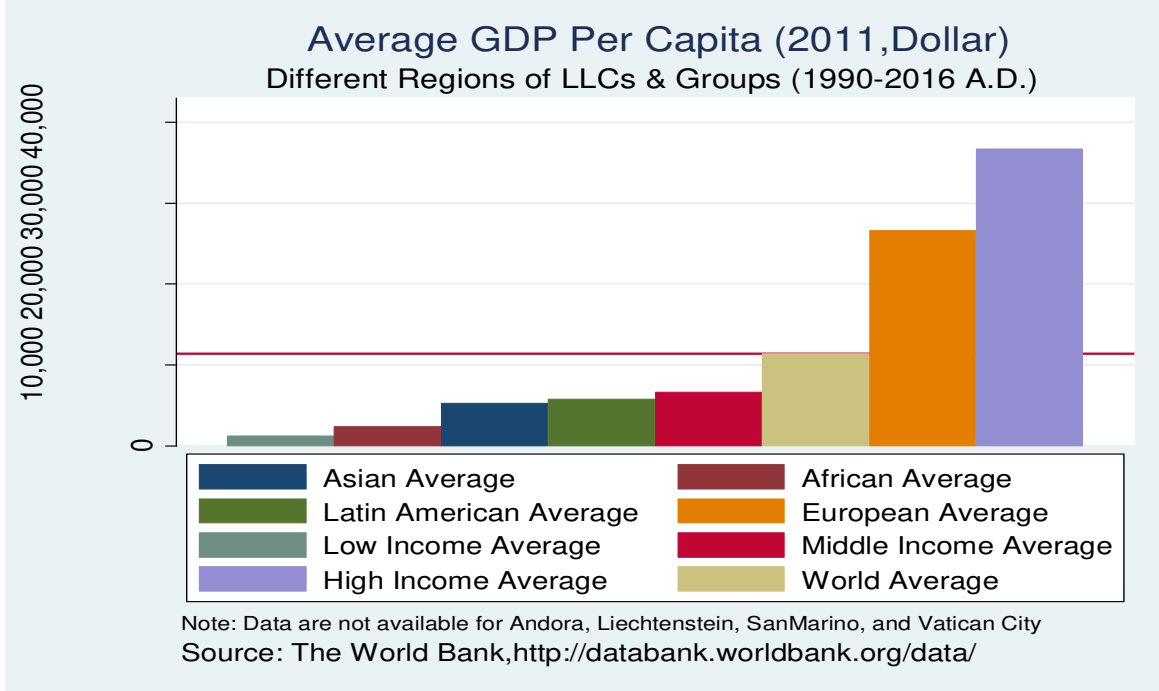
### **5.1 European vs. Non-European Landlockedness**

According to World Bank data, landlocked nations account for approximately 3.4% of the world's real GDP and 7.4% of the world's total population. The average real GDP per capita of the landlocked nations in 2016 was nearly US\$13,448, which was around US\$1,618 less than the average per capita GDP for the world as a whole. The top five largest landlocked economies in terms of total GDP (2016) were Switzerland, Kazakhstan, Austria, Czech Republic, and Hungary. The top five richest landlocked nations in terms of GDP per capita were Liechtenstein, Luxembourg, Switzerland, San Marino, and Austria. Compared to the average real GDP per capita of European landlocked countries, the average GDP per capita of Asian landlocked countries was 4.8 times lower, that of Latin American landlocked countries was 5.4 times lower, and that of African landlocked countries was 14.2 times lower. The following table shows the real gross GDP per capita income (\$PPP) levels in different sets of countries in 2016.

<b>Table 2: Average Real GDP Per Capita by Region/Group of Countries (\$PPP)</b>	
<b>Group</b>	<b>Average Real GDPpc</b>
<b>Africa Landlocked</b>	2960
<b>South Asia Average</b>	5621
<b>Lower Middle-Income Average</b>	6316
<b>Latin America Landlocked</b>	7790
<b>Asia Landlocked</b>	8730
<b>World Average</b>	15066
<b>East Asia &amp; Pacific Average</b>	15787
<b>Europe Landlocked (excluding Vatican City)</b>	41995
<b>High Income Average</b>	43319
<b>Source: WB online data (2016)</b>	
<b>Note: Andorra, Liechtenstein, Kosovo, CAR, and South Sudan data derived from World Factbook estimation (2016)</b>	

African landlocked nations are extremely poor: their average income level is nearly five times as low as the world average income per capita. By contrast, European landlocked nations are on average about as rich as the group of high-income economies as a whole. There is therefore great variability among landlocked economies: landlocked European nations are very prosperous, African landlocked nations are very poor, and Asian and South American landlocked nations lie somewhere in the middle. A similar conclusion can be drawn from observation of the following graph, which represents the average GDP per capita for several groups of landlocked countries.

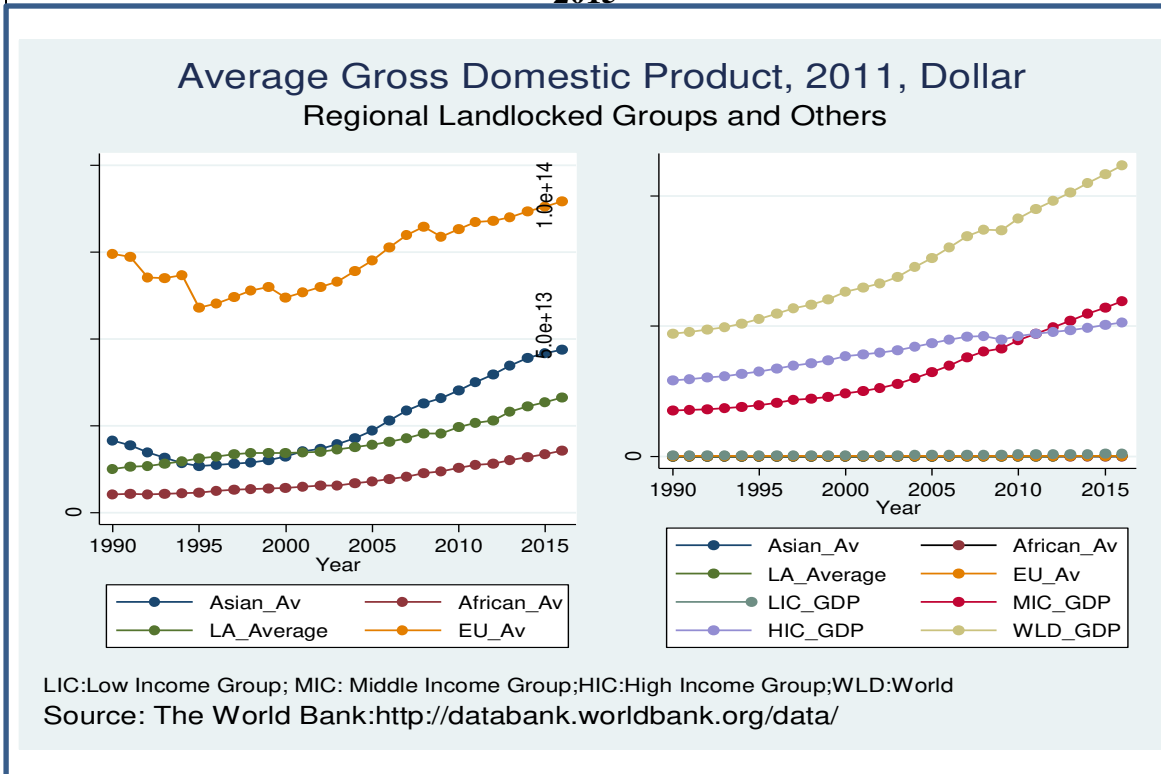
**Figure 1: GDP per capita in different regional groups of landlocked countries, 2011**



The graph above once again shows very clearly that the average income of the group of non-European landlocked nations is significantly below the richer landlocked club. It is also much lower than the world average per capita income level, not to mention that of the high-income countries. Among the various regional groups of landlocked countries, the African landlocked nations are the least fortunate, even though they do have a slightly higher income level than the group of low-income countries as a whole. Asian and Latin American landlocked countries have very similar income levels, which are marginally lower than the average for middle-income countries and significantly lower than the world average.

The following graph shows the evolution over time of the income level in many of these country groupings, allowing for a more dynamic picture:

**Figure 10: GDPpc in Different Regional Groups of Landlocked Countries, 1990-2015**



The graph on the left shows very clearly the enormous income gap between landlocked nations in Europe and those in the Asian, African and Latin American regions. However, we also find a gradual but clear convergent trend on the part of the poorer groups of landlocked economies, which is especially visible in the case of the Asian landlocked economies. The latter overtook the Latin American landlocked economies in the early 2000s and have since consolidated their lead, while the African landlocked nations remain considerably below the other country groups.

When we look at the GDP per capita level across the entire set of landlocked nations (Appendix A), we find that almost all European LLCs are high income countries, the exceptions being Belarus, Macedonia and the poorest country in Europe, Moldova. Still, even these three countries have a higher income level than most African and Asian landlocked

countries. European landlocked nations Austria, Luxembourg, San Marino, and Switzerland have a higher GDP per capita than the average GDP per capita of the high-income group. The two Latin American LLCs, Bolivia and Paraguay, have a slightly higher GDP per capita than the poorest European LLC, Moldova. The average per capita income in the European landlocked group is US\$37,403 PPP, which is around five times that of the group of Latin American landlocked nations, approximately four times that of the group of Asian landlocked nations, and about 14 times higher than that of the group of African landlocked nations. Except for the group of Latin American landlocked nations (which is comprised of only two countries), however, we find that there is significant dispersion in terms of per capita income within each group. In another words, many landlocked nations in each group have an income level significantly above or below the average for their respective regions.

The real GDP per capita of the richest Asian LLC, Kazakhstan, is higher than that of Belarus, Macedonia and Moldova, and close to that of Hungary (\$25,653) and the Slovak Republic (\$29,223). Azerbaijan, Mongolia, and Turkmenistan have lower per capita income levels than Kazakhstan, but higher than the average income of the middle-income group. Bhutan, Laos, and Uzbekistan are close to the Latin American LLC average and slightly above the South Asian LLC average. All other Asian landlocked nations have a real GDP per capita far below the average in the South Asian group. In their turn, all African landlocked nations, except for Botswana and Swaziland, have average income levels far below the average in all other regions, and close to the average of the low-income group.

When we look at the GDP growth rate column in the same table (appendix A), we find that in 2016 European landlocked nations grew less than most other landlocked nations, the exceptions being some especially vulnerable LLCs which grew even less – or negatively. Belarus exhibited an especially negative economic performance, with -3% growth, while

Moldova, Luxembourg, Czech Republic, and Hungary grew by 4.1%, 3.1%, 2.6% and 2.2% respectively. Interestingly, the European landlocked countries with the lowest and highest per capita income levels, respectively Moldova and Luxembourg, grew at a higher rate in 2016 than all other European landlocked nations.

In the same year (2016), the two Latin American LLCs experienced growth rates similar to those of the fastest-growing European landlocked economy. Even more remarkably, five Asian LLCs – Bhutan (8%), Uzbekistan (7.8%), Laos (7%), Tajikistan (6.9%) and Turkmenistan (6.2%) – were among the fastest-growing economies in the world. However, all other Asian LLCs grew by less than 4% in 2016, and Azerbaijan experienced negative growth (-4%).

Among the list of African landlocked nations, three experienced negative growth in 2016: Burundi, Chad and South Sudan. Chad (-7%) and South Sudan (-6.35%) are two especially alarming cases, as their political and economic fragility originated very severe economic contractions. By contrast, however, eight African LLCs – Botswana (4.3%), Burkina Faso (5.9%), Ethiopia (7.6%), Mali (5.8%), Niger (5.0%), Rwanda (5.9%), and Uganda (4.7%) had very positive economic growth rates, which exceeded even that of the fastest-growing European LLC, Moldova. Indeed, in 2016 Ethiopia was the fastest-growing landlocked African nation, and one of the fastest-growing LLCs in the world.

When we look at the literacy rate for the population aged 15+, a crucial factor for knowledge and productivity, the gap between the European LLCs and the others is very clear. European LLCs have literacy rates close to 100%, while those in Latin America also perform quite well (above 90%). In Asia, Uzbekistan, Turkmenistan, Tajikistan, Mongolia, Kyrgyz Republic, Kazakhstan, Armenia and Azerbaijan have literacy rates close to those of European LLCs.

By contrast, however, Afghanistan has the lowest literacy rate of all LLCs (38.2%), and the other Asian LLCs range between 64%-80%. In Africa, no LLCs has a literacy rate above 90%, and two nations have especially shocking literacy rates: Niger (19%) and South Sudan (27%). Botswana, Burundi, Swaziland, and Zimbabwe are slightly above the average of the low-income group and close to the world average rate literacy rate (86.3%).

Looking at life expectancy at birth, which reflects the health status of a population and is another key determinant of the human capital endowment and productivity, we find that the average life expectancy at birth of African landlocked nations is 19 years shorter than the average life expectancy in European LLCs, 12 years shorter than in Latin American LLCs and 10 years shorter than in Asian LLCs. European landlocked nations have a life expectancy in the range 74-83 years. In Latin America LLCs, it ranges between 69-73 years, and in Asian LLCs between 63-74 years. Sadly, a child born in a landlocked African nation can on average expect to live for only approximately 60 years, which is significantly less than in the other regions. There is therefore evidence that, within the group of landlocked countries, life expectancy at birth and the per capita income level are positively correlated.

Appendix A also shows the degree of trade openness across the group of landlocked countries, as measured by merchandise trade as a percent of GDP. Among the group of European LLCs, we find that Luxembourg exhibits the lowest degree of trade openness (64%), while three nations, Slovakia, the Czech Republic and Hungary, have the highest: 171%, 157% and 155%, respectively. Interestingly, the average merchandise trade openness among both the Asian and Latin American landlocked groups is close to 56%; however, the former group ranges from 31% in Uzbekistan to 83% in the Kyrgyz Republic, while the latter group ranges between 45% in Bolivia and 66% in Paraguay. In Africa, Lesotho has the highest degree of merchandise trade openness (120%), followed by Botswana (86%) and

Swaziland (82%). The remaining African landlocked nations range between 24% (Burundi) and 66% (Zambia). Remarkably, Lesotho had much lower per capita income than either Swaziland or Botswana (\$2,736 compared to \$7,224 and \$15,723) but much higher trade openness to merchandise trade (120% compared to 83% and 87%). Thus, the relationship between openness to trade and prosperity is not a simple and universally positive one.

The final column in Appendix A shows inflation in 2016 in all these countries, an indicator of macroeconomic stability. We find that except for Belarus (11% inflation), all European landlocked nations exhibited very low or even negative inflation rates in this year. Latin American landlocked nations had higher levels of inflation: Bolivia 3% and Paraguay 4%. In Asia, Tajikistan had the highest inflation rate at 6%, followed by Azerbaijan and Bhutan with 4% and 3%, respectively. Armenia experienced 1.3% deflation. All this pales in comparison to the situation in African landlocked nations like South Sudan, which experienced 380% annual inflation, or the Central African Republic (37%). Zimbabwe, a country historically known for rampant hyper-inflation, rather surprisingly had a negative inflation rate (-1.6%) in 2016. On average, and but for a few exceptions, inflation (and macroeconomic instability) tends to be highest in the African LLCs, followed by those in Asia and Latin America.

A complementary perspective to the indicators discussed in the previous paragraphs is provided in Appendix B, which shows the value, rank and trend over time of the Human Development Index, a well-known and widely-used composite indicator which comprises three dimensions: life expectancy, education, and per capita income. In 2016, Switzerland, a landlocked country, ranked second highest in the world after Norway in this respect. Several other European landlocked countries ranked above the 33<sup>rd</sup> position: Liechtenstein (15<sup>th</sup>), Luxembourg (20<sup>th</sup>), Austria (24<sup>th</sup>), Czech Republic (28<sup>th</sup>) and Andorra (32<sup>nd</sup>). This was in

stark contrast to African landlocked nations Burundi (184<sup>th</sup>), Burkina Faso (185<sup>th</sup>), Chad (186<sup>th</sup>), Niger (187<sup>th</sup>) and Central African Republic (188<sup>th</sup>), which appear at the very bottom of the table. The HDI value of the six landlocked nations with a very high human development index ranged between 0.70-0.94 in the period 1990-2015, while that of the landlocked nations at the bottom ranged between 0.21-0.55.

Out of 40 landlocked nations included in this table, seven achieved a Very High Human Development Index in 2016 and another seven nations were classified as having a High Human Development Index. However, 11 nations fell under the Medium Human Development Index category and no less than 15 landlocked nations had a Low Human Development Index. In line with what has been said before, all 15 landlocked nations with a low HDI level are non-European nations, while all landlocked countries with a Very High HDI are in Europe. Asian landlocked nations are a mixed group in this respect: a handful (Armenia, Azerbaijan, Kazakhstan, Mongolia, and Uzbekistan) fell under the High HDI category, while the remainder did not go beyond a Medium HDI level. The gloomier part of this picture concerns African landlocked countries: with the exception of Botswana and Zambia (two Medium HDI countries), all African landlocked nations were at the bottom rung of the Human Development Index ladder.

Interestingly, the changes of HDI Rank on the part of landlocked nations between 2010 and 2015 reshuffled only within the same group. Within the VHHDI group, Liechtenstein, Luxembourg, and Hungary fell back a few positions relative to their rank in 2010. In the HHDI group, Uzbekistan moved up six positions, Kazakhstan seven and Mongolia eight, while in the MHDI group Lao PDR and Bhutan both moved up five positions. In the LHDI group, however, 6 nations (Swaziland, Uganda, Afghanistan, South Sudan, Burundi, and

CAR) moved down the HDI ranking, in the case of South Sudan by seven positions. By contrast, Zimbabwe improved its ranking by a full 15 positions.

Eleven landlocked nations (Kazakhstan, Serbia, Moldova, Botswana, Kyrgyzstan, Tajikistan, Swaziland, Zimbabwe, Lesotho, Burundi, and CAR) experienced negative growth in their HDI value in the period 1990-2000, but none of them did so in the following decade. South Sudan and CAR saw the most intense deterioration in their HDI between 2010 and 2015. Over the full 25-year period considered in this table (1990-2015), Swaziland was the only LLC to have experienced negative HDI growth. In sum, we find that, as expected, European landlocked nations exhibit high levels of human development, while non-European ones are much less successful in this respect. However, while many Asian and Latin American landlocked countries have been making rapid progress in terms of their human development, the most severe cases of all, in terms of both HDI level and negative trend, are to be found in the African continent.

These empirical comparisons provide clear support to the conclusions that European landlocked nations have generally managed to achieve much higher levels of prosperity and human development than non-European ones, and that landlockedness *per se* is not an inexorable cause of poverty and underdevelopment. However, by itself this does not tell us to what extent landlocked nations are poor or underdeveloped by virtue of their lack of direct sea access and higher transport costs, or due to other reasons.

## **5.2 Comparative-Descriptive Analysis of Institutions**

This section adopts a comparative-descriptive analysis of institutions across the various groups of landlocked countries, in line with Przeworski's (2004) injunction that comparative method be used in the study of institutions and economic growth. This is also consistent with

Demsetz's (1969) call for a "comparative institutional" approach to policy appraisal, instead of what this author calls the "Nirvana" approach: "comparing an ideal norm with existing 'imperfect' institutional arrangements". This section is divided into three subsections, starting with a comparative analysis of political institutions (5.2.1), followed by a similar analysis of economic institutions (5.2.2) and finally an analysis of the correlation between institutions and GDP per capita (5.2.3).

### *5.2.1 Comparing the Political Institutions of Landlocked Countries*

To back up the importance of political institutions, it is worthwhile recalling the statement of Acemoglu and Robinson (2008: p. 9) to the effect that "political institutions and changes in political institutions are important as ways of manipulating future political power, and thus indirectly shaping future, as well as present, economic institutions and outcomes". Social and political events (political system change) therefore have an important influence upon economic growth and development. Democracy<sup>15</sup> and political stability<sup>16</sup> are commonly regarded as key proximate variables for the prosperity of nations, although some theoretical and empirical literature refers to the concept of "polyarchy" instead of democracy to designate slightly different sets of political freedoms and civil rights<sup>17</sup>. Conversely, coup

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<sup>15</sup> Democracy is understood here as rule of law and rule by people's representatives without ignoring opponents' political rights. However, there may be wide variation between different varieties of democracy, e.g. electoral, liberal, participatory, deliberative, etc., as illustrated by the contrasting examples of the Western liberal (e.g. USA) and popular democratic (e.g. China) types.

<sup>16</sup> A country which changes its government in accordance with a democratic and constitutional process is considered politically stable. By contrast, politically unstable countries are affected by various forms of political violence, such as politically motivated killings, riots and coups d'état.

<sup>17</sup> Civil rights broadly include independence of judiciary, freedom of the press, freedom of assembly and demonstration, freedom of political organization, free trade unions and free religious institutions.

events and other forms of political instability introduce or amplify social and political disorder and can lead to low-growth and underdevelopment traps.

Appendix G takes a systematic look at national or international war and/or violent conflict episodes involving landlocked nations between 1946 and 2016. We find that in this period, only two European landlocked nations, Hungary and Moldova, were involved in an international war (1956) and ethnic violence (1991-97), respectively. Although the magnitude of the latter ethnic violence episode was relatively small, with around 200 fatalities, it is worth noting that this incident occurred in the recent past. All other European landlocked nations did not experience any international wars, ethnic wars, ethnic violence, civil wars and civil violence episodes in the period under consideration.

Both Latin American landlocked nations went through civil wars in their recent history: Bolivia twice (in 1946 and 1952) and Paraguay in 1947. The total number of fatalities in Paraguay is reported at 1500, roughly half the number of deaths in Bolivia.

Fully seven Asian landlocked nations (Afghanistan, Azerbaijan, Armenia, Bhutan, Kyrgyzstan, Laos and Nepal) have been involved in either national or international wars/violence (civil war, civil violence, international war, ethnic war and/or ethnic violence) since 1975. Afghanistan, where civil war is ongoing, has suffered the most, including a magnitude 7 civil war which killed around one million people between 1975 and 2002 and renewed civil conflict since 2001 which has claimed upwards of 70,000 lives.

Laos went through a prolonged civil war (1960-73) and a period of civil violence (1975-90), which caused an estimated 35,000 deaths in total. Bhutan (after 1991) and Kyrgyzstan (after 2010) suffered relatively minor episodes of ethnic violence, which led to the death of 1200 and 600 citizens respectively. Another South Asian country, Nepal, experienced a magnitude

2 civil war which led to the loss of 8,000 lives. Azerbaijan and Armenia have been involved in a magnitude 3 international war for several years, which has taken the lives of 10,000 people. In its turn, Tajikistan suffered six years of civil war at a cost of 25,000 lives.

African landlocked countries have undergone numerous episodes of civil war and ethnic violence over the last few decades. However, while some, like Uganda, Zambia and Zimbabwe, have seen relatively greater political stability in recent times, others, including South Sudan, Ethiopia, Central African Republic and Burundi, have seen intense conflict and political violence in the last decade. Burundi, for example, has been involved in international wars as well as various episodes of intercommunal Hutu/Tutsi violence since 1965 which have caused the death of more than 200,000 people. Political violence is also ongoing and unsettled in Central African Republic, Ethiopia, Mali, and South Sudan, having led to the loss of more than 17000, 800000, 2700 and 44000 lives, respectively. Rwanda, which has been stable and at peace in the last two decades, experienced one of the most egregious instances of genocide and civil conflict in contemporary times in the mid-1990s, while two other landlocked nations, Ethiopia and Zimbabwe, also underwent civil war and ethnic violence episodes which led to the loss of hundreds of thousands of lives. Uganda has been involved in ethnic war, civil war, ethnic violence, and international war (intervention in the civil war in DR Congo). It experienced a magnitude 5 ethnic war in 1971-78 and again in 1991-86, which caused 250,000 and 100,000 fatalities respectively, followed by ethnic violence (Lord's Resistance Army: Langi and Acholi) in the period 1986-2006, which killed 16,000 people. Zambia has not reported any major episodes of political violence except for a magnitude 1 civil violence crisis (1,000 people killed) in 1964.

Looking at the figures in the previous paragraphs, we conclude that approximately 13% of all European landlocked nations have suffered war and/or ethnic violence in the period under

analysis. Hungary was affected by international war in 1960s while Moldova, the poorest European landlocked nation, experienced ethnic violence in the 1990s. Both Latin American landlocked countries were affected by war and insurgencies. Most Asian landlocked countries experienced some form of political violence and instability, through in most case not in the recent past (the notable exception being Afghanistan). The most vulnerable region of all is Africa, where 68% of landlocked nations have been directly or indirectly involved in war and/or civil conflict.

The question of political (in)stability can also be analyzed through the lens of the occurrence of coup d'états. Appendix H, based on the Center for Systemic Peace's Coup d'États database, indicates, for the full set of landlocked countries, whether and when a variety of coup events (successful coups, attempted coups, coup plots and alleged coup plots) and other events not considered coups (auto-coups, ousters by foreign forces, ousters by rebel forces, assassinations of executive and resignations of executive due to poor performance and/or loss of authority) took place in the period 1964-2016.

Looking at this table, we find that none of the European landlocked nations experienced any successful coups; three countries faced alleged coups: Hungary (1946, 1947 and 1949), Belarus (1998) and Moldova (2006); and Belarus additionally experienced auto-coup plots and the occurrence of subversion of the constitutional order by the elected executive and the imposition of an autocratic regime in 1995.

In Latin America, both Bolivia and Paraguay went through numerous such events. However, they were reportedly less severe in Paraguay than Bolivia: the latter country went through eight successful coups in 1964, 1969, 1970, 1971, twice in 1978, 1979, and 1980, in addition to nine unsuccessful coup attempts in the period 1953-1984, five thwarted coups between

1952-2009 and three alleged coups. There was also an auto-coup in 1951, two forced ousters of the ruling executive by rebel forces in 1946 and 1952, and two occasions in which the executive resigned due to poor performance and/or loss of authority in 1982 and 2005. In Paraguay there were five successful coups: twice in 1948 and then in 1949, 1954, and 1989. The country additionally underwent three attempted coups (1948, 1996 and 2000), an alleged coup in 1948 and a thwarted coup in 1955.

In Asia, Afghanistan saw regime change through successful coups on five occasions (1973-1979), while Laos and Nepal did so twice each (in 1960 and 1964 and in 1960 and 2002, respectively). Afghanistan additionally experienced six attempted coups, Armenia two, Azerbaijan four, Kyrgyzstan one, Laos three, Nepal two and Tajikistan one. Nepal and Laos had one thwarted coup each, while Afghanistan (1987), Kyrgyzstan (2012), Kazakhstan (2007), Laos (1990), and Turkmenistan (2002) faced alleged coups on one occasion each. Azerbaijan, however, faced as many as five alleged coups in the period 1997-2011. Only Armenia (1995) and Azerbaijan (1993) faced auto-coups, and only Afghanistan (2001) had a forced ouster of a ruling executive as a direct result of the invasion of the country by foreign armed forces. Likewise, the forced ouster of a ruling executive as a direct result of armed action by rebel forces was only recorded in Afghanistan (1996). Nepal's ruling executive was the target of assassination in 2001, while Azerbaijan (1993), Kyrgyzstan (2005 and 2010), Nepal (2006) and Tajikistan (1992) reported the resignation of the executive due to poor performance and/or loss of authority. Thus, in between coups and other non-coup events, Afghanistan, Azerbaijan, Nepal and Laos can be considered the most vulnerable and politically unstable landlocked nations in Asia.

Ten African countries experienced coup events in the period under analysis: Burkina Faso on five occasions between 1966-1987, Burundi four times between 1966-1996, Central

African Republic four times between 1966-2003 years, Chad three times in 1975-1990, Ethiopia three times between 1974-1977 years, Lesotho three times between 1970-1991, Mali in 1968 and 2012, Niger three times between 1974-2010, Rwanda once (in 1973) and Uganda three times between 1971-1985. This adds to unsuccessful coup attempts in Burkina Faso (2015), Burundi (nine times between 1965-2015), Central African Republic (six times between 1969-2013), Chad (ten times between 1971-2008), Ethiopia (three times between 1960-1989), Lesotho (four times between 1974-2014), Mali (four times between 1969-2012), Niger (1983), South Sudan (2013), Swaziland (1984), Uganda (1974 and 1975), and Zambia (1980, 1990 and 1997). In addition, coup plots were reported in Burundi (twice), Chad (four times), Ethiopia, Lesotho (twice), Malawi (twice), Mali (three times), Niger (five times), Swaziland (twice) and time Zambia, and alleged coups took place in Burkina Faso, Burundi (twice), Central African Republic, Lesotho (twice), Malawi, Mali, Niger, Rwanda, Swaziland, Uganda (six times, including three occasions in the year 1986), Zambia (twice) and Zimbabwe (six times).

Moreover, assassinations of the ruling executive took place in Burkina Faso (1987), Burundi (1993, 1994) and Rwanda (1994), and in Burkina Faso the ruling executive resigned due to poor performance and accompanied by increasing public discontent and popular demonstrations calling for the ouster of the executive leadership in 2014, the same occurring in Burundi (1966), Central African Republic (2014), Lesotho (1990) and Mali (1991). Likewise, there were auto-coups in Burundi (2015), Niger (2009), Swaziland (1973), Uganda (1966), Zambia (1968, 1996), and Zimbabwe (1987). Uganda (1979) was the only country in which the ruling executive was forced out as a direct result of the invasion of the country by foreign armed forces. Finally, four countries, Central African Republic (2013), Ethiopia

(1991), Rwanda (1994) and Uganda (1986), saw their ruling executives overthrown as a direct result of armed action by rebel forces fighting against forces loyal to the regime.

In sum, it is apparent that landlocked nations in all regions of the world except for Europe have seen severe political instability, including a variety of coup and non-coup events. Among European landlocked nations, Belarus and Moldova underwent such episodes in recent decades, but the same occurred much more frequently and severely in the landlocked countries of Latin America, Asia and Africa. African landlocked nations, in particular, have seen especially frequent and severe political instability. Indeed, we find that 20 percent of European, 75 percent of Asian, 93 percent of African and 100 percent of Latin American landlocked nations experienced various forms of coup or non-coup events.

Another way to assess the question of political institutions is through recourse to composite indicators such as the one produced by Freedom House (Appendix J), which comprises sub-dimensions related to political rights (including Electoral Process, Political Pluralism and Participation, and Functioning of Government) and civil liberties (Freedom of Expression and Belief, Associational and Organizational Rights, Rule of Law, and Personal Autonomy and Individual Rights), based on which countries are given one of three country status (combination of political and civil rights ratings): Free (F); Partly Free (PF); and Not Free (NF).

Among landlocked nations, we find that the highest scores in the political rights and civil liberty dimensions are shown by the European group, whose freedom values average around 2 points, followed by the Latin American, Asian and African landlocked nations. Interestingly, however, the African group has a better average civil liberty score (4.75) than the Asian group (5.17). Among the Asian and African groups, however, these averages

conceal a significant measure of dispersal of the actual political rights and civil liberty scores relative to their respective averages.

Among the 13 European landlocked nations, nine were considered free by FH, three were labelled partly free and Belarus was the only one to be deemed not free. In South America, both Bolivia and Paraguay were classified as partly free. Out of 12 Asian landlocked countries, seven were considered not free, four countries were characterized as partly free and only one country, Mongolia, was deemed free. Finally, out of 16 African landlocked countries, eight were placed in the not free category, seven were considered partly free and one country, Botswana, was considered free.

Six of the 13 landlocked European countries (Andorra, Austria, Czech Republic, Luxembourg, San Marino, and Switzerland) enjoy a wide range of political rights (free and fair elections) as well as civil liberties (including freedom of expression, assembly, association, education and religion). Liechtenstein performed strongly in terms of civil liberty but less so on political rights, due to political corruption, limits on the functioning of political parties and opposition groups, and flawed electoral processes. Belarus performed very poorly in terms of civil and political rights, both of which are highly restricted, and the remaining five countries ensured moderate protection of almost all political and civil rights, or strongly protected some rights while neglecting others.

Freedom House also found that both South American landlocked nations strongly protected some civil and political rights while neglecting others. In Asia, out of twelve landlocked nations, only one (Mongolia) ensured free political rights, alongside slightly weaker civil rights. Six Asian landlocked nations (Azerbaijan, Kazakhstan, Laos, Tajikistan, Turkmenistan, and Uzbekistan) had a score of 7, which means few/no political rights and

government oppression, sometimes in combination with civil war. The remaining Asian landlocked nations ensured only moderate protection of political and civil rights, or strongly protected some rights while neglecting others.

The picture is equally dismal among the 16 African landlocked countries. None of these countries achieved a score reflecting the protection of a wide range of political rights (free and fair elections) and civil liberties (including freedom of expression, assembly, association, education and religion). Six countries ensured few/no political rights and civil liberties, while the remaining ten countries scored between 2-6 points, which means moderate to strong protection of some civil liberties and political rights, while neglecting others.

### *5.2.2 Comparing the Economic Institutions of Landlocked Countries*

As is the case with political institutions, economic institutions are also important determinants of a country's per capita income level. This section seeks to characterise landlocked countries based on the economic freedom variables proposed by the Heritage Foundation, including its overall score variable. The twelve aspects of economic freedom assessed by the Heritage Foundation in its Index (2015-2019) are grouped into four broad categories: Rule of law (property rights, judicial effectiveness, and government integrity); Government size (tax burden, government spending, and fiscal health); Regulatory efficiency (business freedom, labour freedom, and monetary freedom); and Market openness (trade freedom, investment freedom, and financial freedom). Out of these twelve variables, six have been chosen for analysis in this dissertation, based on data availability as well as on their ability to represent the arguments made in the theoretical literature (see table: Appendix K).

In terms of the overall economic freedom score, most countries in the group of European landlocked nations are either considered “free” or “mostly free”, while those in the other

regional groups are, for the most part, “mostly unfree”. The actual values of the overall score for most countries do not differ substantially from the average value for their respective regional groupings.

When it comes to the specific indicators, we find that European landlocked countries are on average “moderately free” in terms of property rights, while the other regional landlocked groups (Latin American, Asian, and African) belong to the “repressed” category. Again, the relatively low standard deviation of this variable within each regional grouping indicates that the regional average and the actual data points are quite close to each other. On judicial effectiveness, the average European landlocked country is “mostly unfree”, while all other regional groups are once again in the “repressed” category. On government spending, the average European landlocked group is characterised as “repressed”, a consequence of their relatively high level of government spending and of the Heritage Foundation’s negative view of government intervention; for analogous reasons, all other regional groupings of landlocked countries are, on average, labelled either “free” or “mostly free”.

On business freedom, the European landlocked group is on average placed in the “mostly free” category, while the average African landlocked country is considered “repressed” and Asian and Latin American landlocked countries are on average labelled “moderately free”. On trade freedom, European landlocked countries are typically “free”, the African ones are “moderately free”, and those in Latin America and Asia are “mostly free”. Finally, when it comes to investment freedom, European landlocked countries are on average “mostly free”, those in Africa are “mostly unfree”, and those in Asia and Latin American are considered “repressed”. It is interesting to note that across the various regional country groupings, the standard deviation of this variable is very high: actual data points are in many cases quite far

from the average, and there is a wide gap between the maximum and minimum points in each regional grouping.

When we look at individual countries, we find that Switzerland is considered an economically free country, while Austria, Czech Republic and Luxembourg are mostly free nations. Hungary and Serbia are moderately free nations, whereas Macedonia moved from moderately free in 2015 to mostly free in 2019. Two European landlocked countries (Belarus and Moldova) are found to be “mostly unfree”. Of the two South American landlocked countries, one (Bolivia) is labelled an “economically repressed” nation, while the other (Paraguay) is labelled “moderately free”.

Turning to Asia, we find five mostly unfree landlocked nations (Afghanistan, Laos, Mongolia, Nepal and Tajikistan) and four moderately free ones (Armenia, Azerbaijan, Kazakhstan and Kyrgyzstan). Bhutan has shifted its economic freedom score from mostly unfree to moderately free, while Turkmenistan is the only landlocked Asian country considered to be economically repressed.

Finally, out of 15 African landlocked countries, Botswana is the only one that is considered mostly free, while Uganda is deemed moderately free. Two nations (Chad and Uzbekistan) have improved their economic freedom score from “repressed” in 2015 to “mostly unfree” in 2019, thus joining a group of seven other “mostly unfree” nations (Burkina Faso, Ethiopia, Lesotho, Malawi, Mali, Niger, and Zambia). Conversely, Burundi has seen its economic freedom score deteriorate from mostly unfree in 2015 towards repression in 2018, thus joining two other economically repressed countries (CAR and Zimbabwe).

As regards the property rights score of European landlocked nations, Austria, Luxembourg and Switzerland are deemed “free” (meaning that they allow individuals to acquire, hold, and

utilize private property, secured by clear laws that the government enforces effectively), while the Czech Republic is considered “mostly free”. Three nations (Belarus, Moldova, and Serbia) have improved their property rights score from repression in 2015 to mostly unfree in 2019. In its turn, Macedonia moved from “repressed” in this regard to “moderately freedom”, while Hungary went from “mostly unfree” to “moderately free”.

Both South American landlocked countries are considered by the Heritage Foundation to exhibit repressed property rights conditions. Amongst the Asian landlocked countries, however, six are considered repressed (Afghanistan, Laos, Mongolia, Nepal, Tajikistan, and Turkmenistan), but four have moved from repressed in 2015 to mostly unfree in 2019 (Armenia, Azerbaijan, Kazakhstan, and Kyrgyzstan). Only Bhutan seems to ensure moderately free property rights.

Amongst the African landlocked nations, Rwanda has improved its economic freedom score according to the Heritage Foundation from moderately free to mostly free, while Botswana has moved in the opposite direction, from mostly free to mostly unfree. All the other African landlocked nations are considered “repressed” as far as property rights are concerned.

When it comes to judicial effectiveness (existence of well-functioning legal frameworks, deemed essential for protecting the rights of all citizens against unlawful acts by others, including governments and powerful private parties), Switzerland is considered free, Austria and Luxembourg are mostly free, Macedonia is moderately free, and Belarus is mostly unfree. All other European landlocked nations are considered repressed, as are both South American landlocked countries.

In Asia, four landlocked nations (Azerbaijan, Bhutan, Kazakhstan, and Tajikistan) are characterised as mostly unfree, whereas all the others are considered repressed. In Africa,

Rwanda, deemed free in terms of judicial effectiveness, is a clear outlier and stands out from all other landlocked countries, which are considered repressed.

With respect to government spending (which reportedly seeks to capture the burden imposed by government expenditures, including consumption by the state and transfer payments related to various entitlement programs), the Heritage Foundation finds that four countries (Austria, Hungary, Luxembourg, and Serbia) have “repressed” economies, whereas Moldova is “mostly unfree”. Switzerland is considered moderately free when it comes to government spending. Three countries changed their government spending freedom score during the period under analysis: Belarus (from mostly unfree to repressed), Czech Republic (from repressed to mostly unfree) and Macedonia (from moderately free to mostly free).

According to the Heritage Foundation, both South American landlocked nations saw a deterioration in their government spending index score between 2015 and 2019: Bolivia moved from “moderately free” to “repressed”, while Paraguay went from “free” to “mostly unfree”. Amongst the Asian landlocked countries, five (Afghanistan, Kazakhstan, Laos, Nepal and Turkmenistan) are considered “free” in terms of their level of government spending. Some have seen changed in their scores: Armenia went from “free” to “mostly free”; Bhutan from “moderately free” to “mostly free”; Mongolia from “repressed” to “moderately free”; and Tajikistan from “free” to “moderately free”. Afghanistan remained “moderately free” and Kyrgyz Republic remained “mostly unfree” in the period under analysis.

In Africa, six countries (Burkina Faso, Central African Republic, Chad, Ethiopia, Mali, and Uganda) were characterised as free in terms of government spending by the Heritage Foundation. Burundi shifted from moderately free to free; Malawi from repressed to mostly

free; Niger from free to mostly free; and Zambia from mostly free to free. Botswana was characterised as moderately free in terms of its level of government spending. Thus, in 2015, except for Lesotho, all African landlocked nations were characterised as having a certain degree of “freedom”, reflecting their low level of government spending, which is viewed favourably by this conservative think-tank.

Turning to business freedom (the ability to establish and run an enterprise without undue interference from the state), almost all European landlocked countries are considered either “mostly free” or “moderately free”. Some have seen upward or downward changes in their index score in this dimension between 2015 and 2019. Their score is even higher in the trade freedom dimension (absence of restrictions on citizens’ ability to interact freely as buyers or sellers in the international marketplace). Belarus, Moldova and Serbia are in the “mostly free” category, but all the others are deemed “free”.

The two Latin American landlocked countries have relatively similar scores in terms of business and trade freedom. Bolivia is characterised as mostly unfree in terms of business freedom and mostly free when it comes to trade freedom; while Paraguay is found to be moderately free in terms of business freedom and mostly free when it comes to trade freedom.

When we consider business freedom among the landlocked countries of Asia, we find five countries (Bhutan, Laos, Mongolia, Nepal, Tajikistan) which are considered “moderately free”; four (Armenia, Azerbaijan, Kazakhstan and Kyrgyz Republic) that are “mostly free”; and two (Afghanistan, Turkmenistan) which are considered “repressed”. As far as trade freedom is concerned, the same countries broadly range from “moderately free” to “free”.

In Africa, five countries (Central African Republic, Chad, Malawi, Uganda, and Zimbabwe) are considered “repressed” in terms of business freedom; six (Burundi, Burkina Faso,

Lesotho, Mali, Niger and Rwanda) are “mostly unfree”; and only two (Zambia and Botswana) exhibit higher scores. Their trade freedom scores are labelled more positively: only one country (Chad) is considered “unfree”; and as many as eight countries are considered either “free” or “mostly free”.

Finally, when we look at the investment freedom indicator (reflecting the freedom to choose where and how to invest, allowing capital to flow to its most efficient uses), we find that European landlocked nations, with the exception of Moldova and especially Belarus, are for the most part considered either free or mostly free. In Latin America, Bolivia is assessed as “repressed”, while Paraguay is considered “mostly free”. Amongst the Asian landlocked economies, six (Afghanistan, Bhutan, Laos, Nepal, Tajikistan, Turkmenistan) are considered “repressed” in terms of investment freedom and only two (Azerbaijan and Kyrgyz Republic) are considered “moderately free” – the rest being “mostly unfree”. A slightly more positive picture, at least according to the Heritage Foundation, is to be found in the African landlocked group, which includes three “repressed” nations (Central African Republic, Ethiopia, and Zimbabwe) six “mostly unfree” ones (Burundi, Lesotho, Malawi, Niger, Uganda, and Zambia), and five others with relatively higher scores (Botswana, Burkina Faso, Chad, Mali, and Rwanda).

### ***5.2.3 Relationship between Institutions and Income***

This section is based on an analysis of the correlation between a series of institutional indicators (economic and political) and the level of income per capita among landlocked countries. Three different correlation coefficients<sup>18</sup> are used in this analysis: Pearson,

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<sup>18</sup> The correlation coefficient is a statistical measurement which reflects the relative movement of two variables. It can vary between a maximum of +1 and a minimum of -1. +1 means that the two variables are perfectly positively correlated (i.e., they move in the same direction). -1 means that those two variables are perfectly but negatively correlated (i.e., they move in opposite directions). 0 means that there is no relationship between the relative movement of the two variables.

Spearman and Kendal Tau. The analysis of association is divided into three parts and presented under three correlation tables: Appendix L shows the correlation between per capita income, on the one hand, and three variables from the Centre for Systemic Peace's database: Democracy, Autocracy, and Polity II (see table: Appendix L). In turn, Appendix M looks at the strength of the statistical association between income per capita, on the one hand, and two political-institutional variables from Freedom House's database: Political Rights and Civil Rights (see table: Appendix M). Finally, Appendix N looks at the correlation between per capita income and a variety of economic-institutional variables from the Heritage Foundation database: Property Rights, Freedom from Corruption, Fiscal Freedom, Government Spending, Business Freedom, Trade Freedom, Investment Freedom and Financial Freedom (see table: Appendix N).

**(a) Democracy, Autocracy and Polity II vs. Per Capita Income**

The hypothesis underlying the analysis in this case is that democracy and political stability are conducive to a nation's prosperity: it is widely accepted that democracy is associated with good institutions and quality of governance, including law and order, less bureaucratic hassle, less corruption, more transparency and the replacement of old outdated policies with modern adequate policies enabling individuals to accumulate capital, adequate skills, sound health and good education, and putting them to productive use. Nevertheless, it is worth pointing out that despite the large volume of positive empirical literature, the relationship between democracy and economic growth remains inconclusive for many scholars.

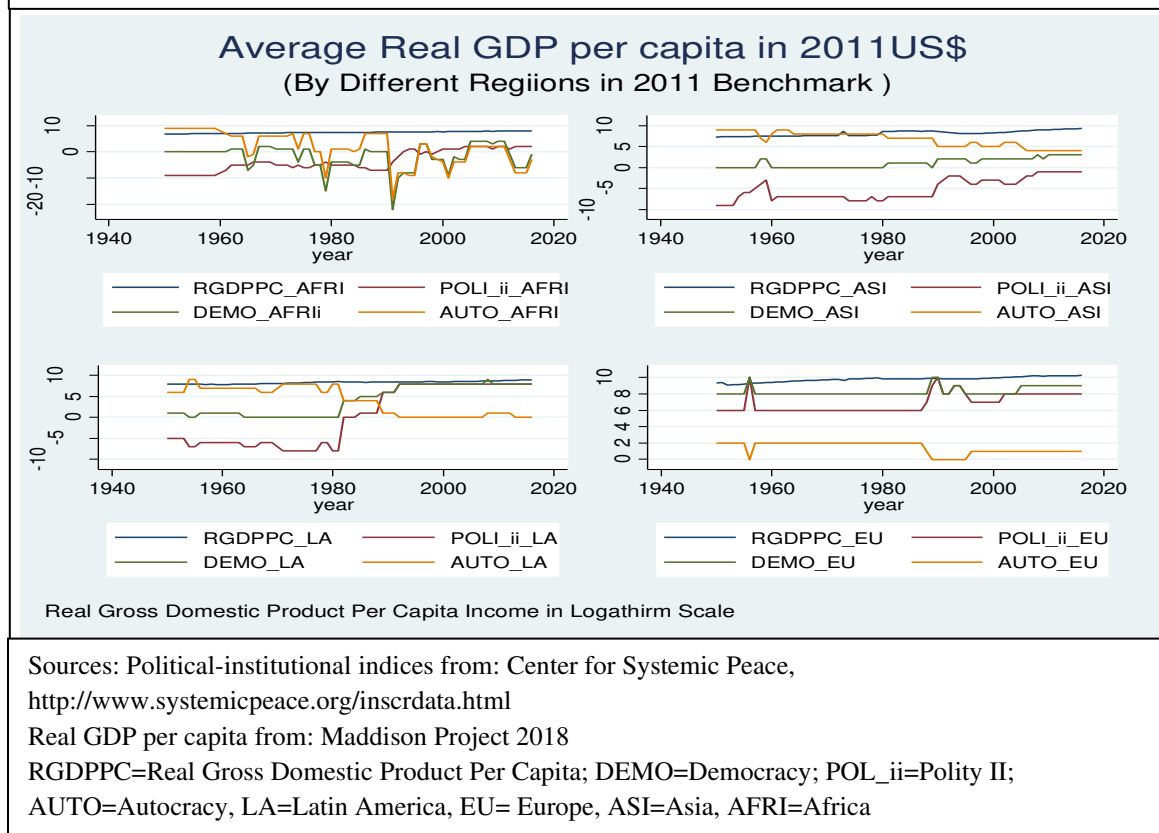
According to Sen (1999), "democracy is a universal value (people anywhere may have reason to see it as valuable). There is a plurality of virtues here, including, first, the intrinsic importance of political participation and freedom in human life; second, the instrumental importance of political incentives in keeping governments responsible and

accountable; and third, the constructive role of democracy in the formation of values and in the understanding of needs, rights, and duties.”

The hypothesis of a positive relationship between democracy and per capita income, as mentioned above, is supported, among others, by the empirical work of Persson and Tabellini (2007), who conclude that “[t]ransitions from autocracy to democracy are associated with an average growth acceleration of about 1 percentage point, producing a gain in per capita income of about 13% by the end of the sample period. (...) The effect of transitions in the opposite direction is even larger: a relapse from democracy to autocracy slows down growth by almost 2 percentage points on average, which implies an income fall of about 45 percent at the end of the sample.”

We begin our own analysis with the graphical visualization of the relationship between the evolution over time of real GDP per capita and that of the Democracy, Autocracy and Polity II indices (Figure 3, below).

**Figure 17: GDPpc vs. Democracy, Autocracy and Polity II**



The analysis of the trends in the graphs above does not immediately suggest the existence of a (positive or negative) relationship between the institutional variables (Democracy, Autocracy and Polity II) and GDP per capita. More rigorous and sophisticated quantitative measures are therefore required, and it is for this reason that we have chosen to undertake an analysis of correlation based on three different statistical techniques (Pearson, Spearman and Kendall's Tau correlation coefficients).

Of the three institutional proxy variables, two (Democracy and Polity II) are significantly and positively associated with real GDP per capita (RGDPPC), i.e. per capita income across all continents with the partial exception of Africa when it comes to Democracy. The other

variable (Autocracy, which is roughly opposite to Democracy) is significant and negatively associated with per capita income across all regional groups of landlocked countries (see Appendix L). In other words, income per capita tends to move in the same direction as Democracy and Polity II, while moving in the opposite direction to Autocracy.

It is somewhat surprising that all the correlation coefficients (Pearson, Spearman and Kendall's) indicate a statistically insignificant association between the democracy variable and income per capita amongst African landlocked countries. This leads us to caution that there is insufficient evidence to conclude that there is a significant linear relationship between democracy and per capita income. However, across all regions there is strong evidence of a negative association with high level of significance ( $p < 0.01$ ) between Autocracy and income per capita, and of a positive association between the Polity II variable and income per capita.

Although there is a high degree of association (with a high level of significance) between democracy and income per capita in all regions except for Africa, Kendall's tau (a b) indicator indicates a weaker association than do the Pearson and Spearman indicators. Democracy and GDPpc have especially strong associations in the case of Latin American and Asian landlocked countries (78% and 77% in terms of Pearson correlation).

As mentioned above, democracy and income per capita have not proven to be statistically associated in the case of landlocked African countries. This anomaly disappears when we analyse the correlation between the Autocracy and per capita income: in this latter case, there is a negative and statistically significant statistical association across all country groupings, which is especially strong in the cases of the Asian and Latin American continents.

Interestingly, Asian landlocked autocracy and income per capita exhibit the highest degree of negative association out of all indicators and regional groups of countries: Pearson (-78%),

Spearman Rank (-82%), Kendall's tau\_a (-60%) and tau\_b (-66%). This is especially interesting in light of the so-called "the Lee hypothesis", i.e. the presumably virtuous association between certain forms of authoritarianism, such as Lee Kuan Yew's Singapore or the Chinese model, and success in terms of economic growth and development in the Asian context (cf. Sen 1999). Curiously enough, this is not what the evidence discussed above seems to suggest, at least amongst Asian landlocked countries and considering democracy and autocracy as assessed by these indicators. This prompts us to raise some theoretical and empirical questions in this regard. What exactly is democracy? Is democracy or the lack thereof instrumentally important for economic growth and development? Should certain countries be seen as more or less "fit for democracy" than others?

#### **(b) Political and Civil Rights vs. Per Capita Income**

Many scholars do not consider democracy to be an appropriate construct to be used in statistical estimation given the inherent difficulties in defining and operationalising democracy and autocracy. Therefore, some empirical studies talk about 'polyarchy' instead of democracy, broadly meaning political freedom and civil rights. However, there is still considerable debate among scholars in this field on whether citizen's voices are important for holding governments accountable.

Empirical studies have found both positive and negative statistical associations between citizen's (civil and political) rights and per capita income. Some have argued that there is an inverse relationship which operates through the channels of investment, property rights, capital flight and the brain drain. Other studies have claimed that there is a positive relationship which runs via government accountability, transparency and control of corruption.

When we run the analysis of correlation by regional country groupings (see Appendix M) we find, rather surprisingly, that the statistical associations are overwhelmingly significant and negative, meaning that income per capita tends to move in the opposite direction to civil and political rights - at least within each of the groups of landlocked countries in the same continent. This contrasts with the usual intuition, as well as the most common hypothesis in the literature – that civil and political rights would be positively associated with income per capita, above and beyond being valuable in themselves. However, it is worth keeping in mind that if we were to bundle together all the landlocked countries, a different pattern might emerge. Indeed, it is quite likely that that would be the case, given that the wealthier landlocked countries of Europe tend to score better in terms of civil and political rights than many middle- and low-income landlocked countries in other continents. What this evidence seems to indicate, rather, is that it is quite possible for low- and middle-income countries to become relatively wealthier irrespective of their poor civil and political rights record, as illustrated by the examples of oil-producing autocracies.

### **(c) Economic Freedom vs. Per Capita Income**

Berggren (2003) argues that "very high and stable economic freedom (...) allows a dynamic economy to function and grow, even though an increase in economic freedom from a low level might exert a much more distinct influence on the growth rate for a certain period (...) so in the long term the economic freedom that increases growth can also be expected to increase accumulated wealth." Similarly, many renowned scholars such as North (1991), Hall and Jones (1999), Rodrik et al (2002), Acemoglu et al (2002), Easterly and Levine (2003), Jones and Romer (2010), and Kasper (2002) have argued in different ways that economic and political freedom is likely to be associated with higher income, sustainable economic growth and development.

In this analysis, we seek to estimate the strength of the cross-country statistical association between per capita income and a set of eight institutional indicators representative of economic freedom, as assessed and compiled by the Heritage Foundation: Property Rights, Freedom from Corruption, Government Spending, Business Freedom, Trade Freedom, Investment Freedom and Financial Freedom (see Appendix N). The analysis is undertaken separately for our usual four macroregional country groupings of landlocked countries: Europe, Latin America, Asia and Africa.

Out of these 8 institutional-economic variables, two (trade freedom and fiscal freedom) exhibit a positive and strong statistical association with per capita income, with a high confidence level, based on all three correlation coefficients. The picture is not so clear when it comes to freedom from corruption: even though this variable has a positive association with per capita income among the African and Latin American landlocked countries, there is insufficient evidence to conclude the existence of a significant statistical association in the case of the European and Asian landlocked economies.

Remarkably, property rights are negatively associated with per capita income across all regional groups of landlocked countries. With the exception of Asia, this negative association has very high confidence levels. Financial freedom also exhibits a systematically negative statistical association with per capita income, albeit with somewhat lower level of confidence.

Four other variables (government spending, business freedom, investment freedom and financial freedom) produced mixed results in terms of their cross-country correlation with per capita income. Amongst the European landlocked countries, government spending is positively correlated with per capita income with high level of statistical significance, but the

opposite occurs amongst the Latin American and African landlocked countries - and the association is insignificant in the case of Asia. Both African and Asian landlocked countries exhibit positive and strong correlations between business freedom and per capita income, but opposite and insignificant associations prevail in the case of the other regions. Similarly, the relationship between investment freedom and per capita income is positive in the case of the European landlocked countries, negative amongst the Latin American landlocked, and insignificant in the case of the Asian and African regions. Finally, there is a negative association between per capita income and financial freedom amongst both the Latin American and African landlocked countries, but mixed associations with insufficient statistical confidence in the case of the other landlocked country groupings.

### **5.3 Conclusions**

The conclusions of this comparative analysis are divided into three parts: Firstly, we undertake a comparison between European and non-European landlocked countries with respect to incidence of violence, war and coup events, as well as in terms of political rights and civil liberties. Secondly, we compare European and non-European LLCs with respect to economic freedoms. Finally, we summarize the statistical association between per capita income and the various institutional variables considered in this chapter.

<b>Table 3: International Wars and Ethnic War and Violence in LLCs by Continent (1946-2016)</b>	
<b>European LLCs</b>	<b>Non-European LLCs</b>
Hungary and Moldova experienced war/violence. This amounts to around 13% of European LLCs having been affected by war and ethnic violence in the period under consideration.	Latin America: Both LLCs (100%) experienced war and/or widespread violence.
	Asia: Seven nations (Afghanistan, Azerbaijan, Armenia, Bhutan, Kyrgyzstan, Laos and Nepal) underwent periods of war and violence during this period. This amounts to around 66% of all Asian LLCs.
	Africa: Five LLCs (South Sudan, Rwanda, Ethiopia, Central African Republic and Burundi) experienced war and/or ethnic violence – i.e., 68% of the total.

<b>Table 4: Number of Coups and Non-Coup Events (1946-2016) in LLCs by Continent</b>	
<b>European LLCs</b>	<b>Non-European LLCs</b>
3 countries (20% of the European LLC group) experienced alleged coups: Hungary, Belarus and Moldova. Belarus also experienced auto-coup plots or the subversion of the constitutional order by elected executive and the imposition of an autocratic regime in 1995.	Latin America: Both Bolivia and Paraguay experienced some these types of events. The case of Paraguay was reportedly less severe than Bolivia.
	Asia: 4 nations (Afghanistan, Azerbaijan, Nepal and Laos) faced the most severe instances of coups and non-coup events within the Asian LLC group. Afghanistan experienced the forced ouster of a ruling executive as a direct result of the invasion of the country by foreign armed forces and the forced ouster of a ruling executive as a direct result of armed action by rebel forces fighting against forces loyal to the regime. Nepal saw the assassination of the ruling executive. Overall, 75 % of the Asian LLC group experienced some sort of event of this kind.
	Africa: 9 LLCs (Burkina Faso, Burundi, CAR, Chad, Ethiopia, Lesotho, Mali, Niger, and Uganda) saw some of the most severe cases of coup events. In total, 95% of the African LLC group suffered at least one coup or non-coup event in the period under analysis.

**Table 5: Comparing Political Rights and Civil Liberties in LLCs by Continent (2018)**

European LLCs	Non-European LLCs
<p>Out of 13 European landlocked nations, 9 are considered free, 3 are partially free and only one (Belarus) is considered not free. That is to say, a mere 8% of European LLCs are considered not free.</p>	<p>Latin America: Both South American landlocked nations are considered to have moderately or strongly protected civil and political rights while neglecting others. They are considered to be not fully free.</p>
	<p>Asia: Out of 12 Asian landlocked nations, only one (Mongolia) has free political rights and slightly lower civil rights. The remainder have some moderately or strongly protected civil and political rights while neglecting others.</p> <p>Overall, nearly 92% nations among the Asian LLC group are considered not free.</p>
	<p>Africa: Among the 16 African landlocked countries, none achieved a score consistent with a wide range of political rights (including free and fair elections) and civil liberties (including freedom of expression, assembly, association, education and religion).</p>

As summarised in the tables above, the group of European landlocked countries has clearly been less affected by international war and ethnic war and violence than the non-European landlocked group. Outside of Europe, African LLCs have experienced such hardship with greater frequency and severity than have Asian and Latin American LLCs. With respect to coups and non-coup events, the non-European LLCs have seen the occurrence of such situations much more frequently than have European LLCs. Again, amongst the non-European LLCs, African LLCs have been exposed with special severity and frequency. Finally, when it comes to civil liberties and political rights, we find that almost all European LLCs (with the exception of Belarus) are considered free countries, but almost all non-European LLCs have some flaws in terms of the upholding of civil liberties and political rights.

In this chapter, we have also undertaken an analysis of the correlation between a series of institutional variables representative of the level of political and economic freedoms, on the one hand, and the level of per capita income across the various regional groups of LLCs, on the other hand. Table 6 (below) presents a summary of the pair-wise (Pearson) statistical association between per capita income and those thirteen institutional variables.

<b>Table 6: Relationship between Income per Capita and Institutional Variables</b>		
<b>Mostly Positive</b>	<b>Mostly Negative</b>	<b>Undetermined</b>
Democracy	Autocracy	Freedom of Corruption
Polity II	Political Rights	Government Spending
Fiscal Freedom	Civil Rights	Business Freedom
Trade Freedom	Property Rights	Investment Freedom
-	-	Financial Freedom

We have found that four institutional variables (Democracy, Polity II, Fiscal Freedom, and Trade freedom) seem to exhibit a positive pair-wise association with per capita income among landlocked countries, as posited by institutionalist theory. On the other hand, we have found that four institutional variables (Autocracy, Political Rights, Civil Rights, and Property Rights) seem to be negatively associated with per capita income in all regional groups of LLCs – which is at odds with the basic hypotheses of institutionalist theory (except for the ‘Autocracy’ variable). Also, somewhat unexpectedly, five variables (Freedom from Corruption, Government Spending, Business Freedom, Investment Freedom and Financial Freedom) exhibit undetermined (a mix of positive, negative and/or unidentified) associations with per capita income across the various groups of LLCs.

In other words, out of 13 institutional variables, only five behave as expected by institutionalist theory: three seem to behave in the opposite way to what would be expected,

while five other variables do not seem to have meaningful or consistent statistical associations with per capita income (see detail in Appendix O). This seems to suggest that the relationship between institutions and prosperity (as represented by income per capita) may be more slightly more subtle and complex than this, perhaps because of the ways in which these variables are constructed and assessed, and perhaps because different institutional configurations may under different circumstances be conducive (or inimical) to prosperity. In order to further investigate this question, in the next chapter we turn to an econometric analysis of the association between income per capita and institutions.

## CHAPTER VI: ECONOMETRIC ANALYSIS

This chapter undertakes an econometric estimation of the causal impact of institutions, in interaction with landlockedness, on prosperity represented by GDP per capita. Different models and specifications are used in order to shed light on this question.

### 6.1 Econometric Analysis: Specifications and Findings

The following econometric analysis is based on a panel data estimation of the relationship between the natural logarithm of GDP per capita (dependent variable), a dummy variable representing the condition of being a LLC, and seventeen institutional variables (predictors) (see definitions and additional information in Appendix P). Data for 134 landlocked and non-landlocked countries, and for the years between 1996 and 2014, were considered. The years 1997, 1999 and 2001 were subsequently removed from the dataset because of missing data for the WGI variables, thus ensuring that the resulting data matrix was a balanced one (i.e., including data values for all countries and years). The total number of data points (observations) in the dataset is, therefore,  $2144 = 134 \text{ countries} * 16 \text{ years}$ . The sources of the data used were, for GDP per capita, the World Bank; and for the institutional variables, Freedom House, Heritage Foundation, and World Governance Indicators.

The institutional variables considered in the analysis were the following:

ccest: Control of Corruption, Estimate

geest: Government Effectiveness, Estimate

pvest: Political Stability and Absence of Violence, Estimate

rgest: Regularity Quality, Estimate

rlest: Rule of Law, Estimate  
vaest: Voice and Accountability, Estimate  
polr: Political Rights  
civl: Civil Liberties  
pror: Property Rights  
corf: Freedom from Corruption  
fiscf: Fiscal Freedom  
govs: Government Spending  
bisf: Business Freedom  
monf: Monetary Freedom  
traf: Trade Freedom  
invf: Investment Freedom  
finf: Financial Freedom

The first econometric estimation exercise considered three alternative models: a baseline Pooled Ordinary Least Squares (POLS) model; a Fixed Effects Model (FEM); and a Random Effects Model (REM). The FEM model is in principle expected to yield more unbiased predictors than the REM model when analyzing panel data because it controls for all measured or unmeasured time invariant variables. This is confirmed by the results of the Hausman test (1) (183.59, Prob. > chi2=0.0000) (see Appendix D). The statistics reject the null hypothesis, which implies that FEM is indeed a more suitable model than REM. Table 7 presents the results of the econometric estimation of the relationship between the seventeen predictor variables, the LLC dummy and the GDPpc dependent variable, using the FEM, REM and POLS models.

<b>Table 7: Baseline Models (with LLCs Dummy)</b>			
	<b>FEM</b>	<b>REM</b>	<b>POLS</b>
<b>z_ccest</b>	-0.0424**	-0.0324*	-0.285***
	(-2.72)	(-2.00)	(-5.85)
<b>z_geest</b>	0.0495**	0.0730***	0.528***
	(2.65)	(3.78)	(10.58)
<b>z_pvest</b>	0.0341***	0.0312***	0.164***
	(4.03)	(3.57)	(8.03)
<b>z_rgest</b>	0.0871***	0.0966***	0.127*
	(5.11)	(5.47)	(2.39)
<b>z_rlest</b>	0.0637**	0.0848***	0.0314
	(2.84)	(3.66)	(0.56)
<b>z_vaest</b>	-0.127***	-0.116***	-0.0337
	(-6.15)	(-5.42)	(-0.52)
<b>z_polr</b>	-0.00464	-0.000308	0.0424
	(-0.36)	(-0.02)	(1.01)
<b>z_civl</b>	-0.0787***	-0.0858***	0.123**
	(-6.45)	(-6.79)	(2.65)
<b>z_pror</b>	-0.0791***	-0.0719***	0.0677*
	(-8.42)	(-7.36)	(2.29)
<b>z_corf</b>	0.0454***	0.0529***	0.148***
	(4.79)	(5.37)	(4.12)
<b>z_fiscf</b>	0.0470***	0.0448***	0.145***
	(7.86)	(7.24)	(10.49)
<b>z_govs</b>	-0.00679	-0.0144*	-0.172***
	(-1.01)	(-2.08)	(-10.76)

<b>z_bisf</b>	<b>0.0403***</b>	<b>0.0418***</b>	<b>0.135***</b>
	(7.61)	(7.58)	(7.77)
<b>z_monf</b>	<b>0.0377***</b>	<b>0.0345***</b>	<b>-0.0403**</b>
	(9.70)	(8.54)	(-2.84)
<b>z_traf</b>	<b>0.0743***</b>	<b>0.0780***</b>	<b>0.163***</b>
	(16.88)	(17.06)	(10.33)
<b>z_invf</b>	<b>-0.0272***</b>	<b>-0.0303***</b>	<b>-0.120***</b>
	(-4.69)	(-5.02)	(-6.06)
<b>z_finf</b>	<b>0.0127*</b>	<b>0.0127*</b>	<b>0.00301</b>
	(2.12)	(2.05)	(0.15)
<b>LLC</b>	<b>0</b>	<b>-0.607***</b>	<b>-0.431***</b>
	(.)	(-5.96)	(-13.02)
<b>Constant</b>		<b>0.163**</b>	<b>0.116***</b>
		(3.11)	(7.88)
<b>Observations</b>	<b>2144</b>	<b>2144</b>	<b>2144</b>
<b>t statistics in parentheses; * p&lt;0.05, ** p&lt;0.01, *** p&lt;0.001</b>			
<b>Dependent Variable: Log of Gross Domestic Product Per Capita</b>			

Under the POLS estimations, five explanatory variables have a statistically significant association with GDPpc which runs counter to the expectations of standard institutionalist theory: Control of Corruption (ccest), Voice and Accountability (vaest), Government Spending (govs), Monetary Freedom (monf), and Investment Freedom (invf). Except for the variable Monetary Freedom, all of these predictors exhibit consistent behavior (contrary to the a priori institutionalist hypotheses) under the FEM and REM estimations. On the other hand, six independent institutional proxy variables behave in a manner supportive of institutionalist theory: Government Effectiveness (geest), Political Stability and Absence of

Violence (pvest), Freedom from Corruption (corf), Fiscal Freedom (fiscf), Business Freedom (bisf), and Trade Freedom (traf) all support the hypotheses of institutionalist theory.

Based on the results of the FEM estimation, we estimate that an increase by one standard deviation in the independent variables geest, pvest, rgest, rlest, corf, fiscf, bisf, monf and traf, respectively, is expected to give rise to an increase by 5%, 3%, 9%, 6%, 5%, 5%, 4%, 4% and 7% of one standard deviation of the dependent variable GDPpc. In all three different models, institutions seem to matter – most of the proxy variables in question certainly have significant associations with income per capita. However, they do not necessarily matter in the way or the direction in which one might expect a priori.

Interestingly, we find that the coefficients of the independent variables under the POLS estimation are significantly larger than the FEM coefficients. Similarly, the different models yield different conclusions with respect to the impact of the landlocked dummy variable upon per capita income: landlocked nations on average have 35% (POLS) and 46% (REM)<sup>19</sup> less per capita income than nations with access to the sea in the POLS and REM estimations but are indistinguishable from the other nations under the FEM estimation.

To further explore these causal relationships, the next set of econometric estimations sought to estimate the influence of institutions on per capita income, once again comparing the POLS model with the FEM and REM estimations, but replacing the landlocked dummy variable with the proxy ratio variable CENC (distance in kilometers from the center of the country to the nearest coast or the nearest navigable river flowing to the sea) (Table 8).

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<sup>19</sup> This is the more accurate estimation, according to the formula:  $100 * \exp(\beta^{\wedge}) - 1$  (Wooldridge, 2010).

**Table 8: Baseline Models (with Distance variable)**

	<b>FEM</b>	<b>REM</b>	<b>POLS</b>
<b>z_ccest</b>	-0.0424**	-0.0335*	-0.320***
	(-2.72)	(-2.07)	(-6.17)
<b>z_geest</b>	0.0495**	0.0730***	0.581***
	(2.65)	(3.78)	(10.90)
<b>z_pvest</b>	0.0341***	0.0304***	0.132***
	(4.03)	(3.48)	(6.26)
<b>z_rgest</b>	0.0871***	0.0972***	0.222***
	(5.11)	(5.51)	(3.98)
<b>z_rlest</b>	0.0637**	0.0828***	-0.0255
	(2.84)	(3.58)	(-0.42)
<b>z_vaest</b>	-0.127***	-0.115***	0.0395
	(-6.15)	(-5.41)	(0.56)
<b>z_polr</b>	-0.00464	-0.000432	0.0417
	(-0.36)	(-0.03)	(0.91)
<b>z_civl</b>	-0.0787***	-0.0852***	0.158**
	(-6.45)	(-6.74)	(3.19)
<b>z_pror</b>	-0.0791***	-0.0725***	0.0266
	(-8.42)	(-7.43)	(0.85)
<b>z_corf</b>	0.0454***	0.0528***	0.206***
	(4.79)	(5.36)	(5.31)
<b>z_fiscf</b>	0.0470***	0.0450***	0.155***
	(7.86)	(7.28)	(10.68)
<b>z_govs</b>	-0.00679	-0.0133	-0.147***
	(-1.01)	(-1.93)	(-8.51)
<b>z_bisf</b>	0.0403***	0.0418***	0.143***
	(7.61)	(7.59)	(7.92)
<b>z_monf</b>	0.0377***	0.0347***	-0.0327*
	(9.70)	(8.61)	(-2.02)
<b>z_traf</b>	0.0743***	0.0775***	0.128***
	(16.88)	(16.98)	(7.73)
<b>z_invf</b>	-0.0272***	-0.0301***	-0.126***
	(-4.69)	(-5.01)	(-5.99)
<b>z_finf</b>	0.0127*	0.0125*	-0.0322
	(2.12)	(2.01)	(-1.60)
<b>z_cenc</b>	0	-0.174***	-0.0656***
	(.)	(-3.67)	(-3.97)
<b>Constant</b>		-4.17e-16	-4.39e-16
		(-0.00)	(-0.00)
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<b>Observations</b>	<b>2144</b>	<b>2144</b>	<b>2144</b>
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t statistics in parentheses; * p<0.05, ** p<0.01, *** p<0.001			
Dependent Variable: Log of Gross Domestic Product per Capita			

The estimated coefficients of the POLS model are different in this case compared to the specification using the LLC dummy variable. For example, the independent variables *rgest* (regulatory quality) and *civil* (civil liberties) are statistically significant at the 1% level, which was not previously the case. Although the results of the FEM model are very similar to those in table 7, the REM and POLS estimations yield quite different results. As was the previously the case, however, the Hausman test (2) statistic (178.10, Prob. > chi2=0.0000) rejects the null hypothesis, meaning that the FEM model is once again deemed a more suitable model than REM (see Appendix D).

Under this specification, the (negative) influence of distance in km is 7% (POLS) and 17% (REM). This is still consistent with the idea that landlockedness matters for output or per capita income. However, this estimation is suggestive of a lesser influence of distance upon the dependent variable, GDPpc, than was the case with the landlocked dummy variable.

The final set of estimations uses a Correlated Random Effects Model in two different versions: with the LLCs dummy variable and with the CENC proxy distance variable (Table 9).

**Table 9: CREM Model (with LLCs Dummy and with Distance variable)**

	CREM	CREMD
z_ccest	-0.0424** (-2.72)	-0.0424** (-2.72)
z_geest	0.0495** (2.65)	0.0495** (2.65)
z_pvest	0.0341*** (4.03)	0.0341*** (4.03)
z_rgest	0.0871*** (5.11)	0.0871*** (5.11)
z_rlest	0.0637** (2.84)	0.0637** (2.84)
z_vaest	-0.127*** (-6.15)	-0.127*** (-6.15)
z_polr	-0.00464 (-0.36)	-0.00464 (-0.36)
z_civl	-0.0787*** (-6.45)	-0.0787*** (-6.45)
z_pror	-0.0791*** (-8.42)	-0.0791*** (-8.42)
z_corf	0.0454*** (4.79)	0.0454*** (4.79)
z_fiscf	0.0470*** (7.86)	0.0470*** (7.86)
z_govs	-0.00679 (-1.01)	-0.00679 (-1.01)
z_bisf	0.0403*** (7.61)	0.0403*** (7.61)
z_monf	0.0377*** (9.70)	0.0377*** (9.70)
z_traf	0.0743*** (16.88)	0.0743*** (16.88)
z_invf	-0.0272*** (-4.69)	-0.0272*** (-4.69)
z_finf	0.0127* (2.12)	0.0127* (2.12)
LLC	-0.443*** (-3.82)	
z_cenc		-0.0813 (-1.60)
Constant	0.119* (2.24)	8.07e-17 (0.00)
-----		
Observations	2144	2144
-----		
t statistics in parentheses; * p<0.05, ** p<0.01, *** p<0.001		
Dependent Variable: Log of Gross Domestic Product Per Capita		

The predicted relative effect of the institutional variables (both in terms of direction and degree) are the same in the FEM and the Correlated Random Effects Model (CREM). Nine institutional variables give rise to increases in the dependent variable GDPpc by between 3% and 9% of one standard deviation when the independent variables themselves increase by one standard deviation. The advantage of the CREM model is that it can predict the time-invariant variables (landlocked dummy) without losing the unbiased estimators as in the FEM model. Under this estimation, the impact of landlockedness on GDP per capita is approximately -36% on average, which is quite close to the impact estimated under the POLS model (-35%; see Table 7). When we use the CENC distance-to-sea variable instead of the landlocked dummy variable in the CREM model, however, we find that it is not statistically significant.

For additional corroboration, some additional specifications were tried, the results of which are presented in Appendices E and F. In Appendix E, we show the results of FEM, REM and CREM estimations using the full set of institutional variables but without either the LLC dummy variable or the CENC distance variable. We find that the estimated coefficients of the institutional variables are the same as in the previous models (see Appendix E). Additionally, we have sought to ascertain the relative influence of the institutional variables and the LLC dummy variable *separately* for the institutional variables from each of the three databases (World Governance Indicators, Freedom House and Heritage Foundation). The results, shown in Appendix F, indicate that when only the WGI institutional variables are considered, the landlockedness dummy variable is associated with an estimated negative impact on GDPpc of 30%. The corresponding impact when only the HF variables are considered is -37%, and that for the FH variables is -41%. In other words, landlockedness is

on average associated with having 30% less, 37% less or 41% less GDP per capita compared to non-landlocked countries depending on whether we control for the institutional variables in the WGI, HF or FH datasets. In these three alternative specifications, the direction of institutional variables is nearly always the same, although the strength of the coefficients differs.

## **6.2 Discussion**

The econometric analysis conducted herein has sought to contribute to the current debate on the impact of institutions on income per capita, given a specific geographical constraint (landlockedness). Based on the analysis of panel data, the baseline Pooled Ordinary Least Square (POLS) regression model suggested that out of seventeen independent institutional variables, seven are positively correlated with the dependent variable GDPpc, as expected by institutionalist theory. These seven variables are Government Effectiveness, Political Stability and Absence of Violence, Civil Liberty, Freedom from Corruption, Fiscal Freedom, Business Freedom, and Trade Freedom. However, four other independent variables (Control of Corruption, Government Spending, Monetary Freedom, and Investment Freedom) behave in ways which seem to be at odds with the theory – and the remaining six variables do not seem to be statistically significant. The predictor Government Effectiveness seems to have an extremely high (and positive) influence on a country's per capita income level. One standard deviation change in the government effectiveness variable is estimated to be associated with a change by 52% of one standard deviation in GDPpc. Of the seven predictors mentioned above, the one with the relatively lesser impact is civil liberty, which is associated with an effect of 12% of one standard deviation.

Compared to the Pooled Ordinary Least Squares Model, the Fixed Effects Model and the Correlated Random Effects Model indicate relatively lesser impacts in the case of all variables except for Civil Liberty and Monetary Freedom. Under these estimations, an increase by one standard deviation in the independent variables Government Effectiveness, Political Stability and Absence of Violence, Regulatory Quality, Rule of Law, Freedom from Corruption, Fiscal Freedom, Business Freedom, Monetary Freedom and Trade Freedom is associated with an increase in the dependent variable GDPpc by 5%, 3%, 9%, 6%, 5%, 5%, 4%, 4% and 7% of one standard deviation, respectively. This indicates that institutional factors – or at least, some institutional factors – matter when it comes to accounting for a country's income per capita level. In particular, regulatory quality and trade freedom seem to have the strongest effects on GDPpc.

The analysis also corroborates the hypothesis that landlockedness is a major constraint to economic growth. Depending on the type of model used, the data suggest that landlockedness by itself is associated with an income per capita penalty of between -30% and -41% compared to non-landlocked nations. This is in line with the idea that geography matters, as argued by MacKellar et al. (2000) and Gallup et al. (1998). However, under the FEM and CREM model we also find that the distance-to-sea variable (*cenc*) does not seem to be statistically significant. In other words, this variable, which is usually interpreted as a proxy variable for the transport costs of landlocked nations, does not have a clear effect on the income per capita level of a country.

In sum, it is hard to provide a definitive answer to the question of which of the two – institutions or landlockedness – matter the most, given their multifaceted characteristics and associations. However, our empirical findings lend more support to the idea that landlockedness matters even when we control for institutions, i.e. it seems to have a negative

impact above and beyond the negative impact associated with having poorer institutions. Institutions, at least some of them, certainly matter for developing nations – but in the case of *landlocked* developing countries, geography seems to constitute the greater constraint.

## CHAPTER VII: CONCLUSIONS

Geography and institutions are complicated multi-layered variables, which makes it especially difficult for a single study such as this one to tell the whole story or provide definitive answers. Landlocked countries are inherently diverse. They may differ in terms of their distance from the ocean and their difficulty of access to the world market. They may differ in terms of their history, their politics, and their patterns of productive specialisation. Often, they are also heterogeneous with respect to their political and economic institutions – although, as we have seen earlier in this thesis, non-European landlocked countries tend to have much poorer institutions, at least as assessed by the organisations and databases which we have used in this analysis. These multiple differences concerning potentially relevant variables create considerable risks of any quantitative analysis missing out on relevant explanatory variables and misspecifying the models – a risk which we must always be aware of.

In the analysis presented in this thesis, we have sought to contribute to the debate on whether geography or institutions matter the most for economic development, or more specifically to determining the level of income per capita. Within ‘geography’, we have focused specifically on the question of landlockedness, leaving out other geographical variables such the different agroecological zones, land productivity, susceptibility to diseases, etc. These other potentially relevant variables, and others such as the availability of natural resources, the infrastructure endowment or the ‘quality’ of a country’s neighbors, may well be very relevant, but we have decided to leave them for other studies to look into, insofar as our priority was to contribute to the specific debate on the growth and development dilemmas of landlocked developing countries.

The analysis in this dissertation explored the hypothesis that landlockedness is a constraint on economic growth because of two main barriers: the lack of direct access to the sea and the fact that the distance to the ocean (hence, to the world market) tends to be greater, insofar as one must add the distance to the border and the distance across the transit neighboring country or countries. Theoretically speaking, this consideration is underpinned by the gravity theory of trade, which holds the volume of bilateral trade to be directly proportional to the income of any two trading countries and inversely proportional to the distance between them. The hypothesis is also supported by the East Asian success stories of the last few decades, including those of the Asian tigers or dragons (South Korea, Taiwan, Singapore and Hong Kong) as well as China, in which export-led growth was pursued very successfully by countries which had full access to the sea and to the world market. Landlocked countries are thus constrained in their access to the world market, face higher trade costs and, consequently, tend to have lower income per capita – at least, so has been argued by the literature on landlockedness, including by such authors as Reitsma (1980), Bowen (1986), Gallup et.al. (1998), Ozmanczyk and Mango (2003), Carcamo-Diaz (2004), UN-OHRLLS (2013), Chowdhury and Erdenebileg (2006), or MacKellar et al (2000).

By contrast, other scholars have instead stressed the institutional determinants of growth and development: the fact that countries may be constrained in their ability to grow and develop due to such factors as a poor tax and fiscal system, inadequate incentives, monopolies, political unrest, violence and conflict, an inefficient judiciary, etc. For these authors, it is more of a constraint to be “locked” by institutions than to be locked by geography, i.e. landlocked. While it is true that many landlocked developing countries have poor institutions, the argument is that it is really those poor institutions that constitute the key constraint, rather than landlockedness per se. This alternative hypothesis builds on a long tradition of

institutional economics – especially, in the case of this thesis, the so-called new institutional economics and its emphasis on private property rights, rule of law, freedom from corruption, civil liberties, press freedom and so forth as key determinants of long-term growth, as exposed by such renowned scholars as North (1991), Sachs and Warner (1995), Hall and Jones (1999), Gallup et. al. (1998), Rodrik (2000), Easterly and Levine (2003), Helpman (2004), Acemoglu and Robinson (2008), Jones and Romer (2010) or Carmignani (2012).

In order to contribute to this debate and provide our own answers to these questions, this study has proceeded in two steps. First, we have undertaken a comparative-descriptive analysis of European and non-European landlocked countries in terms of their political and economic institutions, susceptibility to wars and coups, etc. For that purpose, we have drawn on a variety of data sources, including the Center for Systemic Peace, Freedom House, and the Heritage Foundation. As a result of that analysis, we have come to the clear conclusion that non-European landlocked countries are characterised by poor political and economic institutions, in stark contrast to European landlocked countries.

However, we have also sought to pin down the cross-country statistical association between these institutional variables and the level of per capita income, with recourse to three different correlation coefficients: Pearson, Spearman and Kendall's Tau. Here, we have arrived at more mixed and ambiguous results. While we have found that five institutional variables (Democracy, Polity II, Fiscal Freedom, Trade Freedom and Autocracy) seem to pair-wise associations with per capita income across all groups of landlocked countries as posited by institutionalist theory, we have also found that three institutional variables (Political Rights, Civil Rights, and Property Rights) seem to be negatively associated with per capita income in all regional groups of LLCs, which is at odds with the basic hypotheses of institutionalist theory. Also, and again somewhat unexpectedly, five variables (Freedom from Corruption,

Government Spending, Business Freedom, Investment Freedom and Financial Freedom) exhibit undetermined associations with per capita income (a mix of positive, negative and/or unidentified correlation) across the various groups of LLCs, again in contrast to the expectations of institutionalist theory.

The second major component of our empirical analysis was an econometric study of the effects of institutions, in interaction with geographical (landlockedness) proxies, upon the level of per capita income. In this part of the analysis, we have used a variety of different models – Pooled Ordinary Least Squares (POLS), Fixed Effects Model (FEM), Random Effects Model (REM), and Correlated Random Effects Model (CREM) – and seventeen institutional predictors as well as a landlockedness dummy variable or, alternatively, a distance-to-sea quantitative variable.

Based on this econometric analysis, our baseline POLS regression model suggested that out of seventeen independent institutional variables, seven (Government Effectiveness, Political Stability and Absence of Violence, Civil Liberty, Freedom from Corruption, Fiscal Freedom, Business Freedom, and Trade Freedom) are positively and significantly correlated with the dependent variable Gross Domestic Product per capita (GDPpc), as posited by institutionalist theory. However, four explanatory variables (Control of Corruption, Government Spending, Monetary Freedom, and Investment Freedom) were found to be significantly associated in ways *contrary* to the expectations of the same theory, while the remaining six variables were found not to be statistically significant.

We came to relatively similar results under the baseline FEM and REM specifications, although the number of predictors which behaved in accordance with the hypotheses of institutionalist theory increased slightly. In these latter cases, we found Government

Effectiveness, Political Stability and Absence of Violence, Regulatory Quality, Rule of Law, Freedom from Corruption, Fiscal Freedom, Business Freedom, Monetary Freedom and Trade Freedom to be positively and significantly associated with the theoretical hypotheses. The predictor Government Effectiveness has an especially high degree of positive influence on per capita income: one standard deviation change in this variable is estimated to give rise to an increase in GDPpc by 52% of one standard deviation. However, the variables Control of Corruption, Voice and Accountability, Property Rights and Investment Freedom appeared to be significantly associated in ways contrary to the theory, while Political Rights, Government Spending and Financial Freedom were found to be statistically non-significant predictors. Similar findings, with only minor differences, were obtained when we replaced the landlockedness dummy variable with the distance-to-sea proxy variable.

Finally, we specified and ran a Correlated Random Effects Model with both kinds of landlockedness proxy variables (landlockedness dummy and distance-to-sea variable). Compared to the earlier specifications, this generally leads to the predictors having relatively weaker influences on the dependent variable GDPpc (the exceptions to this being the Civil Liberty and Monetary Freedom variables). Under this final specification, nine of the seventeen predictors behave in accordance with the theory. The estimated effect of their increase by one standard deviation is, respectively, 5% of one standard deviation in the case of Government Effectiveness, 3% for Political Stability and Absence of Violence, 9% for Regularity Quality, 6% for Rule of Law, 5% for Freedom from Corruption, 5% for Fiscal Freedom, 4% for Business Freedom, 4% for Monetary Freedom and 7% for Trade Freedom. This is the case irrespective of whether landlockedness is represented by a dummy variable or the distance-to-sea variable. Once again, the behaviour of some of the predictors is at odds with institutionalist theory: Control of Corruption, Voice and Accountability, Civil Liberties

and Property Rights seem to significantly but negatively associated with income per capita. In other words, while there is evidence to suggest that some institutional factors are indeed relevant for enabling a country to grow and develop, it is by no means obvious that that is the case for all institutional variables, nor can it be said that the simpler versions of the story told by institutionalist theory are unequivocally supported by the data.

What the data does indicate is that, even after controlling for these seventeen institutional variables, landlockedness remains a significant, and by far the most important, determinant of a country's per capita income level. Depending on the model specification, landlocked nations are estimated to have anywhere between 30% and 41% less GDPpc than their coastal counterparts, even after controlling for the effect of institutions. This supports the hypothesis that, all things considered, landlockedness is indeed a major obstacle to economic growth and development. In other words, geography does matter, as argued by MacKellar et al (2000), Gallup et al (1998) and many others. At the same time, we find that the distance-to-sea variable (cenc) does not appear to be statistically significant. Taken together, these two findings suggests that it is landlockedness itself (the fact of there being one or more borders between the country and the world market), not the distance to the sea, that constitutes the key constraint.

The combination of statistical methods adopted in this thesis has thus led to several key conclusions. European landlocked countries have much better political and economic institutions than non-European landlocked countries. Across the various regional groups of landlocked countries, the relationship between institutions and income per capita is complex and often not as expected by institutionalist theory. And across the overall set of landlocked and non-landlocked countries, the condition of landlockedness is unequivocally associated with lower per capita income even after controlling for the effect of institutions, while the

effect of institutions is considerably more ambiguous. Our empirical findings do not lead to the rejection of the idea that institutions matter, but certainly support the need for qualifications: institutions probably do matter for economic growth and development, but some institutions probably have more subtle and complex relationships with growth than usually assumed, and the question of which institutions to consider and how to properly assess and measure them is also not straightforward. By contrast, landlocked countries are unequivocally burdened by their geography and therefore require greater efforts if they are to achieve the same level of prosperity as other countries—a fact that should not be overlooked by either the policymakers in these countries or by the international development community.

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## Appendix A: Selected Indicators for Developed and Developing Landlocked Nations

Selected Indicators (2016)						
Country/Group	GDP Per Capita	GDP growth	Literacy rate	Life expectancy	Merch. trade	Inflation (%)
	PPP (2011 \$)	(annual %)	(% 15 & above)	total (2015)	(% of GDP)	
<b>Andorra</b>	..	1.23	100	..	..	..
<b>Austria</b>	44358.01	1.48	..	81.84	79.28	0.86
<b>Belarus</b>	16742.26	-2.65	99.7	73.62	107.48	11.84
<b>Czech Republic</b>	31352.82	2.59	..	79.47	156.5	0.64
<b>Hungary</b>	25653.85	2.21	99.1	75.96	155.48	0.4
<b>Liechtenstein</b>	..	..	..	82.07	..	..
<b>Luxembourg</b>	94764.97	3.08	..	82.23	63.87	0.3
<b>Moldova</b>	4944.34	4.1	99.4	75.52	89.87	..
<b>San Marino</b>	56500.47	0.97	..	..	..	..
<b>Slovak Republic</b>	29223.65	3.32	..	77.21	170.57	-0.52
<b>Switzerland</b>	57430.05	1.38	..	83.2	85.67	-0.43
<b>Macedonia</b>	13054.78	2.41	97.8	75.52	..	-0.24
<b>Average</b>	37402.52	1.83	99.2	78.67	113.59	1.61
<b>S.D.</b>	26707.01	1.78	0.85	3.5	41.18	4.16
<b>Max.</b>	94764.97	4.1	100	83.2	170.57	11.84
<b>Min.</b>	4944.34	-2.65	97.8	73.62	63.87	-0.52
<b>Bolivia</b>	6707.96	4.26	92.5	68.75	45.48	3.63
<b>Paraguay</b>	8871.38	4.02	95.1	73.04	66.53	4.09
<b>Average</b>	7789.67	4.14	93.8	70.9	56	3.86
<b>S.D.</b>	1529.77	0.17	1.84	3.04	14.89	0.33
<b>Max.</b>	8871.38	4.26	95.1	73.04	66.53	4.09
<b>Min.</b>	6707.96	4.02	92.5	68.75	45.48	3.63
<b>Afghanistan</b>	1739.58	2.23	38.2	63.3	36.63	2.17
<b>Armenia</b>	8190.24	0.2	99.7	74.21	47.91	-1.27
<b>Azerbaijan</b>	15994.01	-3.1	99.8	71.85	58.69	4.18
<b>Bhutan</b>	8253.29	7.99	64.9	69.81	70.26	3.29
<b>Kazakhstan</b>	23443.09	1.1	99.8	72	45.25	..
<b>Laos</b>	5734.52	7.02	79.9	66.28	50.88	1.51

Selected Indicators (2016)						
Country/Group	GDP Per Capita	GDP growth	Literacy rate	Life expectancy	Merch. trade	Inflation (%)
	PPP (2011 \$)	(annual %)	(% 15 & above)	total (2015)	(% of GDP)	
<b>Kyrgyz Republic</b>	3291.97	3.83	99.5	70.65	83.43	0.42
<b>Mongolia</b>	11361.01	1.24	98.4	69.12	74	0.55
<b>Nepal</b>	2297.65	0.41	63.9	69.87	44.22	..
<b>Tajikistan</b>	2762.59	6.9	99.8	71.01	75.88	6
<b>Turkmenistan</b>	15648.37	6.2	99.7	67.64	49.75	..
<b>Uzbekistan</b>	6038.87	7.8	100	71.15	31.98	..
<b>Average</b>	8729.6	3.49	86.97	69.74	55.74	2.11
<b>S.D.</b>	6716.22	3.65	20.72	2.89	16.57	2.33
<b>Max.</b>	23443.09	7.99	100	74.21	83.43	6
<b>Min.</b>	1739.58	-3.1	38.2	63.3	31.98	-1.27
<b>Botswana</b>	15723.24	4.29	88.5	65.75	86.64	3.77
<b>Burundi</b>	721.18	-0.57	85.6	57.07	24.12	5.54
<b>Burkina Faso</b>	1642.19	5.92	36	59.84	47.64	..
<b>Central African Republic</b>	647.9	4.5	36.8	51.38	27.24	37.14
<b>Chad</b>	1845.91	-7	22.31	52.55	39.58	..
<b>Ethiopia</b>	1608.29	7.56	49.1	65.01	26.95	7.27
<b>Lesotho</b>	2736.35	2.4	79.4	53.57	119.82	6.61
<b>Malawi</b>	1083.8	2.48	62.1	62.54	63.36	..
<b>Mali</b>	1971.08	5.8	33.1	57.46	43.09	..
<b>Niger</b>	914.47	5.04	19.1	59.68	34.72	..
<b>Rwanda</b>	1773.75	5.93	70.5	66.62	36.26	5.73
<b>South Sudan</b>	1808.16	-6.35	27	56.3	..	380.78
<b>Swaziland</b>	7723.64	1.37	87.5	56.91	82.83	7.85
<b>Uganda</b>	1687.08	4.66	78.4	59.51	31.74	..
<b>Zambia</b>	3646.96	3.61	63.4	60.28	66.7	..
<b>Zimbabwe</b>	1879.63	0.62	86.5	61.34	39.33	-1.56
<b>Average</b>	2963.35	2.52	57.83	59.11	51.34	50.35
<b>S.D.</b>	3790.17	4.18	25.6	4.53	27.35	124.4
<b>Max.</b>	15723.24	7.56	88.5	66.62	119.82	380.78
<b>Min.</b>	647.9	-7	19.1	51.38	24.12	-1.56
<b>WORLD</b>	15065.99	2.5	86.25	86.2	42.33	1.61
<b>LIC</b>	1574.14	4.18	60.58	..	38.96	..
<b>ECA</b>	18678.44	1.51	..	..	46.49	1.28
<b>HIC</b>	43319.34	1.69	..	..	44.55	0.4
<b>MIC</b>	10677.89	4.04	85.64	..	38.33	3.29
<b>LAC</b>	13844.35	-0.79	..	..	36.66	3.52
<b>SAS</b>	5620.62	6.82	..	..	28.41	3.73

<b>Selected Indicators (2016)</b>						
<b>Country/Group</b>	<b>GDP Per Capita</b>	<b>GDP growth</b>	<b>Literacy rate</b>	<b>Life expectancy</b>	<b>Merch. trade</b>	<b>Inflation (%)</b>
	<b>PPP (2011 \$)</b>	<b>(annual %)</b>	<b>(% 15 &amp; above)</b>	<b>total (2015)</b>	<b>(% of GDP)</b>	
<b>LIC: Low income; ECA: Europe &amp; Central Asia (excluding high income); HIC: High income; MIC: Middle income; LAC: Latin America &amp; Caribbean (excluding high income); SAS: South Asia</b>						
<b>Source: World Bank Online and World Development Indicators.</b>						

## Appendix B: HDI of Developed and Developing Landlocked Nations

Rank and Trend of Human Development Index										
HDI rank	Change in HDI rank	Country	Human Development Index (HDI) Value				Average annual HDI growth (%)			
			1990	2011	2013	2015	1990-2000	2000-2010	2010-2015	1990-2015
<b>VHHDI</b>										
2	0.00	Switzerland	0.83	0.93	0.94	0.94	0.67	0.49	0.16	0.49
15	-5.00	Liechtenstein	..	0.91	0.91	0.91	..	0.48	0.16	..
20	-4.00	Luxembourg	0.78	0.89	0.89	0.90	0.88	0.46	0.11	0.56
24	-1.00	Austria	0.79	0.88	0.89	0.89	0.53	0.50	0.31	0.47
28	0.00	Czech Republic	0.76	0.86	0.87	0.88	0.76	0.47	0.39	0.57
32	9.00	Andorra	..	0.82	0.85	0.86	..	..	0.95	..
43	-4.00	Hungary	0.70	0.82	0.83	0.84	0.89	0.67	0.36	0.70
<b>HHDI</b>										
52	1.00	Belarus	..	0.79	0.80	0.80	..	1.45	0.23	..
56	7.00	Kazakhstan	0.69	0.77	0.79	0.79	-0.07	1.13	0.72	0.56
66	0.00	Serbia	0.71	0.77	0.77	0.78	-0.07	0.65	0.50	0.33
78	-2.00	Azerbaijan	..	0.74	0.75	0.76	..	1.43	0.48	..
84	1.00	Armenia	0.63	0.73	0.74	0.74	0.16	1.24	0.39	0.64
92	8.00	Mongolia	0.58	0.71	0.73	0.73	0.17	1.77	0.94	0.96
105	6.00	Uzbekistan	..	0.67	0.69	0.70	..	1.12	1.07	..
<b>MHDI</b>										
107	0.00	Moldova	0.65	0.68	0.70	0.70	-0.87	1.18	0.81	0.28
108	-3.00	Botswana	0.58	0.69	0.70	0.70	-0.43	1.93	0.56	0.71
110	-4.00	Paraguay	0.58	0.68	0.69	0.69	0.73	0.79	0.54	0.71
111	2.00	Turkmenistan	..	0.67	0.68	0.69	..	..	0.78	..

Rank and Trend of Human Development Index										
HDI rank	Change in HDI rank	Country	Human Development Index (HDI) Value				Average annual HDI growth (%)			
			1990	2011	2013	2015	1990-2000	2000-2010	2010-2015	1990-2015
118	0.00	Bolivia	0.54	0.66	0.67	0.67	1.26	0.66	0.77	0.92
120	3.00	Kyrgyzstan	0.62	0.64	0.66	0.66	-0.37	0.65	0.98	0.30
129	2.00	Tajikistan	0.62	0.61	0.62	0.63	-1.39	1.28	0.64	0.08
132	5.00	Bhutan	..	0.58	0.60	0.61	..	..	1.19	..
138	5.00	Lao PDR	0.40	0.55	0.57	0.59	1.54	1.59	1.59	1.57
139	3.00	Zambia	0.40	0.55	0.57	0.58	0.64	2.50	1.30	1.51
144	2.00	Nepal	0.38	0.54	0.55	0.56	1.66	1.73	1.07	1.57
		<b>LHDI</b>								
148	-1.00	Swaziland	0.55	0.53	0.54	0.54	-0.78	0.38	0.57	-0.05
154	15.00	Zimbabwe	0.50	0.46	0.50	0.52	-1.55	0.57	2.67	0.13
159	4.00	Rwanda	0.24	0.47	0.49	0.50	3.14	3.39	1.40	2.89
160	2.00	Lesotho	0.49	0.48	0.49	0.50	-1.06	0.56	1.20	0.04
163	-3.00	Uganda	0.31	0.48	0.48	0.49	2.51	1.88	0.66	1.88
169	-2.00	Afghanistan	0.29	0.46	0.48	0.48	1.43	2.95	1.08	1.97
170	1.00	Malawi	0.33	0.45	0.47	0.48	1.74	1.40	1.38	1.53
174	1.00	Ethiopia	..	0.42	0.43	0.45	..	3.79	1.71	..
175	4.00	Mali	0.22	0.41	0.43	0.44	2.94	3.14	1.82	2.80
181	-7.00	South Sudan	..	0.42	0.42	0.42	..	..	-0.49	..
184	-1.00	Burundi	0.27	0.39	0.40	0.40	-0.06	3.67	0.97	1.62
185	0.00	Burkina Faso	..	0.38	0.40	0.40	..	..	1.27	..
186	0.00	Chad	..	0.38	0.39	0.40	..	2.13	1.37	..
187	1.00	Niger	0.21	0.33	0.34	0.35	1.85	2.41	1.76	2.06
188	-1.00	CAR	0.32	0.37	0.34	0.35	-0.19	1.41	-0.47	0.39

### Rank and Trend of Human Development Index

HDI rank	Change in HDI rank	Country	Human Development Index (HDI) Value				Average annual HDI growth (%)			
			1990	2011	2013	2015	1990-2000	2000-2010	2010-2015	1990-2015
..		VHHDI	0.79	0.88	0.89	0.89	0.55	0.48	0.35	0.48
..		HHDI	0.57	0.72	0.74	0.75	1.04	1.19	0.83	1.06
..		MHDI	0.46	0.61	0.62	0.63	1.23	1.31	1.09	1.23
..		LHDI	0.36	0.48	0.49	0.50	0.89	2.02	0.92	1.35
..		Europe & Central Asia	0.65	0.74	0.75	0.76	0.23	0.95	0.63	0.59
..		Latin America & the Caribbean	0.63	0.74	0.75	0.75	0.92	0.63	0.58	0.74
..		South Asia	0.44	0.59	0.61	0.62	1.38	1.51	1.25	1.40
..		Sub-Saharan Africa	0.40	0.50	0.52	0.52	0.54	1.67	1.04	1.09
..		Least Developed Countries	0.35	0.49	0.50	0.51	1.40	1.90	1.08	1.54
..		World	0.60	0.70	0.71	0.72	0.71	0.82	0.61	0.74

**VHHDI: Very High Human Development Index; HHDI: High Human Development Index; MHDI: Medium Human Development Index; LHDI: Low Human Development Index**

**Source: Human Development Index (HDI) Report 2016; Table 2. HDI Trends, 1990-2015**

## Appendix C: Long-Term Demographic and Economic Growth Rates

Population, GDP and GDP per capita Growth Rates (0 -1998) for Selected Countries/Groups of Countries								
	Year							
	0-1000	1000- 1500	1500- 1820	1820- 1870	1870- 1913	1913- 1950	1950- 1973	1973- 1998
	<b>Population Growth Rates</b>							
<b>Austria</b>	0.03	0.21	0.16	0.59	0.94	0.07	0.39	0.25
<b>Switzerland</b>	0	0.15	0.32	0.75	0.87	0.53	1.39	0.41
<b>Hungary</b>	0.05	0.18	0.41	..	..	..	..	..
<b>Total Western Europe</b>	0	0.16	0.26	0.69	0.77	0.42	0.7	0.32
<b>Total Eastern Europe</b>	0.03	0.15	0.31	0.72	0.99	0.25	1.03	0.36
<b>United States</b>	0.06	0.09	0.5	2.83	2.08	1.21	1.45	0.98
<b>United Kingdom</b>	0.09	0.14	0.53	0.79	0.87	0.27	0.48	0.21
<b>Other Latin America</b>	0.07	0.07	0.12	1.5	1.78	2.02	2.65	1.98
<b>Total Latin America</b>	0.07	0.09	0.06	1.27	1.64	1.97	2.73	2.01
<b>Other Asia excluding China &amp; India</b>	0.01	0.06	0.15	0.58	1.02	2.05	2.4	2.22
<b>Total Asia excluding Japan</b>	0	0.09	0.29	0.15	0.55	0.92	2.19	1.86
<b>Other North Africa</b>	0.03	0.05	0.14	..	..	..	..	..
<b>Other Africa</b>	0.09	0.1	0.16	..	..	..	..	..
<b>Africa</b>	0.07	0.07	0.15	0.4	0.75	1.65	2.33	2.73
<b>World</b>	0.02	0.1	0.27	0.4	0.8	0.93	1.92	1.66
	<b>Economic Growth Rates</b>							
<b>Austria</b>			0.33	1.45	2.41	0.25	5.35	2.36
<b>Switzerland</b>			0.5	1.85	2.43	2.6	4.51	1.05
<b>Total Western Europe</b>	-0.01	0.3	0.41	1.65	2.1	1.19	4.81	2.11

**Population, GDP and GDP per capita Growth Rates (0 -1998) for Selected Countries/Groups of Countries**

	Year							
	0-1000	1000-	1500-	1820-	1870-	1913-	1950-	1973-
		1500	1820	1870	1913	1950	1973	1998
<b>Total Eastern Europe</b>	0.03	0.18	0.41	1.36	2.31	1.14	4.86	0.73
<b>United States</b>			0.86	4.2	3.94	2.84	3.93	2.99
<b>United Kingdom</b>			0.8	2.05	1.9	1.19	2.93	2
<b>Other Latin America</b>			0.25	1.75	3.51	3.61	5.1	2.9
<b>Total Latin America</b>	0.07	0.09	0.21	1.37	3.48	3.43	5.33	3.02
<b>Other Asia excluding China &amp; India</b>	0.01	0.1	0.15	0.72	1.67	2.47	6.05	4.67
<b>Total Asia excluding Japan</b>	0	0.13	0.29	0.03	0.94	0.9	5.18	5.46
<b>Africa</b>	0.07	0.06	0.16	0.52	1.4	2.69	4.45	2.74
<b>World</b>	0.01	0.15	0.32	0.93	2.11	1.85	4.91	3.01
	<b>GDP Per Capita Growth Rates</b>							
<b>Austria</b>	..	..	0.17	0.85	1.45	0.18	4.94	2.1
<b>Switzerland</b>	..	..	0.17	1.09	1.55	2.06	3.08	0.64
<b>Total Western Europe</b>	-0.01	0.13	0.15	0.95	1.32	0.76	4.08	1.78
<b>Total Eastern Europe</b>	0	0.03	0.1	0.63	1.31	0.89	3.79	0.37
<b>United States</b>	..	..	0.36	1.34	1.82	1.61	2.45	1.99
<b>United Kingdom</b>	..	..	0.27	1.26	1.01	0.92	2.44	1.79
<b>Other Latin America</b>	..	..	0.13	0.25	1.71	1.56	2.38	0.91
<b>Total Latin America</b>	0	0.01	0.15	0.1	1.81	1.43	2.52	0.99
<b>Other Asia excluding China &amp; India</b>	..	0.05	0	0.13	0.64	0.41	3.56	2.4
<b>Total Asia excluding Japan</b>	0	0.05	0	-0.11	0.38	-0.02	2.92	3.54

**Population, GDP and GDP per capita Growth Rates (0 -1998) for Selected Countries/Groups of Countries**

	Year							
	0-1000	1000-	1500-	1820-	1870-	1913-	1950-	1973-
		1500	1820	1870	1913	1950	1973	1998
<b>Africa</b>	0	-0.01	0.01	0.12	0.64	1.02	2.07	0.01
<b>World</b>	0	0.05	0.05	0.53	1.3	0.91	2.93	1.33

**1. All rates are average annual growth rates for the periods in question.**

**2. Due to the unavailability of historical data, two major countries, Austria and Switzerland, are compared with the Asian, African and Latin American groups and to two other major developed nations, USA and UK.**

Source: "World Population and GDP before 1820", Angus Maddison (1926-2010),

Website: <http://www.ggdc.net/maddison/oriindex.htm>

## Appendix D: Hausman Test Results for the FEM and REM Model Specifications

Hausman Test Result (1)

. hausman FIXED\_Eff RANDOM\_Eff, sigmamore

---- Coefficients ----				
V_B)	(b)	(B)	(b-B)	sqrt(diag(V_b-
	FIXED_Eff	RANDOM_Eff	Difference	S.E.
z_ccest	-.0424249	-.0323681	-.0100568	.0017503
z_geest	.0495251	.0730147	-.0234895	.0023516
z_pvest	.034077	.0312424	.0028347	.001087
z_rgest	.0871351	.0966365	-.0095014	.0018643
z_rlest	.0636781	.0847806	-.0211026	.0030006
z_vaest	-.127122	-.1156974	-.0114246	.0027538
z_polr	-.0046353	-.0003079	-.0043273	.0009444
z_civl	-.0787231	-.0857969	.0070738	.0013761
z_pror	-.0791307	-.0718681	-.0072626	.0008227
z_corf	.0453865	.0528909	-.0075044	.0008412
z_fiscf	.0469704	.0448243	.0021461	.0007114
z_govs	-.0067854	-.0144021	.0076167	.0008571
z_bisf	.0403236	.0418018	-.0014782	.0002873
z_monf	.0377444	.0345035	.0032409	.0003196
z_traf	.0743251	.078017	-.0036919	.000373
z_invf	-.0271653	-.0302565	.0030913	.0004028
z_fin	.0126788	.0127278	-.000049	.0003823

b = consistent under Ho and Ha; obtained from  
xtreg

B = inconsistent under Ha, efficient under Ho; obtained from  
xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(17) &= (b-B)' [(V_b - V_B)^{-1}] (b-B) \\ &= 183.59 \\ \text{Prob} > \text{chi2} &= 0.0000 \end{aligned}$$

Hausman Test Result (2)

. hausman FIXED\_EffD RANDOM\_EffD, sigmamore

---- Coefficients ----				
V_B)	(b)	(B)	(b-B)	sqrt(diag(V_b - V_B))
	FIXED_EffD	RANDOM_EffD	Difference	S.E.
z_ccest	-.0424249	-.0334828	-.0089421	.0016614
z_geest	.0495251	.0730474	-.0235223	.0022897
z_pvest	.034077	.0304057	.0036713	.0010603
z_rgest	.0871351	.0972298	-.0100946	.001802
z_rlest	.0636781	.0827712	-.0190932	.0028461
z_vaest	-.127122	-.1153023	-.0118197	.0026249
z_polr	-.0046353	-.0004321	-.0042032	.0008987
z_civl	-.0787231	-.0851667	.0064436	.0012841
z_pror	-.0791307	-.0724534	-.0066773	.0007832
z_corf	.0453865	.0527533	-.0073668	.0008101
z_fiscf	.0469704	.0450392	.0019311	.0006753
z_govs	-.0067854	-.0133075	.0065221	.0008022
z_bisf	.0403236	.0417606	-.0014371	.000274
z_monf	.0377444	.0347474	.002997	.0003038

z_traf	.0743251	.0775272	-.0032021	.0003532
z_invf	-.0271653	-.0301494	.0029841	.0003839
z_finf	.0126788	.0124768	.000202	.0003654

-----  
-----

b = consistent under Ho and Ha; obtained from  
xtreg

B = inconsistent under Ha, efficient under Ho; obtained from  
xtreg

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(17) = (b-B)' [(V_b - V_B)^{-1}] (b-B)$$

$$= 178.10$$

$$\text{Prob}>\text{chi2} = 0.0000$$

## Appendix E: FEM, REM and CREM Specifications without Landlocked Proxies

Dependent Variable *z\_lgdppc*

	Fixed Effect	Random Eff~t	CORR_Rando~t
<i>z_ccest</i>	-0.0424** (-2.72)	-0.0330* (-2.04)	-0.0424** (-2.72)
<i>z_geest</i>	0.0495** (2.65)	0.0742*** (3.83)	0.0495** (2.65)
<i>z_pvest</i>	0.0341*** (4.03)	0.0300*** (3.43)	0.0341*** (4.03)
<i>z_rgest</i>	0.0871*** (5.11)	0.0984*** (5.56)	0.0871*** (5.11)
<i>z_rlest</i>	0.0637** (2.84)	0.0838*** (3.62)	0.0637** (2.84)
<i>z_vaest</i>	-0.127*** (-6.15)	-0.113*** (-5.29)	-0.127*** (-6.15)
<i>z_polr</i>	-0.00464 (-0.36)	-0.000615 (-0.05)	-0.00464 (-0.36)
<i>z_civl</i>	-0.0787*** (-6.45)	-0.0864*** (-6.83)	-0.0787*** (-6.45)
<i>z_pror</i>	-0.0791*** (-8.42)	-0.0722*** (-7.39)	-0.0791*** (-8.42)
<i>z_corf</i>	0.0454*** (4.79)	0.0531*** (5.39)	0.0454*** (4.79)
<i>z_fiscf</i>	0.0470*** (7.86)	0.0448*** (7.23)	0.0470*** (7.86)

<b>z_govs</b>	-0.00679	-0.0138*	-0.00679
	(-1.01)	(-2.00)	(-1.01)
<b>z_bisf</b>	0.0403***	0.0418***	0.0403***
	(7.61)	(7.57)	(7.61)
<b>z_monf</b>	0.0377***	0.0346***	0.0377***
	(9.70)	(8.56)	(9.70)
<b>z_traf</b>	0.0743***	0.0777***	0.0743***
	(16.88)	(16.97)	(16.88)
<b>z_invf</b>	-0.0272***	-0.0301***	-0.0272***
	(-4.69)	(-4.99)	(-4.69)
<b>z_finf</b>	0.0127*	0.0125*	0.0127*
	(2.12)	(2.01)	(2.12)

## Appendix F: FEM, REM and CREM Specifications Run Separately for WGI, HF and FH Institutional Variables

### 1) Using Only World Governance Indicators (WGI) Data

Dependent Variable z\_lgdppc

	Fixed Effect	Random Eff~t	CORR_Rando~t
z_ccest	-0.114*** (-5.72)	-0.102*** (-5.04)	-0.114*** (-5.72)
z_geest	0.102*** (4.27)	0.129*** (5.31)	0.102*** (4.27)
z_pvest	0.0260* (2.39)	0.0228* (2.06)	0.0260* (2.39)
z_rgest	0.138*** (6.86)	0.150*** (7.32)	0.138*** (6.86)
z_rlest	0.111*** (4.00)	0.144*** (5.12)	0.111*** (4.00)
z_vaest	-0.0931*** (-4.64)	-0.0758*** (-3.78)	-0.0931*** (-4.64)
Dummy variable lan..	0 (.)	-0.595*** (-5.17)	-0.362** (-3.06)

2) Using Only Heritage Foundation (HF) Data

Dependent Variable z\_lgdppc

	Fixed Effect	Random Eff~t	CORR_Rando~t
z_pror	-0.0732*** (-7.70)	-0.0598*** (-6.04)	-0.0732*** (-7.70)
z_corf	0.0568*** (5.87)	0.0730*** (7.25)	0.0568*** (5.87)
z_fiscf	0.0578*** (9.50)	0.0542*** (8.55)	0.0578*** (9.50)
z_govs	-0.00549 (-0.79)	-0.0149* (-2.07)	-0.00549 (-0.79)
z_bisf	0.0458*** (8.47)	0.0500*** (8.84)	0.0458*** (8.47)
z_monf	0.0475*** (12.14)	0.0477*** (11.63)	0.0475*** (12.14)
z_traf	0.0785*** (17.34)	0.0839*** (17.76)	0.0785*** (17.34)
z_invf	-0.0129* (-2.27)	-0.0128* (-2.15)	-0.0129* (-2.27)
z_finf	0.0234*** (3.83)	0.0258*** (4.04)	0.0234*** (3.83)
Dummy variable lan..	0 (.)	-0.683*** (-6.32)	-0.468*** (-4.18)

3) Using Only Freedom House (FH) Data

Dependent Variable z\_lgdppc

	Fixed Effect	Random Eff~t	CORR_Rando~t
z_polr	0.0775*** (5.73)	0.0730*** (5.39)	0.0775*** (5.73)
z_civl	-0.192*** (-13.01)	-0.200*** (-13.61)	-0.192*** (-13.01)
Dummy variable lan..	0 (.)	-0.685*** (-4.28)	-0.528** (-3.21)

## Appendix G: War and Violence Episodes in Landlocked Countries

International War and Ethnic War and Violence Episodes (1946-2016)					
Landlocked Nations Directly Involved	Brief Description	Beginning	End	Magnitude	Deaths
<b>Europe</b>					
Hungary	International war	1956	*	3	20000
Moldova	Ethnic violence (Trans-Dniester Russians)	1991	1997	1	2000
<b>Latin America</b>					
Bolivia	President Villarroel ousted by general armed uprising, CV	1946	*	1	1000
Bolivia	"National Revolution", CV	1952	*	2	2000
Paraguay	Paraguay Civil War "Febrerista Insurrection", CV	1947	*	1	1500
<b>Asia</b>					
Afghanistan	Civil war	1978	2002	7	1000000
Afghanistan	Ouster of Taliban and continuing civil war, CW	2001	2016+	4	70000
Azerbaijan-Armenia	International war (Nagorno-Karabakh)	1990	1994	3	10000
Azerbaijan	Ethnic War (Nagorno-Karabakh)	1988	1997	3	15000
Bhutan	Rebellion and forced repatriation of Lhotshampas (ethnic-Nepalese), EV	1991	1993	2	1200
Kyrgyzstan	Ethnic violence (Kyrgyz; Uzbeks, following ouster of Bakiyev)	2010	*	2	600
Laos	Civil war	1960	1973	3	25000
Laos	Civil violence (rebel Lao and Hmong)	1975	1990	2	10000
Nepal	Civil war (UPF "People's War")	1996	2006	2	8000
Tajikistan	Civil warfare, CW	1992	1998	3	25000
<b>Africa</b>					
Burundi	Ethnic violence (failed coup; Hutu/Tutsi)	1965	*	2	5000
Burundi	Ethnic violence (Hutus target Tutsis)	1972	*	2	2000
Burundi	Repression of Hutus, EW	1972	1973	4	100000
Burundi	Ethnic violence (Tutsis against Hutus)	1988	*	3	10000

### International War and Ethnic War and Violence Episodes (1946-2016)

Landlocked Nations Directly Involved	Brief Description	Beginning	End	Magnitude	Deaths
Burundi	Civil violence	1991	*	1	1000
Burundi	Ethnic warfare (Tutsis against Hutus), EW	1993	2005	4	100000
Burundi	Government forces target opposition in dispute over President Nkurunziza's "election" to a third term, CV	2015	2016+	1	800
Burundi-Rwanda	International violence	1962	1964	1	1500
Central African Rep.	Civil violence (attacks by Bozize loyalists; coup), CV	2001	2003	1	1000
Central African Republic	APRD, UFDR, and Seleka rebels and "anti-balaka" (Christian) militias, EW	2005	2016+	3	16000
Chad	Civil war	1965	1994	4	75000
Chad	Anti-Deby regime: United Front for Democratic Change, Union of Forces for Democracy and Development and others, CW	2005	2010	1	2000
Chad	Communal fighting between Toroboro ("black" sedentary farmer) and Janjawid ("arab" pastoralist) militias, EV	2006	2010	2	5000
Ethiopia	Eritrean separatists, EV	1962	1973	1	2000
Ethiopia	Ogaden clashes, IV	1964	*	1	2000
Ethiopia	Ethnic war (Oromo separatists), EW	1999	2000	1	2000
Ethiopia	Somali and Oromo militants in Ogaden region, EV	2007	2016+	1	3500
Ethiopia-Eritrea	Interstate war, IW	1998	2000	5	100000
Ethiopia-Uganda	"Ogaden War" ethnic violence (Somalis), EW	1977	1979	2	10000
Ethiopia-Zimbabwe	Ethnic warfare (Eritreans and others), EW	1974	1991	6	750000
Mali	Ethnic violence (Tuareg)	1990	1995	1	1000
Mali	Islamist Ansar Dine and ethnic-Tuareg "Azawad" separatists, CV	2012	2016+	1	1750
Niger	Ethnic violence (Azawad and Toubou)	1990	1997	1	1000
Rwanda	PARMEHUTU overthrow of Tutsi monarchy; repression of Tutsis, EW	1959	1966	3	75000
Rwanda	Ethnic warfare (Tutsis v Hutu regime), EW	1990	1994	3	15000
Rwanda	Ethnic violence (Hutus target Tutsis), EW	1994	*	7	500000

### International War and Ethnic War and Violence Episodes (1946-2016)

Landlocked Nations Directly Involved	Brief Description	Beginning	End	Magnitude	Deaths
Rwanda	Ethnic warfare (Hutus vs Tutsi regime), EW	1994	1998	3	15000
Rwanda	Ethnic war (attacks by Hutu guerillas), EW	2001	*	1	2500
Rwanda	Direct Intervention in DR Congo civil war, IV	1996	2002	2	3500
South Sudan	Communal violence in south: Lou Nuer and Murle; rebel militias, EV	2009	2016+	1	3500
South Sudan	Rebellion by ethnic Nuer supporters of Reik Machar leads to war with ethnic Dinka supporters of President Salva Kiir, EW	2013	2016+	4	40000
Uganda	Ethnic violence (Buganda), EW	1966	*	1	2000
Uganda	Ethnic warfare (Idi Amin regime), EW	1971	1978	5	250000
Uganda	Repression of dissidents, CW	1981	1986	4	100000
Uganda	Ethnic violence (Lord's Resistance Army: Langi and Acholi)	1986	2006	2	16000
Uganda	Direct Intervention in DR Congo civil war, IV	1996	2002	1	1200
Zambia	Civil violence	1964	*	1	1000
Zimbabwe	Ethnic violence (ZANU/ZAPU v Whites)	1972	1979	3	20000
Zimbabwe	Ethnic violence (Ndebele)	1981	1987	2	3000

Notes:

(1) Magnitude: Magnitude of societal-systemic impact; CV: Civil Violence; CW: Civil War; EV: Ethnic Violence; EW: Ethnic War; IV: International Violence; IW: International War

(2) Landlocked Countries excluded from this table imply that no direct involvement in national or international war/violence is reported.

Source: *MAJOR EPISODES OF POLITICAL VIOLENCE (MEPV) AND CONFLICT REGIONS, 1946-2016*

*Monty G. Marshall, Center for Systemic Peace <www.systemicpeace.org> Last Updated, July 25, 2017*

## Appendix H: Matrix of Coup and Non-Coup Events in Landlocked Countries (1946-2016)

Occurrence of Coup and Non-Coup Events by Country per Year										
Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
<b>Europe</b>										
Belarus	1995	0	0	0	0	1	0	0	0	0
Belarus	1998	0	0	0	1	0	0	0	0	0
Hungary	1946	0	0	0	1	0	0	0	0	0
Hungary	1947	0	0	0	1	0	0	0	0	0
Hungary	1949	0	0	0	1	0	0	0	0	0
Moldova	2006	0	0	0	1	0	0	0	0	0
<b>Latin America</b>										
Bolivia	1946	0	0	0	0	0	0	1	0	0
Bolivia	1951	0	0	0	0	1	0	0	0	0
Bolivia	1952	0	0	1	0	0	0	1	0	0
Bolivia	1953	0	1	0	0	0	0	0	0	0
Bolivia	1964	1	0	0	0	0	0	0	0	0
Bolivia	1968	0	1	0	0	0	0	0	0	0
Bolivia	1969	1	0	0	0	0	0	0	0	0
Bolivia	1970	1	1	0	0	0	0	0	0	0
Bolivia	1971	1	1	0	0	0	0	0	0	0
Bolivia	1974	0	2	0	1	0	0	0	0	0
Bolivia	1978	2	0	2	1	0	0	0	0	0
Bolivia	1979	1	0	0	0	0	0	0	0	0
Bolivia	1980	1	0	0	0	0	0	0	0	0
Bolivia	1981	0	2	0	0	0	0	0	0	0
Bolivia	1982	0	0	0	0	0	0	0	0	1
Bolivia	1984	0	1	0	1	0	0	0	0	0

### Occurrence of Coup and Non-Coup Events by Country per Year

Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
Bolivia	1985	0	0	1	0	0	0	0	0	0
Bolivia	2005	0	0	0	0	0	0	0	0	1
Bolivia	2009	0	0	1	0	0	0	0	0	0
Paraguay	1948	2	1	0	1	0	0	0	0	0
Paraguay	1949	1	0	0	0	0	0	0	0	0
Paraguay	1954	1	0	0	0	0	0	0	0	0
Paraguay	1955	0	0	1	0	0	0	0	0	0
Paraguay	1989	1	0	0	0	0	0	0	0	0
Paraguay	1996	0	1	0	0	0	0	0	0	0
Paraguay	2000	0	1	0	0	0	0	0	0	0
Paraguay	2012	0	0	0	0	0	0	0	0	1
<b>Asia</b>										
Afghanistan	1973	1	3	0	0	0	0	0	0	0
Afghanistan	1978	1	0	0	0	0	0	0	0	0
Afghanistan	1979	2	1	0	0	0	0	0	0	0
Afghanistan	1987	0	0	0	1	0	0	0	0	0
Afghanistan	1990	0	1	0	0	0	0	0	0	0
Afghanistan	1992	1	0	0	0	0	0	0	0	0
Afghanistan	1996	0	0	0	0	0	0	1	0	0
Afghanistan	2001	0	0	0	0	0	1	0	0	0
Afghanistan	2002	0	1	0	0	0	0	0	0	0
Armenia	1995	0	1	0	0	1	0	0	0	0
Armenia	1999	0	1	0	0	0	0	0	0	0
Azerbaijan	1993	0	0	0	0	1	0	0	0	1
Azerbaijan	1994	0	1	0	0	0	0	0	0	0
Azerbaijan	1995	0	2	0	0	0	0	0	0	0

### Occurrence of Coup and Non-Coup Events by Country per Year

Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
Azerbaijan	1996	0	1	0	0	0	0	0	0	0
Azerbaijan	1997	0	0	0	1	0	0	0	0	0
Azerbaijan	1998	0	0	0	1	0	0	0	0	0
Azerbaijan	2000	0	0	0	1	0	0	0	0	0
Azerbaijan	2005	0	0	0	1	0	0	0	0	0
Azerbaijan	2011	0	0	0	1	0	0	0	0	0
Kyrgyzstan	2003	0	1	0	0	0	0	0	0	0
Kyrgyzstan	2005	0	0	0	0	0	0	0	0	1
Kyrgyzstan	2010	0	0	0	0	0	0	0	0	1
Kyrgyzstan	2012	0	0	0	1	0	0	0	0	0
Kazakhstan	2007	0	0	0	1	0	0	0	0	0
Laos	1960	1	0	0	0	0	0	0	0	0
Laos	1964	1	0	0	0	0	0	0	0	0
Laos	1965	0	1	0	0	0	0	0	0	0
Laos	1966	0	1	0	0	0	0	0	0	0
Laos	1973	0	1	0	0	0	0	0	0	0
Laos	1990	0	0	0	1	0	0	0	0	0
Laos	2007	0	0	1	0	0	0	0	0	0
Nepal	1950	0	0	1	0	0	0	0	0	0
Nepal	1960	1	2	0	0	0	0	0	0	0
Nepal	2001	0	0	0	0	0	0	0	1	0
Nepal	2002	1	0	0	0	0	0	0	0	0
Nepal	2006	0	0	0	0	0	0	0	0	1
Tajikistan	1992	0	1	0	0	0	0	0	0	1
Turkmenistan	2002	0	0	0	1	0	0	0	0	0
<b>Africa</b>										

### Occurrence of Coup and Non-Coup Events by Country per Year

Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
Burkina Faso	1966	1	0	0	0	0	0	0	0	0
Burkina Faso	1980	1	0	0	0	0	0	0	0	0
Burkina Faso	1982	1	0	0	0	0	0	0	0	0
Burkina Faso	1983	1	0	0	0	0	0	0	0	0
Burkina Faso	1987	1	0	0	0	0	0	0	1	0
Burkina Faso	2003	0	0	0	1	0	0	0	0	0
Burkina Faso	2014	0	0	0	0	0	0	0	0	1
Burkina Faso	2015	0	1	0	0	0	0	0	0	0
Burundi	1965	0	1	0	0	0	0	0	0	0
Burundi	1966	1	1	0	0	0	0	0	0	1
Burundi	1972	0	0	0	1	0	0	0	0	0
Burundi	1976	1	0	0	0	0	0	0	0	0
Burundi	1987	1	0	0	0	0	0	0	0	0
Burundi	1992	0	1	0	0	0	0	0	0	0
Burundi	1993	0	2	0	0	0	0	0	1	0
Burundi	1994	0	1	0	0	0	0	0	1	0
Burundi	1996	1	0	0	0	0	0	0	0	0
Burundi	2001	0	2	0	0	0	0	0	0	0
Burundi	2006	0	0	1	1	0	0	0	0	0
Burundi	2010	0	0	1	0	0	0	0	0	0
Burundi	2015	0	1	0	0	1	0	0	0	0
Central African Republic	1966	1	0	0	0	0	0	0	0	0
Central African Republic	1969	0	1	0	0	0	0	0	0	0
Central African Republic	1974	0	1	0	0	0	0	0	0	0

### Occurrence of Coup and Non-Coup Events by Country per Year

Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
Central African Republic	1979	1	0	0	0	0	0	0	0	0
Central African Republic	1981	1	0	0	0	0	0	0	0	0
Central African Republic	1983	0	1	0	0	0	0	0	0	0
Central African Republic	1996	0	1	0	0	0	0	0	0	0
Central African Republic	2001	0	1	0	0	0	0	0	0	0
Central African Republic	2003	1	0	0	0	0	0	0	0	0
Central African Republic	2010	0	0	0	1	0	0	0	0	0
Central African Republic	2013	0	1	0	0	0	0	1	0	0
Central African Republic	2014	0	0	0	0	0	0	0	0	1
Chad	1963	0	0	1	0	0	0	0	0	0
Chad	1965	0	0	1	0	0	0	0	0	0
Chad	1971	0	1	0	0	0	0	0	0	0
Chad	1975	1	0	0	0	0	0	0	0	0
Chad	1976	0	1	0	0	0	0	0	0	0
Chad	1977	0	1	0	0	0	0	0	0	0
Chad	1982	1	0	0	0	0	0	0	0	0
Chad	1989	0	1	0	0	0	0	0	0	0
Chad	1990	1	0	0	0	0	0	0	0	0
Chad	1991	0	1	0	0	0	0	0	0	0
Chad	1992	0	2	0	0	0	0	0	0	0
Chad	1993	0	1	0	0	0	0	0	0	0

### Occurrence of Coup and Non-Coup Events by Country per Year

Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
Chad	2006	0	1	1	0	0	0	0	0	0
Chad	2008	0	1	0	0	0	0	0	0	0
Chad	2013	0	0	1	0	0	0	0	0	0
Ethiopia	1960	0	1	0	0	0	0	0	0	0
Ethiopia	1974	2	0	0	0	0	0	0	0	0
Ethiopia	1977	1	1	0	0	0	0	0	0	0
Ethiopia	1989	0	1	0	0	0	0	0	0	0
Ethiopia	1991	0	0	0	0	0	0	1	0	0
Ethiopia	2009	0	0	1	0	0	0	0	0	0
Lesotho	1970	1	0	0	0	0	0	0	0	0
Lesotho	1974	0	1	0	0	0	0	0	0	0
Lesotho	1983	0	0	0	1	0	0	0	0	0
Lesotho	1986	1	0	0	0	0	0	0	0	0
Lesotho	1990	0	0	1	0	0	0	0	0	1
Lesotho	1991	1	0	0	0	0	0	0	0	0
Lesotho	1994	0	1	0	0	0	0	0	0	0
Lesotho	1996	0	0	1	0	0	0	0	0	0
Lesotho	2007	0	0	0	1	0	0	0	0	0
Lesotho	2009	0	1	0	0	0	0	0	0	0
Lesotho	2014	0	1	0	0	0	0	0	0	0
Malawi	2001	0	0	0	1	0	0	0	0	0
Malawi	2008	0	0	1	0	0	0	0	0	0
Malawi	2012	0	0	1	0	0	0	0	0	0
Mali	1968	1	0	0	0	0	0	0	0	0
Mali	1969	0	1	0	0	0	0	0	0	0
Mali	1971	0	0	0	1	0	0	0	0	0

### Occurrence of Coup and Non-Coup Events by Country per Year

Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
Mali	1978	0	1	0	0	0	0	0	0	0
Mali	1980	0	0	1	0	0	0	0	0	0
Mali	1991	0	1	0	0	0	0	0	0	1
Mali	1993	0	0	1	0	0	0	0	0	0
Mali	1996	0	0	1	0	0	0	0	0	0
Mali	2012	1	1	0	0	0	0	0	0	0
Niger	1974	1	0	0	0	0	0	0	0	0
Niger	1975	0	0	1	0	0	0	0	0	0
Niger	1976	0	0	1	0	0	0	0	0	0
Niger	1983	0	1	0	0	0	0	0	0	0
Niger	1996	1	0	0	0	0	0	0	0	0
Niger	1998	0	0	0	1	0	0	0	0	0
Niger	2009	0	0	0	0	1	0	0	0	0
Niger	2010	1	0	1	0	0	0	0	0	0
Niger	2011	0	0	1	0	0	0	0	0	0
Niger	2015	0	0	1	0	0	0	0	0	0
Rwanda	1973	1	0	0	0	0	0	0	0	0
Rwanda	1980	0	0	0	1	0	0	0	0	0
Rwanda	1994	0	0	0	0	0	0	1	1	0
South Sudan	2013	0	1	0	0	0	0	0	0	0
Swaziland	1973	0	0	0	0	1	0	0	0	0
Swaziland	1983	0	0	1	1	0	0	0	0	0
Swaziland	1984	0	1	1	0	0	0	0	0	0
Uganda	1966	0	0	0	0	1	0	0	0	0
Uganda	1971	1	0	0	0	0	0	0	0	0
Uganda	1974	0	1	0	0	0	0	0	0	0

### Occurrence of Coup and Non-Coup Events by Country per Year

Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
Uganda	1975	0	1	0	0	0	0	0	0	0
Uganda	1979	0	0	0	0	0	1	0	0	0
Uganda	1980	1	0	0	0	0	0	0	0	0
Uganda	1985	1	0	0	0	0	0	0	0	0
Uganda	1986	0	0	0	3	0	0	1	0	0
Uganda	1987	0	0	0	1	0	0	0	0	0
Uganda	2013	0	0	0	1	0	0	0	0	0
Uganda	2016	0	0	0	1	0	0	0	0	0
Zambia	1968	0	0	0	0	1	0	0	0	0
Zambia	1980	0	1	0	0	0	0	0	0	0
Zambia	1981	0	0	1	0	0	0	0	0	0
Zambia	1988	0	0	0	1	0	0	0	0	0
Zambia	1990	0	1	0	0	0	0	0	0	0
Zambia	1993	0	0	0	1	0	0	0	0	0
Zambia	1996	0	0	0	0	1	0	0	0	0
Zambia	1997	0	1	0	0	0	0	0	0	0
Zimbabwe	1987	0	0	0	0	1	0	0	0	0
Zimbabwe	1995	0	0	0	1	0	0	0	0	0
Zimbabwe	1998	0	0	0	1	0	0	0	0	0
Zimbabwe	2001	0	0	0	1	0	0	0	0	0
Zimbabwe	2006	0	0	0	1	0	0	0	0	0
Zimbabwe	2007	0	0	0	1	0	0	0	0	0
Zimbabwe	2014	0	0	0	1	0	0	0	0	0

**Source:** Center for Systemic Peace, Coups d'état, 1946-2016, <http://www.systemicpeace.org/inscrdata.html>

**CAR:** Central African Republic

**scoup1:** Successful Coups: Number of successful coups d'état that occurred in the year of record

**atcoup2:** Attempted Coups: Number of attempted (but ultimately unsuccessful) coups d'état that occurred in the year of record

**pcoup3:** Coup Plots: Number of (thwarted) coup plots that were reported by government officials during the year of record

### Occurrence of Coup and Non-Coup Events by Country per Year

Country	year	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	rebutex	assassex	resignex
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**apcoup4:** Alleged Coup Plots: Number of alleged coup plots announced by government officials during the year of record (allegations of coup plots usually involve less formal adjudication procedures and are often used by authorities to justify repression of opposition leaders).

**agcoup:** Auto-Coups: Indicator of the occurrence of subversion of the constitutional order by a ruling (usually elected) executive and the imposition of an autocratic regime during the year of record (often referred to as a presidential or self -coup or by the Spanish term: autogolpe)

**foroutex:** Ouster of Leadership by Foreign Forces: Indicator of the forced ouster of a ruling executive as a direct result of the invasion of the country by foreign armed forces (which may partner with local militias but take the lead in unseating the country's leadership)

**rebutex:** Ouster of Leadership by Rebel Forces: Indicator of the forced ouster of a ruling executive as a direct result of armed action by rebel forces fighting against forces loyal to the regime (rebel leaders then assume regime leadership often resulting in a political, or socio-political,revolution)

**assassex:** Assassination of Executive: Indicator of the assassination of the ruling executive during the year of record (assassinations are perpetrated by persons acting outside the ruling elite and do not result in a substantive change in regime leadership)

**resignex:** Resignation of Executive Due to Poor Performance and/or Loss of Authority: Indicator of the coerced resignation of the ruling executive due to poor performance and accompanied by increasing public discontent and popular demonstrations calling for the ouster of the executive leadership (including impeachment proceedings which may or may not be successful in forcing executive removal); like assassinations, coerced resignations of an executive do not result in a substantive change in regime leadership (although they may lead to new elections)

**Note:** Landlocked countries absent from this matrix imply that coups and non-coup events are not reported.

## Appendix I: Total Number of Coup and Non-Coup Events in Landlocked Countries (1946-2016)

### Total Number of Coup and Non-Coup Events (1946-2016)

Region/Country	Coup Events				Non-Coup Events					
	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	reboutex	assassex	resignex	
<b>Europe</b>										
<b>Belarus (1995-1998)</b>	0	0	0	1	1	0	0	0	0	
<b>Hungary (1946-1949)</b>	0	0	0	3	0	0	0	0	0	
<b>Moldova (2006)</b>	0	0	0	1	0	0	0	0	0	
<b>Latin America</b>										
<b>Bolivia (1946-2009)</b>	8	9	4	3	1	0	2	0	2	
<b>Paraguay (1948-2012)</b>	5	3	1	1	0	0	0	0	1	
<b>Asia</b>										
<b>Afghanistan (1973-2002)</b>	5	6	0	1	0	1	1	0	0	
<b>Armenia (1995-1999)</b>	0	2	0	0	1	0	0	0	0	
<b>Azerbaijan (1993-2011)</b>	0	4	0	5	1	0	0	0	1	
<b>Kyrgyzstan (2003-2012)</b>	0	1	0	1	0	0	0	0	2	
<b>Kazakhstan (2007)</b>	0	0	0	1	0	0	0	0	0	
<b>Laos (1960-2007)</b>	2	3	1	1	0	0	0	0	0	
<b>Nepal (1950-2006)</b>	2	2	1	0	0	0	0	1	1	
<b>Tajikistan (1992)</b>	0	1	0	0	0	0	0	0	1	

**Total Number of Coup and Non-Coup Events (1946-2016)**

Region/Country	Coup Events				Non-Coup Events					
	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	reboutex	assassex	resignex	
<b>Turkmenistan (2002)</b>	0	0	0	1	0	0	0	0	0	
<b>Africa</b>										
<b>Burkina Faso (1966-2015)</b>	5	1	0	1	0	0	0	1	1	
<b>Burundi (1965-2015)</b>	4	9	2	2	1	0	0	2	1	
<b>CAR (1969-2014)</b>	4	6	0	1	0	0	1	0	1	
<b>Chad (1963-2013)</b>	3	10	4	0	0	0	0	0	0	
<b>Ethiopia (1960-2009)</b>	3	3	1	0	0	0	1	0	0	
<b>Lesotho (1970-2014)</b>	3	4	2	2	0	0	0	0	1	
<b>Malawi (2001-2012)</b>	0	0	2	1	0	0	0	0	0	
<b>Mali (1968-2012)</b>	2	4	3	1	0	0	0	0	1	
<b>Niger (1974-2015)</b>	3	1	5	1	1	0	0	0	0	
<b>Rwanda (1973-1994)</b>	1	0	0	1	0	0	1	1	0	
<b>South Sudan (2013)</b>	0	1	0	0	0	0	0	0	0	
<b>Swaziland (1973-1984)</b>	0	1	2	1	1	0	0	0	0	
<b>Uganda (1966-2016)</b>	3	2	0	6	1	1	1	0	0	

**Total Number of Coup and Non-Coup Events (1946-2016)**

Region/Country	Coup Events				Non-Coup Events				
	scoup1	atcoup2	pcoup3	apcoup4	agcoup	foroutex	reboutex	assassex	resignex
Zambia (1968-1997)	0	3	1	2	2	0	0	0	0
Zimbabwe (1987-2014)	0	0	0	6	1	0	0	0	0

**CAR:** Central African Republic

**scoup1:** Successful Coups: Number of successful coups d'état that occurred in the year of record

**atcoup2:** Attempted Coups: Number of attempted (but ultimately unsuccessful) coups d'état that occurred in the year of record

**pcoup3:** Coup Plots: Number of (thwarted) coup plots that were reported by government officials during the year of record

**apcoup4:** Alleged Coup Plots: Number of alleged coup plots announced by government officials during the year of record (allegations of coup plots usually involve less formal adjudication procedures and are often used by authorities to justify repression of opposition leaders).

**agcoup:** Auto-Coups: Indicator of the occurrence of subversion of the constitutional order by a ruling (usually elected) executive and the imposition of an autocratic regime during the year of record (often referred to as a presidential or self -coup or by the Spanish term: autogolpe)

**foroutex:** Ouster of Leadership by Foreign Forces: Indicator of the forced ouster of a ruling executive as a direct result of the invasion of the country by foreign armed forces (which may partner with local militias but take the lead in unseating the country's leadership)

**reboutex:** Ouster of Leadership by Rebel Forces: Indicator of the forced ouster of a ruling executive as a direct result of armed action by rebel forces fighting against forces loyal to the regime (rebel leaders then assume regime leadership often resulting in a political, or socio-political, revolution)

**assassex:** Assassination of Executive: Indicator of the assassination of the ruling executive during the year of record (assassinations are perpetrated by persons acting outside the ruling elite and do not result in a substantive change in regime leadership)

**resignex:** Resignation of Executive Due to Poor Performance and/or Loss of Authority: Indicator of the coerced resignation of the ruling executive due to poor performance and accompanied by increasing public discontent and popular demonstrations calling for the ouster of the executive leadership (including impeachment proceedings which may or may not be successful in forcing executive removal); like assassinations, coerced resignations of an executive do not result in a substantive change in regime leadership (although they may lead to new elections)

**Note:**

Landlocked countries absent from this table imply that coup and non-coup events not reported in this period.

**Source:** Center for Systemic Peace, *Coups d'état, 1946-2016*, <http://www.systemicpeace.org/inscrdata.html>

## Appendix J: Political Institutions Variable Scores across Landlocked Countries

Political Institutions Variable Scores							
Country	Status	Political Rights	Civil Liberties	Country	Status	Political Rights	Civil Liberties
		Rating	Rating			Rating	Rating
<b>European LLCs</b>				<b>African LLCs</b>			
Andorra	F	1.00	1.00	Botswana	F	3	2
Austria	F	1.00	1.00	Burkina Faso	PF	4	3
Belarus	NF	6.00	6.00	Burundi	NF	7	6
Czech Republic	F	1.00	1.00	CAR	NF	7	7
Hungary	F	3.00	2.00	Chad	NF	7	6
Kosovo	PF	3.00	4.00	Ethiopia	NF	7	6
Liechtenstein	F	2.00	1.00	Lesotho	PF	3	3
Luxembourg	F	1.00	1.00	Malawi	PF	3	3
Macedonia	PF	4.00	3.00	Mali	PF	5	4
Moldova	PF	3.00	3.00	Niger	PF	4	4
San Marino	F	1.00	1.00	Rwanda	NF	6	6
Serbia	F	3.00	2.00	South Sudan	NF	7	7
Switzerland	F	1.00	1.00	Swaziland	NF	7	6
Average	-	2.31	2.08	Uganda	PF	6	4
S.D.	-	1.55	1.55	Zambia	PF	4	4
Max.	-	6.00	6.00	Zimbabwe	NF	6	5
Min.	-	1.00	1.00	Average	-	5.38	4.75
<b>Latin American LLCs</b>				S.D.	-	1.63	1.57
Bolivia	PF	3.00	3.00	Max.	-	7.00	7.00
Paraguay	PF	3.00	3.00	Min.	-	3.00	2.00
Average	-	3.00	3.00				
S.D.	-	0.00	0.00				
Max.	-	3.00	3.00				
Min.	-	3.00	3.00				
<b>Asian LLCs</b>							
Afghanistan	NF	5.00	6.00				
Armenia	PF	5.00	4.00				
Azerbaijan	NF	7.00	6.00				
Bhutan	PF	3.00	4.00				

Kazakhstan	NF	7.00	5.00				
Kyrgyzstan	PF	5.00	5.00				
Laos	NF	7.00	6.00				
Mongolia	F	1.00	2.00				
Nepal	PF	3.00	4.00				
Tajikistan	NF	7.00	6.00				
Turkmenistan	NF	7.00	7.00				
Uzbekistan	NF	7.00	7.00				
Average	-	5.33	5.17				
S.D.	-	2.06	1.47				
Max.	-	7.00	7.00				
Min.	-	1.00	2.00				

Source: Freedom House; <https://freedomhouse.org/content/freedom-world-data-and-resources>  
Note: NF: Not Free; PF: Partly Free; and F: Free. Political and Civil Liberties Ratings: Each country is rated between 1 and 7, with 1 representing the greatest degree of freedom and 7 the smallest degree of freedom.

## Appendix K: Economic Institutions Variable Scores across Landlocked Countries, 2015 and 2019

Country	Overall Score		Property Rights		Judicial Effectiveness		Government Spending		Business Freedom		Trade Freedom		Investment Freedom	
<b>Europe LLCs</b>														
Austria	71	72	90	84	N/A	71	20	25	78	75	88	86	90	90
Belarus	50	58	20	55	N/A	52	55	41	72	75	81	76	20	30
Czech Rep.	73	74	75	75	N/A	48	41	52	68	72	88	86	80	80
Hungary	67	65	55	61	N/A	45	26	32	75	61	88	86	75	80
Liechtenstein	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	90	N/A	85	85
Luxembourg	73	76	90	83	N/A	72	42	47	71	69	88	86	95	95
Macedonia	67	71	35	65	N/A	61	66	70	79	80	86	82	60	65
Moldova	58	59	40	55	N/A	30	52	59	67	67	80	78	50	55
Serbia	60	64	45	50	N/A	45	27	45	58	73	78	77	75	70
Switzerland	81	82	90	85	N/A	82	65	65	78	75	90	87	85	85
Average	66.67	69	60	68.11	-	56	43.778	48.4	71.8	72	85.7	82.7	71.5	73.5
S.D.	9.367	8.04674	26.926	13.87	-	17	16.998	14.8	6.78	5.6	4.3729	4.5	22.61	19.44365
Max.	81	82	90	85	-	82	66	70	79	80	90	87	95	95
Min.	50	58	20	50	-	30	20	25	58	61	78	76	20	30
<b>Latin American LLCs</b>														
Bolivia	47	42	10	21	N/A	12	61	49	54	59	78	70	10	15
Paraguay	61	62	30	40	N/A	30	82	79	58	62	81	77	75	75
Average	54	52	20	30.5	-	21	71.5	64	56	61	79.5	73.5	42.5	45
S.D.	9.89	14.14	14.142	13.44	-	13	14.84	21.2	2.83	2.1	2.12	4.95	45.96	42.42
Max.	61	62	30	40	-	30	82	79	58	62	81	77	75	75
Min.	47	42	10	21	-	12	61	49	54	59	78	70	10	15
<b>Asian LLCs</b>														
Afghanistan	N/A	52	N/A	20	N/A	30	81	80	61	49	N/A	66	55	10
Armenia	67	68	20	57	N/A	46	83	79	83	78	85	81	75	75
Azerbaijan	61	65	20	59	N/A	53	60	60	75	70	76	75	55	60
Bhutan	57	63	60	63	N/A	55	60	72	62	69	49	79	20	20
Kazakhstan	63	65	25	59	N/A	56	85	84	74	74	79	80	40	50
Kyrgyz Rep.	61	62	20	50	N/A	28	53	54	74	73	80	79	60	60
Laos	51	57	15	39	N/A	43	87	85	60	60	59	82	30	35
Mongolia	59	55	30	48	N/A	24	36	63	68	66	75	76	50	50
Nepal	51	54	30	39	N/A	35	89	84	66	62	62	60	5	10
Tajikistan	53	56	20	48	N/A	52	82	65	65	67	75	74	25	25
Turkmenistan	41	48	5	32	N/A	30	94	92	30	30	80	76	0	10
Uzbekistan	47	53	15	50	N/A	34	67	67	73	73	70	63	0	10
Average	55.55	58.1667	23.636	47	-	41	73.083	73.8	65.9	64	71.818	74.3	34.58	34.58333

Country	Overall Score		Property Rights		Judicial Effectiveness		Government Spending		Business Freedom		Trade Freedom		Investment Freedom	
S.D.	7.699	6.24985	13.981	12.6	-	12	17.645	11.9	13.2	13	10.87	7.31	25.18	23.59298
Max.	67	68	60	63	-	56	94	92	83	78	85	82	75	75
Min.	41	48	5	20	-	24	36	54	30	30	49	60	0	10
<b>African LLCs</b>														
Botswana	70	70	70	58	N/A	46	62	66	67	69	72	84	70	65
Burkina Faso	59	59	25	49	N/A	43	80	80	50	52	68	65	65	65
Burundi	54	49	20	21	N/A	31	61	83	61	50	72	68	60	50
CAR	46	49	15	20	N/A	30	92	94	27	24	52	51	45	45
Chad	46	50	20	27	N/A	25	84	92	27	28	55	47	45	60
Ethiopia	52	54	30	33	N/A	41	91	90	56	49	64	61	20	35
Lesotho	50	53	35	42	N/A	46	0	33	55	53	65	81	45	55
Malawi	55	51	40	36	N/A	40	49	70	49	42	72	75	55	50
Mali	56	58	25	34	N/A	33	89	85	47	54	73	70	60	65
Niger	55	52	30	37	N/A	31	84	76	39	56	66	66	55	55
Rwanda	65	71	30	72	N/A	83	79	79	60	56	81	70	65	60
Uganda	60	60	25	42	N/A	39	89	89	43	46	77	75	60	55
Zambia	59	54	30	45	N/A	36	78	80	68	71	77	73	55	55
Zimbabwe	38	40	10	30	N/A	25	74	75	37	33	58	70	0	25
Average	54.64	55	28.929	39	-	39	72.286	78	49	49	68	68.3	50	52.85714
S.D.	8.168	8.24621	14.166	14.11	-	14	24.358	15.3	13.3	14	8.5844	10.2	19.01	11.55493
Max.	70	71	70	72	-	83	92	94	68	71	81	84	70	65
Min.	38	40	10	20	-	25	0	33	27	24	52	47	0	25

Source: Economic Freedom, Heritage Foundation 2019; <https://www.heritage.org/index/download>

Note: A score of 100 indicates more freedom and 0 means the opposite. Scores 80-100: Free (F); 70-79.9: Mostly Free (MoF); 60-69.9: Moderate Free (MdF); 50-59.9: Mostly Unfree (MoUF); 0-49.9: Repressed®; N/A: Not Available.

## Appendix L: Correlations between CSP Institutional Variables and GDP per capita

Correlations between Institutions and GDPpc (2011)								
	Democracy				Autocracy			
	Pearson	Spearman	Kendall's		Pearson	Spearman	Kendall's	
		Rank	Tau-a	Tau-b		Rank	Tau-a	Tau-b
<b>Europe</b>	0.56	0.52	0.26	0.41	-0.45	-0.59	-0.33	-0.44
	(0.000)	(0.000)	(0.000)		0.0001	(0.000)	(0.000)	
<b>Latin America</b>	0.78	0.71	0.47	0.54	-0.76	-0.73	-0.51	-0.56
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	
<b>Asia</b>	0.77	0.73	0.49	0.59	-0.78	-0.82	-0.6	-0.66
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	
<b>Africa</b>	-0.09	-0.086	-0.03	-0.03	-0.62	-0.68	-0.48	-0.5
	0.47	0.49	0.66		(0.000)	(0.000)	(0.000)	
	<b>Polity II</b>							
	Pearson	Spearman	Kendall's					
		Rank	Tau-a	Tau-b				
<b>Europe</b>	0.53	0.63	0.4	0.51				
	(0.000)	(0.000)	(0.000)					
<b>Latin America</b>	0.78	0.71	0.47	0.53				
	(0.000)	(0.000)	(0.000)					
<b>Asia</b>	0.67	0.6	0.42	0.46				
	(0.000)	(0.000)	(0.000)					
<b>Africa</b>	0.88	0.85	0.64	0.68				
	(0.000)	(0.000)	(0.000)					

Sources: Real GDP Per capita from Maddison Project, 2018; Institution indicators (Democracy, Autocracy and Polity II) from Center for Systemic Peace Polity IV Project, <http://www.systemicpeace.org/inscrdata.html>

## Appendix M: Correlations between FH Institutional Variables and GDP per capita

Correlations between Institutions and GDPpc								
	Political Rights				Civil Rights			
	Pearson	Spearman Rank	Kendall's		Pearson	Spearman Rank	Kendall's	
			Tau-a	Tau-b			Tau-a	Tau-b
<b>Europe</b>	-0.4941 (0.0014)	-0.5063 (0.0010)	-0.3509 (0.0016)	-0.3652	-0.6119 (0.000)	-0.6085 (0.000)	-0.4157 (0.0002)	-0.4352
<b>Latin America</b>	-0.4539 (0.0000)	-0.4212 (0.0076)	-0.2982 (0.0057)	-0.3345	-0.6338 (0.0000)	-0.5631 (0.0002)	-0.3765 (0.0002)	-0.4703
<b>Asia</b>	-0.4653 (0.0028)	-0.5806 (0.0001)	-0.4238 (0.0001)	-0.4538	-0.7102 (0.000)	-0.7359 (0.0000)	-0.5007 (0.0000)	-0.5192
<b>Africa</b>	-0.6408 (0.0000)	-0.6679 (0.0000)	-0.4831 (0.0000)	-0.4915	-0.6843 (0.0000)	-0.6736 (0.0000)	-0.4899 (0.0000)	-0.5008

Sources: Real GDP per capita from Maddison Project, 2018; Institution indicators (Political and Civil Rights) from Freedom House.

## Appendix N: Correlations between HF Institutions and GDP per capita

Correlations between Institutions and GDPpc								
	Property Rights				Freedom of Corruption			
Landlocked	Pearson	Spearman	Kendall's		Pearson	Spearman	Kendall's	
		Rank	Tau-a	Tau-b		Rank	Tau-a	Tau-b
<b>Europe</b>	-0.85	-0.87	-0.67	-0.70	-0.17	-0.41	-0.29	-0.29
	0.000	0.000	0.000		0.47	0.07	0.06	
<b>Latin America</b>	-0.69	-0.70	-0.47	-0.53	0.62	0.69	0.47	0.47
	0.0005	0.0004	0.0021		0.0028	0.0006	0.0033	
<b>Asia</b>	-0.63	-0.97	-0.86	-0.89	0.019	0.36	0.3	0.31
	0.0725	0	0		0.9343	0.1047	0.052	
<b>Africa</b>	-0.96	-0.99	-0.93	-0.95	0.56	0.51	0.49	0.5
	0.000	0.000	0.000		0.008	0.018	0.0019	
	Fiscal Freedom				Government Spending			
Landlocked	Pearson	Spearman	Kendall's		Pearson	Spearman	Kendall's	
		Rank	Tau-a	Tau-b		Rank	Tau-a	Tau-b
<b>Europe</b>	0.93	0.95	0.84	0.84	0.74	0.74	0.59	0.59
	0.000	0.000	0.000		0.0001	0.0001	0.0002	
<b>Latin America</b>	0.72	0.86	0.66	0.67	-0.69	-0.54	-0.38	-0.38
	0.0002	0.000	0.000		0.0005	0.012	0.01	
<b>Asia</b>	0.87	0.99	0.94	0.94	0.3	0.03	-0.019	-0.019
	0.000	0.000	0.000		0.19	0.89	0.92	
	0.87	0.91	0.8	0.8	-0.75	-0.71	-0.50	-0.50
<b>Africa</b>	0.000	0.000	0.000		0.0001	0.000	0.0019	
	Business Freedom				Trade Freedom			
Landlocked	Pearson	Spearman	Kendall's		Pearson	Spearman	Kendall's	
		Rank	Tau-a	Tau-b		Rank	Tau-a	Tau-b

Correlations between Institutions and GDPpc								
<b>Europe</b>	-0.19	-0.28	-0.14	-0.14	0.9	0.9	0.78	0.78
	0.4	0.21	0.4		0.000	0.000	0.000	
<b>Latin America</b>	0.013	0.38	0.17	0.18	0.74	0.8	0.58	0.58
	0.95	0.09	0.29		0.0001	0	0.0003	
<b>Asia</b>	0.69	0.59	0.495	0.53	0.8	0.75	0.49	0.49
	0.0005	0.0051	0.0013		0.000	0.0001	0.0019	
<b>Africa</b>	-0.89	-0.78	-0.59	-0.60	0.92	0.93	0.75	0.75
	0.000	0.000	0.0002		0.000	0.000	0.000	
	<b>Investment Freedom</b>				<b>Financial Freedom</b>			
	<b>Pearson</b>	<b>Spearman</b>	<b>Kendall's</b>		<b>Pearson</b>	<b>Spearman</b>	<b>Kendall's</b>	
		<b>Rank</b>	<b>Tau-a</b>	<b>Tau-b</b>		<b>Rank</b>	<b>Tau-a</b>	<b>Tau-b</b>
<b>Europe</b>	0.45	0.49	0.38	0.4	-0.30	-0.41	-0.26	-0.27
	0.04	0.023	0.01		0.18	0.06	0.1	
<b>Latin America</b>	-0.69	-0.72	-0.45	-0.50	-0.60	-0.58	-0.40	-0.47
	0.0005	0.0003	0.0034		0.0041	0.0062	0.007	
<b>Asia</b>	-0.17	-0.018	0.0048	0.0048	0.35	0.42	0.24	0.25
	0.461	0.94	1		0.125	0.06	0.12	
	-0.27	-0.25	-0.21	-0.22	-0.56	-0.66	-0.50	-0.51
<b>Africa</b>	0.24	0.275	0.182		0.008	0.0012	0.0017	
Sources: Institution indicators from Heritage Foundation: <a href="https://www.heritage.org/index/explore">https://www.heritage.org/index/explore</a> ; GDPpc from World Development Indicators.								

## Appendix O: Summary of Relationship between GDPpc and Institutional Variables

<b>Relationship between GDPpc and Institutional Variables: Summary</b>					
	<b>Democracy</b>	<b>Autocracy</b>	<b>Polity II</b>	<b>Political Rights</b>	<b>Civil Rights</b>
Europe	Positive	Negative	Positive	Negative	Negative
Latin America	Positive	Negative	Positive	Negative	Negative
Asia	Positive	Negative	Positive	Negative	Negative
Africa	Unidentified	Negative	Positive	Negative	Negative
	<b>Property Rights</b>	<b>Freedom of Corruption</b>	<b>Fiscal Freedom</b>	<b>Government Spending</b>	<b>Business Freedom</b>
Europe	Negative	Unidentified	Positive	Positive	Unidentified
Latin America	Negative	Positive	Positive	Negative	Unidentified
Asia	Negative	Unidentified	Positive	Unidentified	Positive
Africa	Negative	Positive	Positive	Negative	Negative
	<b>Trade Freedom</b>	<b>Investment Freedom</b>	<b>Financial freedom</b>		
Europe	Positive	Positive	Unidentified		
Latin America	Positive	Negative	Negative		
Asia	Positive	Unidentified	Unidentified		
Africa	Positive	Unidentified	Negative		
<p>Note: The correlation coefficient is considered statistically significant for a 5% level of significance. Unidentified means insufficient evidence to conclude on the significance of the linear relationship.</p>					

## **Appendix P: Institutional Variables – Definitions and Additional Information**

**Political rights:** Measured on a 1-7 scale. One means the country enjoys a wide range of political rights including free and fair elections. There is majority ruling in the country and minorities are well represented in politics and government.

**Civil rights:** Measured on a 1-7 scale. One means a wide range of civil rights, including freedoms of expression, assembly, association, education, and religion, as well as a fair legal system that ensures the rule of law, independent judiciary, free economic activity, and equal opportunities for all, including women and minority groups.

**Democracy (Institutionalized democracy):** Conceived as three essential, interdependent elements. First, the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders. Second, the existence of institutionalized constraints on the exercise of power by the executive. Finally, the guarantee of civil liberties to all citizens in their daily lives and acts of political participation.

**Autocracy (Institutionalized autocracy):** Defined operationally in terms of the presence of a distinctive set of political characteristics, based on the competitiveness of political participation, the regulation of participation, the openness and competitiveness of executive recruitment and constraints on chief executive.

**Polity II:** Modified version of the Polity variable (which subtracts Autocracy from Democracy) by fixing standardized authority scores.

**Property Rights:** Assesses the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively.

**Freedom of Corruption:** The score for this component is derived by averaging the scores of six sub-factors weighted equally: Public trust in politicians, Irregular payments and bribes, Transparency of government policymaking, Absence of corruption, Perceptions of corruption, and Governmental and civil service transparency.

**Government spending:** The government spending component captures the burden imposed by government expenditures, which includes consumption by the state and all transfer payments related to various entitlement programs.

**Fiscal freedom:** The score for the fiscal health component is based on two sub-factors: 80 percent of score from average deficits as a percentage of GDP in the most recent three years and 20 percent of score for debt as a percentage of GDP.

**Business freedom:** The business freedom component measures the extent to which the regulatory and infrastructure environments constrain the efficient operation of businesses.

**Trade freedom:** A composite measure of the extent of tariff and nontariff barriers that affect imports and exports of goods and services.

**Investment Freedom:** Absence of constraints to the flow of investment capital. Deductions from the score of 100 are made for a variety of investment restrictions: National treatment of foreign investment, Foreign investment code, Restrictions on land ownership, Sectoral investment restrictions, Expropriation of investments without fair compensation, Foreign exchange controls, and Capital controls.

**Financial freedom:** This index scores an economy's financial freedom in five broad areas: Extent of government regulation of financial services, Degree of state intervention in banks and other financial firms through direct and indirect ownership, Government influence on the allocation of credit, Extent of financial and capital market development, and Openness to foreign competition.

*Sources:*

**Center for Systemic Peace:** Democracy, Autocracy and Polity II

**Freedom House:** Political Rights, Civil Rights

**Heritage Foundation:** Property Rights, Freedom of Corruption, Government spending, Fiscal freedom, Business freedom, Trade freedom, Investment Freedom, Financial freedom

## Appendix Q: Income Group Classification of Landlocked Countries (2013)

Country	2013	WB Classification
<b>Asia</b>		
Afghanistan	690	LIE
Nepal	730	LIE
Tajikistan	990	LIE
Kyrgyz Republic	1210	LMIE
Lao PDR	1450	LMIE
Uzbekistan	1880	LMIE
Bhutan	2330	LMIE
Mongolia	3770	LMIE
Armenia	3800	LMIE
Turkmenistan	6880	UMIE
Kazakhstan	11550	UMIE
<b>Europe</b>		
Moldova	2470	LMIE
Macedonia, FYR	4870	UMIE
Belarus	6730	UMIE
Azerbaijan	7350	UMIE
Hungary	13260	HIE
Slovak Republic	17810	HIE
Czech Republic	18950	HIE
Andorra	43110 (2008)	HIE
Austria	50430	HIE
San Marino	51470 (2008)	HIE

Luxembourg	69900	HIE
Switzerland	90760	HIE
Liechtenstein	136770 (2009)	HIE
Vatican City	0	
<b>Africa</b>		
Botswana	7770	LMIE
Burkina Faso	670	LIE
Burundi	260	LIE
Malawi	270	LIE
Central African Republic	320	LIE
Niger	400	LIE
Ethiopia	470	LIE
Uganda	550	LIE
Rwanda	630	LIE
Mali	670	LIE
Zimbabwe	860	LIE
Chad	1020	LIE
Lesotho	1500	LMIE
Zambia	1810	LMIE
Swaziland	2990	LMIE
<b>Latin America</b>		
Bolivia	2550	LMIE
Paraguay	4010	LMIE

**Low Income Economies (LIE): \$ 1045 or Less**

**Lower Middle Income Economies (LMIE): \$ 1046-\$4125**

**Upper Middle-Income Economies (UMIE): \$ 4126-\$12745**

**High Income Economies (HIE): \$12746 or More**

*Source: World Bank Development Indicators (GNI Per Capita)*