Essays on Institutions and International Trade

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Abstract

The Thesis analyses the impact that humanly devised institutions, defined as "formal and informal constraints on political, economic, and social interactions"[1], have on international trade and the patterns comparative advantage. The key assumption of the Thesis is that although institutions impact on the whole economy they may influence some sectors more than others. Industry's dependence on institutions is a technological feature of production. Hence, for example, industries that require a large number of intermediate inputs for production will be more dependent on the quality of contract enforcement regulation for their growth. The Thesis analyses 4 different sub-components of institutional quality: contract enforcement, financial development, property rights and labour market institutions. The Thesis' hypotheses regarding each of these sub-components are as follows:

1. Countries with more efficient contract enforcement regulations will specialize (have a comparative advantage) in more complex sectors that depend on contracts with suppliers/producers for their growth.
2. Countries with more secure property rights will specialize in sectors that are more dependent on intangible assets for production.
3. Countries with higher financial development will have a comparative advantage in sectors that are more dependent on external finance for their growth.
4. Countries with more flexible labour markets will specialize in more volatile industries.

In order to test these assumptions we construct three econometric models (Chapters 4-6). In Chapter 4 we assess how contract enforcement regulations, financial development, property rights and labour market institutions impact on trade volumes using a well-known gravity model. In Chapter 5 we test whether these sub-components have an impact on growth of value-added at industry level. Finally, in chapter 6 the impact on firms' productivity is tested. The results show that contract enforcement regulations and financial development affect countries' comparative advantage by affecting countries trade flows, value-added and productivity in a way consistent with the hypothesis. The results regarding the other two institutional sub-components are mixed but we do find some evidence the countries with more secure property rights export more and have higher value-added growth in sectors that are more dependent on intangible assets. These results are robust to different specifications. Using a novel set of instrumental variables we show that causality runs from institutions to trade, value-added and productivity rather than the reverse.

We supplement the empirical evidence with a case-study of Lesotho's textiles and garment industry and also find some evidence that this export-oriented industry emerged in Lesotho at least partly due to this country's good institutions that are better than its African competitors.

From a policy perspective our results imply that institutional and regulatory reform - especially in enforcement of contracts and financial sector regulations - may enhance the capacity of poor countries to move up to specialization into higher-valued products and to reap benefits from international integration.

[1] North, D. (1990). *Institutions, Institutional Change and Economic Performance*, New York: Cambridge University Press.

Declaration

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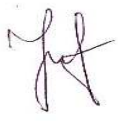
Signed: Tomasz Iwanow 

List of Abbreviations

2SLS - Two-Stage-Least-Squares
AGOA - African Growth and Opportunity Act
ANC - African National Congress
BCP - Basotho Congress Party
BNP - Basotho National Party
CEPII - Centre d'Etudes Prospectives et d'Informations Internationales (France)
CET - Common External Tariff
CES - Centre for Economic Studies
CIA - Central Intelligence Agency
EU - European Union
FDI - Foreign direct investment
DBIs - Doing Business Indictors
GDP - Gross Domestic Product
GoL - Government of Lesotho
GNI - Gross National Income
HIV - Human Immunodeficiency Virus
IMF - International Monetary Fund
ISIC - International Standard Industrial Classification
IPRI - International Property Rights Index
I-O - Input - Output
LDC - Least Developed Countries
LNDC - Lesotho National Development Corporation
NBER - National Bureau of Economic Research
NICs - Newly Industrialized Countries
PICS - Productivity and Investment Climate Survey
R&D - Research and Development
OECD - Organization for Economic Cooperation and Development
OLS - Ordinary Least Squares
SACU - Southern Africa Customs Union
SADC - Southern African Development Community
SIC - Standard Industrial Classification
SSA - Sub-Saharan Africa
TFP - Total Factor Productivity
UN - United Nations
UNCTAD - United National Conference on Trade and Development
UNCITRAL -United Nations Commission on International Trade Law
UNDP - United Nations Development Programme
UNIDO - United Nations Industrial Development Organization
US - United States
WEF - World Economic Forum
WTO - World Trade Organization

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Chapter 1: Introduction and Research Question

1.1 Introduction

> *How do we account for the persistence of poverty in the midst of plenty? If we know the sources of plenty, why don't poor countries simply adopt policies that make for plenty? ... We must create incentives for people to invest in more efficient technology, increase their skills, and organize efficient markets. Such incentives are embodied in institutions.*
>
> *Douglas North (2000; p. 1)*

> *It makes little sense for economists to discuss the process of exchange without specifying the institutional setting within which trading takes place.*
>
> *Ronald Coase (1992; p. 718)*

About 85 per cent of the world's population of 6.5 billion live in developing countries on one-fourth of the total world income; of them, 1.2 billion live on less than $1 a day (Todaro and Smith, 2009). Some developing countries, most notably China and India, are likely to catch up with developed economies and the Newly Industrialized Countries (NICs). On the other hand, a large group of countries that can be characterized as least developed have failed to tap the opportunities provided by the global economy and are quickly falling behind the rest of the world in terms of wealth, health, education and other development indicators. The debate on whether countries within the world economy are diverging or converging in terms of relative income per capita is on-going but between-country inequalities seem to be growing, indicating that many developing countries are lagging increasingly far behind both developed countries and some emerging economies.

Designing appropriate policy responses to the challenges of enhancing economic growth and alleviating poverty is therefore as important as ever. But as highlighted by Rodrik (2009), virtually every major development strategy of the past 50 years has fallen short of becoming a panacea. Policies implemented in several developing countries in the 1950s and 1960s – such as the dominant import-substitution strategy based on the assumption of declining terms of trade for primary products and the dynamic benefits of manufacturing (Prebisch, 1959), and the "Big Push" development planning that emphasized increasing returns to scale and sought to kick-start growth through large-scale investments as well as the planning model (Rosenstein-Rodan, 1943) – failed to yield results. The dominant Washington Consensus policies of the 1990s, intended to achieve macroeconomic stability, privatization and efficient liberalized markets, did

not lend enough attention to the dynamic forces that underlie growth and were also less successful than anticipated.

The current paradigm influencing recent reforms emphasizes the importance of improved institutions as one of the key factors enhancing economic growth. (For a detailed definition of institutions, please refer to section 1.2.) This framework is largely motivated by North's (1990) ideas on institutional development. The new established argument contends that "history and economic and political institutions have trumped other factors in determining economic success" (Birdsall et al., 2005). Recent empirical evidence points to "the primacy of institutions over integration and geography," indicating that among these three "deep" determinants of growth, institutions are the key in influencing long-run income levels (Rodrik, 2004; Jacob and Osang, 2006).[2]

To illustrate this argument, Easterly (2001) lists the expected answers to the economic growth problem that so far have not worked: "the list of failed panaceas includes foreign aid, foreign investment, education, family planning, big infrastructure projects, conditional aid, debt forgiveness and so on."[3] In his argument, none of these activities will have any impact on development unless countries meet the basic institutional requirements: protection of property rights, rule of law, efficient bureaucracy, corruption-free government and political constraint on executive. Actions to design and implement policies that enhance countries' institutional environments thus have genuine capacity to advance economic growth throughout the world.

This Thesis aims at improving the understanding of the ways in which institutions affect the process of industrialization, shape the international trade architecture and define countries' comparative advantage. By narrowing the analysis to focus on one of the various channels through which institutions affect economic performance, the Thesis aims to go beyond the standard understanding of institutions as key factor in economic growth. It aims to provide a more detailed assessment and identify which sub-components of institutional environment are crucial for enhancing exports and economic performance. In doing so, this analysis uses both econometric (quantitative) methods and qualitative techniques (manufacturing survey and interviews). This chapter introduces the research question through a detailed overview of these channels and defines relevant concepts.

[2] A recent study by Sachs (2003) reaches the opposite conclusion, arguing that geography is the key variable determining cross-country income disparity.
[3] Cited in Jon Hilsenrath**,** "Sustainable Development Gains University Cachet," *Wall Street Journal*, 25 November 2002.

The structure of this introductory chapter is as follows. Section 1.2 defines and overviews the key functions of institutions. Section 1.3 defines and highlights the importance of international trade. Section 1.4 summarizes the channels through which institutions affect trade and presents the research hypothesis. Section 1.5 overviews the further structure of the Thesis and, finally, section 1.6 concludes.

1.2 Definition and Functions of Institutions

The definition of institutions is broad and fairly vague, as the concept of good governance is itself a multifaceted phenomenon. As North (1990) suggests, "the specifications of exactly what institutions are, how they differ from organizations, and how they influence transaction and production costs are the key to much of the analysis."

Toward one end of the spectrum, institutions establish the "rules of the game" for a society or, in North's (1990) widely cited definition, represent: "the formal and informal constraints on political, economic, and social interactions." Well-functioning institutions can be seen as those that create incentive structures capable of decreasing uncertainty and promoting efficiency, thereby contributing to improved economic performance.

A similar definition used in the new institutional growth literature by Acemoglu et al. (2002) describes institutions as "a cluster of social arrangements that include constitutional and social limits on politicians' and elites' power, the rule of law, provisions for meditating social cleavages, strong property rights enforcement, a minimum amount of equal opportunity and relatively broad base access to education, etc."

Literature focused on institutional development argues that it may be inappropriate to continue assuming that developing economies make the most efficient use of available resources and technology that they already possess. Rather, it is possible that these developing countries let a substantial portion of their resources simply go to waste, which contributes to and accentuates their economic disadvantage (Olson, 1997).

A more concrete and specific definition of the broad concept of institutions is given by the IMF (2003; p. 97). According to this definition,

> *Institutions are particular organizational entities, procedural devices, and regulatory frameworks. Such institutions affect performance primarily by fostering better policy choices. Examples include commitment devices such as central bank independence and balanced budget amendments; the existence and design of international trade agreements; and regulations governing the functioning of labour, product, and financial markets.*

Various indicators used to define and evaluate institutions in the fields of economics and political science are quite diverse. In the sphere of economics, institutions are often proxied by the legal system and regulatory and bureaucratic characteristics. In the sphere of political science, institutions are often understood to encompass factors affecting a country's political stability such as coups, riots or wars, in addition to characteristics of its political regime such as executive powers, constitution and elections.

As highlighted by Acemoglu et al. (2005; p. 1-2):

> *Of primary importance to economic outcomes are the economic institutions in society such as the structure of property rights and the presence and perfection of markets. Economic institutions are important because they influence the structure of economic incentives in society. Without property rights, individuals will not have the incentive to invest in physical or human capital or adopt more efficient technologies. Economic institutions are also important because they help to allocate resources to their most efficient uses; they determine who gets profits, revenues and residual rights of control. When markets are missing or ignored (as they were in the Soviet Union, for example), gains from trade go unexploited and resources are misallocated. Societies with economic institutions that facilitate and encourage factor accumulation, innovation and the efficient allocation of resources will prosper.*

Both formal and informal constraints make up a country's institutional environment. North's theoretical framework describes "a continuum with unwritten taboos, customs, and traditions at one end and constitutions and laws governing economics and politics at the other" (Aron, 2000). Formal institutions can be laws and regulations officially adopted by the government as well as rules codified and adopted by public and private organizations operating under public law – for instance, private firms complying with corporate legal framework. On the other hand, informal institutions, "often operating outside of the formal legal system, reflect unwritten codes of social conduct" (World Bank, 2002). Here examples may include norms of land inheritance and social codes of conduct, as well as a method sometimes used by moneylenders to determine prospective clients' creditworthiness: verifying their reputation by checking the social network. In this way, when formal rules fail to come into existence, "a dense social network leads to the development of customs, laws, trust, and normative rules that constitute an informal institutional framework" (Aron, 2000).

It is important to draw a distinction between institutions and policies. Policies are goals and desired outcomes whereas institutions define behavioural norms and rules of interaction among agents in an economy. Government policies can alter institutional environment by modifying incentives, but institutions can in turn sway outcomes of government policies. Therefore, it can be argued that policies and institutions are endogenous, jointly affecting each other (World Bank, 2002).

Here it is instructive to highlight the implications of differing institutional structure between developing and developed countries summarized by North (1990; p. 64):

> *We have only to contrast the organization of production in a Third World economy with that of an advanced industrial economy to be impressed by the consequences of poorly defined and/or ineffective property rights. Not only will the institutional framework result in high costs of transacting in the former, but also insecure property rights will result in using technologies that employ little capital and do not entail long-term agreements. Moreover, such mundane problems as the inability to get spare parts or a two-year wait to get a telephone installed will necessitate a different organization of production than an advanced country requires. A bribe sufficient to get quick delivery through the maze of import controls or get rapid telephone installation may exist, but the resultant shadow transactions costs significantly alter relative prices and consequently the technology employed.*

1.3 International Trade

Since the time of Adam Smith (1776) and David Ricardo (1821), economists have highlighted the key importance of trade in determining economic development. (For an overview, refer to Winters, 2002). Understanding the underlying reasons for countries' comparative advantage and international trade patterns has been the subject of economic research for centuries.

David Ricardo was the first to formulate the idea of comparative cost currently known as comparative advantage. A country has a comparative advantage in producing and selling a good if it has the lowest opportunity cost in producing that good. Mutually beneficial exchange is possible whenever relative production costs differ prior to trade (Byrns, 2011). The idea of comparative advantage and relative production costs is central to this Thesis, as this study seeks to explain how institutions impact these factors.[4]

[4] The thesis examines actual patterns of trade rather than the abstract concept of comparative advantage, as it is assumed that despite trade barriers remaining in the world today, trade is at present sufficently free for the comparative advantage to have revealed itself in the current trade architecture.

One of the most important contributions to international trade theory seeking to explain comparative advantage is the Heckscher-Ohlin-Vanek (HOV) model. The theory, in the words of Ohlin (1933), is based on the following assumption:

> *Abundant industrial agents are relatively cheap, scanty agents relatively dear, in each region. Commodities requiring for their production much of the former and little of the latter are exported in exchange for goods that call for factors in the opposite proportion. Thus indirectly, factors in abundant supply are exported and factors in scanty supply are imported.*

In other words, assuming the existence of two factors of production, labour and capital, the HOV theory stipulates that trade patterns will develop as follows: capital-abundant countries will export capital-intensive goods and import labour-intensive goods. On the other hand, labour-abundant countries will export labour-intensive goods and import capital-intensive goods.

However, serveral studies found that theory HOV theory has diverged from the actual patterns of trade observed in the world. Already back in 1950's Leontief (1953) investigated the validity of HOV predictions. He found that US exports are less capital intensive than its imports. Leontief's empirical result seemed to have contradicted the HOV predictions was later termed the Leontief paradox. The finding has also encouraged a new wave of empirical research and theoretical refinements testing the HOV theorem.

Linder (1961) noted that much of international trade, particularly in manufactures, takes place among similar countries rather than among countries with disparate factor endowments (as between rich and poor countries), which contradicts the HOV theory prediction. It was found that developed countries which in theory are capital-abundant increasingly trade with each other in similar products rather than exploit difference in factor endowments by trading with developing countries that are relatively more labour-abundant.

In the late 1970s further analyses, such as Krugman (1979) and Helpman and Krugman (1985), gave rise to the so-called new trade theories, partly in search for a formal framework to rectify the problems of the HOV model and partly to incorporate differentiated products and intra-industry trade which HOV had not previously explained. The role of increasing returns to scale and imperfect competition in explaining international trade regardless of the factor

endowments were key contributions of Helpman and Krugman's work. However, these theories did not describe the full picture regarding comparative advantage and the patterns of trade.

Economic studies aiming to test the HOV theory have provided quite mixed results. In particular, two puzzles of international trade have been discovered, relating to the "border effect" and "the mystery of missing trade." The mystery of missing trade is the gap between the volume of international trade that would be optimal according to the standard neo-classical trade models based on the HOV theorem and the actual trade flows observed in the world. In particular, Trefler (1995) found that there is a large gap between the amount of factor trade projected by HOV theory and the actual factor trade. He described this gap as "the case of missing trade".

Another puzzle in international trade theory is the so-called "border effect," the fact that national borders matter a great deal even among rich countries, with economic transactions biased in favour of home markets. Econometric studies by McCallum (1995) and Helliwell (1998) provided evidence for the existence of the border effect. Similarly working within a gravity model setting, these studies control for objective variables that impact on trade such as countries' size, tariffs and other trade policies, distance between trading partners and language. They show that the US states trade significantly more with each other than with Canadian provinces. In fact, the model's results indicate that Canadian provinces and US states should trade 12 to 20 times more than they actually do.

Trade economists have searched for explanations for the underperformance of the HOV model by introducing theoretical modifications of the theory's assumptions. This has led to an improved quantitative fit of the predicted to actual trade in factor content. In particular, Trefler (1993) made a first attempt to introduce Hick-neutral productivity modification in order to integrate international differences in factor prices into the HOV model. Davies and Weinstein (2001) have criticised Trefler's (1993) additions to the HOV model because these did not present general differences in technology. In their paper Davies and Weinstein relax HOV assumptions and explicitly introduce international difference in technology. They find that with such additions a substantial improvement in prediction power is achieved. Wood (1994) argued that empirical tests for HOV theory have miss-specified it by treating capital as immobile factor of production when in fact capital is internationally mobile and hence may not affect the pattern of international trade. In his empirical testing of HOV theory, and assuming the mobility of capital, Wood (1994) finds that HOV provides a rather accurate description of global patterns

of trade. Romalis (2004) integrates a mulit-country HOV model with a continuum of goods with Krugman's (1980) model of monopolistic competition and transport costs. Romalis shows that by doing so the goodness of fit of the HOV improves. More recently, researchers have turned to investigating, for example the impact of networks on international trade. Baskaran, Blöchl, Brück, & Theis (2011) analyse the differences trading within a network for traded commodities. The authors' empirical results highlight that differences in endowments are correlated with bilateral trade when network connections are dense. Hence, in the case when a good is traded competitively then HOV predicts bilateral trade rather well.

Despite recent impovments in the predictive power of HOV theory Baldwin (2006; p. 8-9) concludes that:

> *Although the successive modifications help account for why HOV model fails, the basic reasons why factor efficiencies difference occur or why multiple cones of factor diversification arise are not explained. Although we end up concluding that relative factor endowments matter in accounting for the embodied factor content of trade, there remains a black box of other important forces influencing this trade whose components and determinants are not well understood. Further research efforts directed at formulating and testing theories dealing with these determinants are very much needed.*

Partially to explain the existence of such puzzles of international trade, empirical and theoretical research has begun to emphasize cross-country diversity stemming from differences in institutional environments in addition to differences in technology and factor endowments. Recent research seeks to explain how this institutional diversity impacts patterns of international trade and comparative advantage. Institutional diversity has high explanatory potential because trade transaction costs are substantially influenced by institutional diversities between countries. Trade patterns could be partially explained by the fact that rich countries have developed relatively similar institutions, especially those pertaining to contractual and legal environment, vis-à-vis institutions in other countries.

Belloc (2006; p. 4) in her review of the topic explains the theoretical foundations of the importance of institutional diversity for international trade as follows:

> *The underlying idea is that international trade does not occur in a context of completely anonymous and impersonal exchange that is assumed in standard trade models, where institutions either do not exist or simply are the same everywhere. In reality, international exchange decisions are affected by the degree of uncertainty that pervades markets and cross-country relations, which is associated with asymmetric information, opportunistic behaviours and transaction costs.*

Furthermore, as highlighted by Rodrik and Rodríguez (2001), national borders divide political and legal jurisdictions. International trade takes place within and among countries' institutional environments, and these institutions to some extend define the profitability of trade transactions, thereby shaping the patterns of both national and international exchange. Then, in an explanation by Greif (1992), "at each point in time, the combined impact of institutions, endowments, technology, and preferences determine actual trade."

1.4 Impact of Institutions on International Trade: the Thesis Question

As North (1991) noted, institutions "determine transaction and production costs and hence the profitability and feasibility of engaging in economic activity". Consequently, the structure and maturity of institutions that underlie these exchange relationships affect both the magnitude and the direction of trade. Intuitively, one should expect that the quality of institutions also matters for the kinds of products that firms choose to manufacture and exchange. This Thesis examines this relationship, focusing on the way in which institutions shape the patterns of international trade and comparative advantage.

1.4.1 Institutions, Transaction Costs and Trade

The traditional approach to explaining the impact of institutional environment on trade is rooted in the transaction cost literature, which assumes that trading partners incur friction costs during the exchange of goods. Some of the factors that give rise to such transactions costs include the search for a trustworthy trading partner and the subsequent negotiation of the contract, as well as monitoring and enforcement of the contract's execution and pursuit of juridical recourse if its terms are violated (Baeten and den Butter, 2006). The traditional approach assumes that institutions affect trade volumes through their impact on transaction costs.

Main proponents of this view, Anderson and Marcouiller (2002), demonstrate that weak institutions raise international transaction costs and hamper international trade. They argue that "trade is reduced by hidden transactions costs associated with the insecurity of international exchange: contracts may not be enforceable across jurisdictional boundaries, bribes may be extorted by customs officials, and shipments may even be hijacked."

On the other hand, the authors find that "trade expands dramatically when it is supported by strong institutions – specifically, by a legal system capable of enforcing commercial contracts and by transparent and impartial formulation and implementation of government economic policy" (Anderson and Marcouiller, 1999).

This approach, often called the "transaction costs effect" (Berkowitz et al., 2006), is an important and well-established avenue through which institutions impact on international trade. This approach, however, is not one that directly shapes countries' comparative advantage and therefore is not explicitly the focus of this Thesis. More recent theoretical and empirical research highlighted that institutions can also impact on trade via the *production effect*, discussed in the following section.

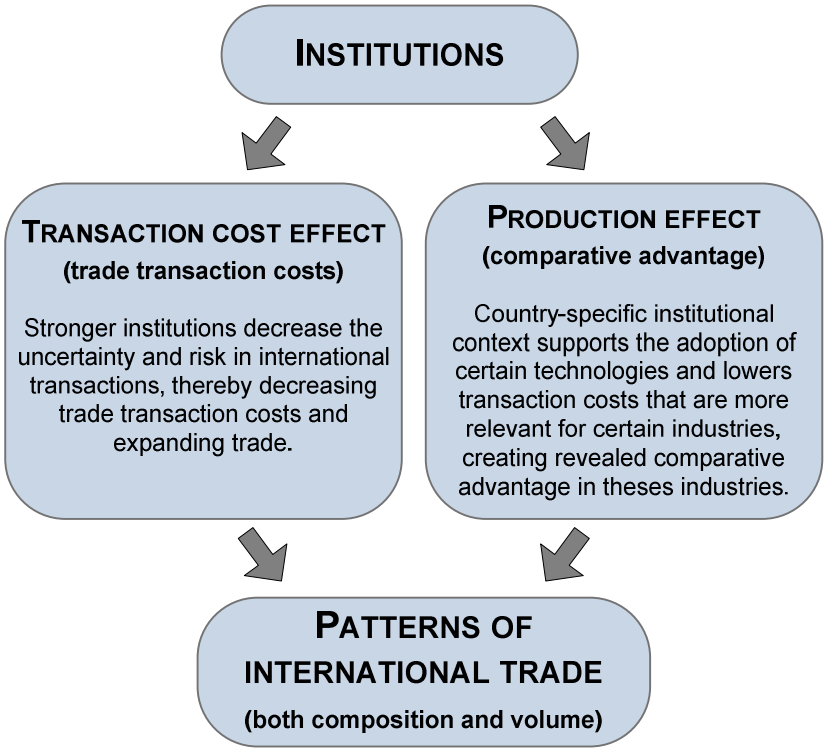
1.4.2 Institutions, Production Costs, Comparative Advantage and Trade

The *production cost effect* approach highlights the fact that institutions can alter productions costs. This Thesis assumes that institutions are a source of comparative advantage in a way consistent with the Heckscher-Ohlin-Vanek model. Much like the availability of capital and labour influences the relative production costs in favour of a relatively more factor-abundant good, institutions tilt relative production costs toward industries that rely on them in their activities and in favour of countries with high-quality institutional environments. A necessary condition for a production factor to give rise to comparative advantage is that it is immobile across economies. This condition is clearly fulfilled in the case of institutional environments since they cannot (for a large part) be readily transferred country-to-country.

The key assumption of this Thesis is that country-specific institutional context supports the adoption of certain technologies and lowers production (and transaction) costs that are more relevant for certain industries. Industries differ in requirements for factors of production and institutional conditions needed for industry growth. In turn, countries differ in their ability to meet these industry-specific requirements. It can therefore be concluded that comparative advantage can arise from these country-industry matches. Since countries differ in institutional environment, different countries will have a comparative advantage in different industrial sectors for which their idiosyncratic institutional environment is most conducive (figure 1.1 summarizes these two effects).

To narrow the focus of this analysis and to account for the fact that previous research has been scarcer regarding this topic (see Chapter 2), the Thesis will focus its attention on the *Production Costs* effect of institutions. It will trace and analyse the channels through which institutions affect trade via this effect.

Figure 1.1: Transaction Cost and Production Cost Effects of Institutions on Trade

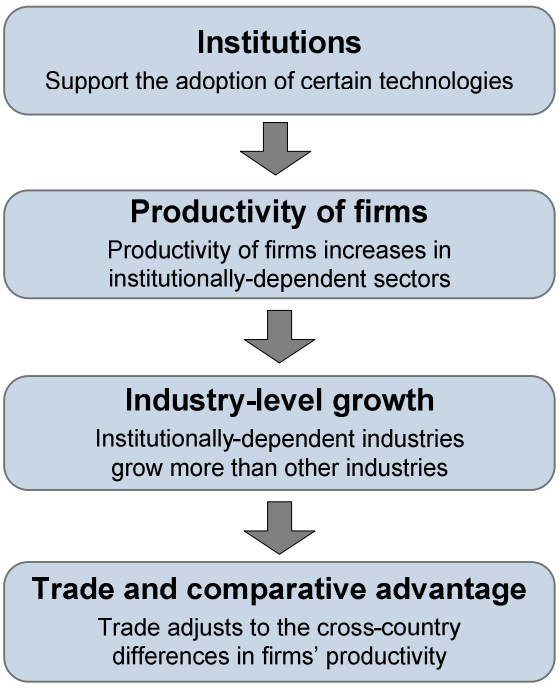


Source: Designed by the author

The research hypothesis invariably necessitates that the analysis addresses not only trade patterns but also industry-level growth and productivity patterns across economic sectors. The key assumption behind the production effect of institutions is that they support the adoption of certain technologies. Industries that are more dependent on these technologies will display higher productivity and growth rates, in line with the assumed impact of institutions.

The effects of institutions on trade and comparative advantage are likely to emerge only after companies have adopted new technologies and firm-level productivity has increased, a point illustrated in figure 1.2. The impact of institutional environment on trade and comparative advantage will arise from its positive impact on productivity of some sectors as opposed to others. In an empirical test of these assumptions, Chapter 5 of this Thesis analyses whether institutions affect industry growth patterns, and Chapter 6 investigates the impact of institutions on firms' productivity.

Figure 1.2: Impact of Institutions on the Patterns of Trade through the Production Effect



Source: Designed by the author

There is a new and vibrant research field that analyses how institutions affect comparative advantage via the production cost effect (for example Nunn, 2004; Beck, 2002; Claessens and Laeven, 2004; and Cuñat and Melitz, 2004). This literature identifies how specific sub-components of institutional environment, such as contract enforcement mechanisms, property rights, labour market regulations and structure of the financial sector, affect countries' comparative advantage. The quality of institutions is central as it permits to overcome frictions that occur when two parties with different and often opposing interests enter into a production relationship. Yet the literature has thus far not made a unified attempt at empirically testing the impact of institutions on comparative advantage patterns.[5]

The aim of this Thesis is to fill this gap by providing a unified empirical framework, including a common dataset and rigorous econometric techniques, to study how institutional environment affects comparative advantage and international trade. By doing so, this Thesis aims to unpack the black box of institutions – going beyond the basic statement that institutions "matter" – and to identify specific channels and magnitudes of their impact. Furthermore, in order to validate

[5] A notable exception is a study undertaken by Chor (2010), which has been developed simultaneously with this study.

empirical results, a case study approach based on a detailed survey of manufacturing firms is undertaken. Given the results of the empirical and qualitative sections, the policy implications of this Thesis offer more detailed suggestions on specific policy options available for countries that wish to move toward specialization in higher value-added goods.

This Thesis therefore aims to enhance the body of knowledge on the topic through answering the following five questions:

- Do institutions matter in influencing what types of goods countries export, and hence do they impact trade patterns and comparative advantage?
- If yes, what are the channels through which institutions can affect the patterns of international trade and comparative advantage?
- Which are the most important institutions for enhancing international trade?
- Are the empirical results derive from the cross country empirical analysis confirmed by the case study for Lesotho?
- Given the answers to the questions above, what are the policy options for countries aiming to improve their institutional framework and, through that, to enhance trade?

This Thesis builds three quantitative models based on data from a wide variety of sources, and tests the impact of institutions on a range of economic outcomes. The first empirical model (Chapter 4) investigates the impact of institutions on trade patterns. Chapter 5 presents an econometric model that examines the impact of institutions on trade and value-added growth. Chapter 6 analyses the impact of institutions on firm productivity. A qualitative case study of Lesotho in Chapter 7 supplements the quantitative analysis.

Furthermore, this study is intended to supplement the theoretical framework examining causal linkages between institutional environment, and trade patterns. A recent review of literature addressing the impact of institutions on income levels notes that “this literature has served its purpose and is essentially complete. The number of instrumental variables is limited, and their coarseness prevents close analysis of particular casual mechanisms from institutions to growth” (Pande and Udry 2005). The authors further argue that cross-country macro-level measurement of institutions is “necessarily coarse and obscures important dimensions of heterogeneity.” Recent theoretical advances, mainly related to trade theory, suggest significant sector-specific heterogeneity in the nature of institutions, highlighting that while institutional characteristics

impact productivity across all sectors, they tend to affect some sectors more than others. This can in turn determine the patterns of comparative advantage across the world.

By investigating how different types of institutions influence trade and comparative advantage and, through those effects, impact countries' income levels, this study provides a more in-depth analysis. In addition, by moving the focus of the analysis to the industry level, this Thesis is able to overcome some of the weaknesses of cross-country studies. In particular it is able to investigate how different sectors respond to the prevailing institutions as well as to limit the problem of reverse causality (see section 2.4).

This Thesis studies the behaviour of firms primarily because the key route through which institutions influence trade is their effect on decisions and operational efficiency of individual enterprises. Institutions such as property rights and contract law shape the regulatory and economic environment within which firms operate and influence their internal decisions and productivity. For example, financial market regulations affect the availability and price of capital while intellectual property regulations affect the design and price of products. Institutions also significantly influence firms' decisions regarding key factors of production. For instance, while labour market regulations might intend to encourage training and skills creation, they can also unintentionally reduce the incentives for firms to hire new workers. In this way, institutions can inhibit or enhance the functioning of markets, with repercussions for overall economic activity and growth.

The following section sets the scene for the reminder of the Thesis by providing a detailed analysis of the impact of particular types of institutions on comparative advantage and trade. These institutions relate to contract enforcement, property rights, labour markets and the financial sector.

1.4.3 Contract Enforcement

The key assumption of the literature dealing with contract enforcement and trade is that countries with better legal institutions, and in particular better contract enforcement regulation, have a comparative advantage in more complex goods. To that effect, North (1990) noted that "the inability of societies to develop effective, low-cost enforcement of contracts is the most important source of both historical stagnation and contemporary underdevelopment in the Third World."

Here it is useful to introduce the notion of "contract incompleteness," introduced by Ronald Coase (1937) but most vividly expressed in a seminal paper by Grossman and Hart (1986). The key assumption of the incomplete contract theory is that economic agents when writing a contract are unable to include provisions that would take into account all possible future eventualities. Since contracts are to some extent incomplete there will always be a threat of disputes and court action in a contractual arrangement. Contracting parties will invariably like to guard themselves against such a possibility and this will affect their behaviour before the contracts are being signed. The fact that contract are by their very nature incomplete also implies that contracts for some transaction may be more complete then for other.

Within the framework of "incomplete contracts," contract enforcement regulations play a key role in influencing comparative advantage. To illustrate this influence, it is important to note that goods differ in production processes. For goods that are easily standardized – as is the case with simple products like oil, grains and metals – the task of writing and enforcing a contract is easier. Berkowitz et al. (2006) argue that "while there may be important differences in the purity of these resources, these can still be specified by the parties ex ante and easily verified by way of inspection ex post."

On the other hand, more complex goods, such as for example electronic components, often need to be adapted to the specific needs of a buyer and present a harder challenge in their quality verification. Similarly, the production process of a complex final good often requires input suppliers to customize their products, making quality control and verification of contract completeness more important. This in turn means that for the production of complex goods, contract enforcement environment is more crucial.

A more formal way of explaining this institutional comparative advantage is offered by Nunn (2005; p. 2). He highlights that for relationship-specific investments, underinvestment is likely to occur when it is impossible to fully enforce contracts:

> *An investment is "relationship-specific" if its value within a buyer-seller relationship is significantly higher than outside the relationship. An example is an investment made by an inputs supplier to customize an input for a final good producer. When customization requires investments that are relationship-specific, the final good producer can hold-up the supplier if contracts are imperfectly enforced.*

Nunn's explanation in essence describes the "hold-up problem" outlined in detail by Grossman and Hart (1986). For the purpose of this Thesis it is important to note that in the production

process of more complex goods where customization is crucial, the hold-up problem is more severe. Countries with strong contract-enforcing institutions, which facilitate the production of complex goods, are therefore likely to have a comparative advantage in the production of these goods.

In addition, depending on the complexity of production, firms rely on a different number of input suppliers with whom they need to enter into a contractual relationship. Simple products, such as furniture, need relatively few intermediate input suppliers in comparison to sophisticated products, such as electronics. Also from this perspective countries with strong contract enforcement institutions are likely to have comparative advantage in complex goods with a large amount of input suppliers. On the contrary, countries with poor quality of contract enforcement will have comparative advantage in relatively simpler products that require fewer supplier relationships to manage.

Hypothesis 1: **Countries with more efficient contract enforcement regulations will specialize (have a comparative advantage) in more complex sectors that depend on contracts with suppliers /producers for their growth.**

1.4.3.1 Contract Enforcement, Vertical Integration and Patterns of Exchange

Another important notion highlighted by the literature on contract enforcement and its impact on trade is that firms might adapt their organizational structures in order to cope with imperfect enforcement of contracts (for example Antras and Helpman, 2008). In particular, firms often respond to poor contract enforcement by vertically integrating their production processes.

As highlighted above, the hold-up problem entails transaction costs associated with market exchanges and, as Coase (1937) suggested, such costs may be avoided or reduced through choosing the optimal organizational structure. This idea has been extended by Williamson (1971, 1979) who pointed out that vertical integration can be a firm's response to the hold-up problem. Williamson emphasized that moving the production of specific inputs inside the firm's boundaries reduces dependence on contract enforcement for the final good. The key assumption is that the impact of contract enforcement regulations on comparative advantage of complex goods is reduced when firms are better able to integrate vertically. Given that production processes vary between industries, different sectors will have different inherent capacities for vertical integration. This implies that institutional environment can have an

impact on organizational structure, which in turn affects the structure of economic exchanges, productivity and other factors.

Sectoral divergence in the capacity to vertically integrate production is assumed to affect the magnitude of the impact that institutions will have on the patterns of trade and comparative advantage. In industries with an inherit capacity for integration this impact will be subdued, as multinational firms will be able to produce intermediate inputs in the cheapest locations and undertake international trade within the enterprise's boundaries, thereby diminishing the uncertainties related to such transactions. In industries where vertical integration is technically more difficult to achieve, multinational companies will be required to outsource the production of inputs to outside suppliers and hence will have to rely heavier on the country's institutional features for production and trade. Poor institutional design and imperfect contract enforcement will therefore subdue trade and affect comparative advantage to a greater extent in industries with limited capacity for vertical integration.

We can therefore formulate this study's second hypothesis regarding the impact of contract enforcement regulation on trade and comparative advantage as follows:

Hypothesis 1a: **Vertical integration is a substitute for good contract enforcement regulations when producing contract-intensive goods. Hence, the impact of institutional comparative advantage stemming from contract enforcement regulations will be diminished in industries and sectors that have an inherent capacity for vertical integration.**

1.4.4 Property Rights

The notion of a property right is defined as "owner's right to use a good or asset for consumption and/or income generation" (Besley and Ghatak, 2010). When such a right is granted and recognized, it legally precludes other individuals or economic entities from using this good or asset. As a result, the granting of a property right "affects resource allocation by shaping the incentives of individuals to carry out productive activities involving the use of the good or asset, undertake investments that maintain or enhance its value, and also, to trade or lease it for other uses." (Besley and Ghatak, 2010).

Property rights have gained centre stage in the institutional approach to economic development. Economic literature has in the past decades analysed the relationship between property rights regimes and investment and growth. Here the key idea has been initially coined

by Demsets (1967), who contended that in cases where property rights are not secure there is a non-zero, positive probability of expropriation. This probability in turn acts as an indiscriminate tax on the assets and reduces the expected return on any investment that could in the future increase the property's value. Through this mechanism, weak or non-existent property rights may create disincentive to invest.

In Demsets' argument, the impact of property right regimes on investment can be extended to include the behaviour of companies, a statement he illustrated with an example of copyrights and patents. Demsets (1967; p. 359), argued that:

> *If a new idea is freely appropriable by all, if there exist communal rights to new ideas, incentives for developing such ideas will be lacking. The benefits derivable from these ideas will not be concentrated on their originators. If we extend some degree of private rights to the originators, these ideas will come forth at a more rapid pace.*

In their work to develop a unified theory of property rights, Besley and Ghatak (2010; p. 4528) identify several ways in which property rights affect economic development:

> *The first is expropriation risk—insecure property rights imply that individuals may fail to realize the fruits of their investment and efforts. Second, insecure property rights lead to costs that individuals have to incur to defend their property which, from the economic point of view, is unproductive. The third is failure to facilitate gains from trade—a productive economy requires that assets are used by those who can do so most productively and improvements in property rights facilitate this. In other words, they enable an asset's mobility as a factor of production (e.g. via a rental market). The fourth is the use of property in supporting other transactions. Modern market economies rely on collateral to support a variety of financial market transactions and improving property rights may increase productivity by enhancing such possibilities.*

All these four key elements influence investment decisions of firms and individuals in the way hypothesized by Demsets. Each of the four venues alters the framework of incentives for individuals and companies, leading them to constrain their activities in some cases or expand production in others.

In the modern economy, the key components of the capital stock are the so-called intangible assets, such as copyrights and patents. These assets can be defined as "resources controlled by the enterprises which possess the following attributes: non-physical in nature, capable of producing future economic net benefits, protected legally or through de facto right" (Arthur Andersen, 1992). The increasing importance of intangible assets in the economy has become apparent in recent years. As highlighted by a report by European Commission (2003) "at the

most fundamental level, economic activity can only be sustained by the application of intellectual inputs since the stock of physical resources is finite."

Recent theoretical and empirical advances indicate that property right regimes influence the creation of intangible assets and through that shape countries' comparative advantages. As one example, Claessens and Laeven (2003) assert that property rights affect comparative advantage by influencing firms' asset structure, since they alter the allocation of investable funds by firms across various types of assets. Claessens and Laeven seek to explain the empirical finding of Demirgüç-Kunt and Maksimovic (1999) who show that firms in developing countries have higher proportion of fixed assets to total assets and fewer intangible assets than firms in developed countries. They argue that firms in countries with lower institutional quality have a higher preference for fixed assets and a hence smaller share of intangible assets. This can be attributed in particular to the fact that in an environment of poor property rights, securing returns to fixed assets is more straightforward than for intangibles. Claessens and Leaven (2003; p. 2) further clarify their argument as follows:

> *A firm is always at risk of not getting the returns from its assets (tangible or intangible) due to actions by the government, its own employees, or other firms. For the firm's employees and other firms, in particular powerful competitors, it is relatively easy to steal the intangible assets of a firm if property rights are not secure. Without property rights protection, employees can simply walk away with many of a firm's intangible assets and competitors can easily copy them. As such, property rights in a narrow sense are very important for securing returns on intangible assets. In contrast, stealing physical property such as buildings and machinery is more difficult, particularly for competing firms, even when general property rights are not secure.*

The empirical finding that firms have fewer intangible assets in developing countries than in developed countries and the hypothesis that this finding is related to the degree of property right protection have direct relevance for countries' patterns of trade and comparative advantage. Given the analysis above, one can formulate the hypothesis regarding the impact of property rights on countries' patterns of trade and comparative advantage as follows: enterprises operating in environments with stronger property rights are likely to specialize in industries dependent on intangible assets for growth. On the other hand, firms operating in countries with poor property right protection will specialize in sectors and industries with less dependence on intangible assets. In short, this study's second hypothesis is as follows:

Hypothesis 2: **Countries with more secure property rights will specialize in sectors that are more dependent on intangible assets for production.**

1.4.5 Labour Market Institutions

The structure of the labour market and the availability of relevant skills within this market are crucial determinants of economic growth. In fact, growth in human capital which refers to the accumulation of competencies and knowledge that support individuals' ability to perform a task is a central notion in the new growth theory (see for example Mankiw, Romer and Weil (1992). The new growth theory emphasizes social gains or externalities from education and the acquisition of human capital as key sources of economic growth.

Similarly, Pissarides and Veganzones (2005) argues that *"if we are to understand growth and development, we need to understand the creation and deployment of human capital and that the organization of the labour market."* He further notes that *"the organization of the labour market and institutions are critical from the perspective of acquiring and enhancing human capital."* Further research needs to address labour market institutions[6] and the links between human capital, institutional structure and economic growth. From an institutional perspective, the question is how labour market interventions influence the opportunities and incentives for firms to undertake productive investment, increase employment and grow. The modern economy necessitates an on-going process of firms' reinvention and turnover to channel resources to their most productive activities. Labour regulation and in particular employment protection can affect the cost of workforce reorganization and influence the opportunities and incentives for firms to adopt new technologies and expand. Hence employment protection regulation can influence the structure of the economy and through that impact comparative advantage.

One of the key challenges that governments face in designing labour market institutions is striking the right balance between employment stability and firms' need to adjust workforce in accordance with the changing business situation, allowing the private sector to progress to more productive activities. Strong employment protection increases the cost of company reorganization, when it is required by new technology, and may reduce the incentives for firms to innovate. Employment protection laws can also decrease turnover of firms in the market with potential negative repercussions for new technology acquisition, as new firms are often more adapt in harnessing new technologies.

[6] A widely cited definition of labour market institutions by Nickell and Layard (1997) is as follows: *Formal labour market institutions are labour taxes standards and employment protection, labour unions, social security systems. Informal labour market institutions i.e. the social institutions which affect or derive from the incorporation of labour in production, such as informal social norms and rules also form a part of labour market institutions.*

Research on the impact of labour institutions on comparative advantage and consequent development outcomes is still in its infancy. One of the initial contributions to this field was Cuñat and Melitz (2006) who studied the impact of one type of labour market institution, namely employment protection. The authors argue that labour market flexibility can be a source of comparative advantage. The key assumption is that countries whose labour markets are relatively more flexible will specialize in relatively more volatile industries. Cuñat and Melitz assume that "in the presence of firm-level shocks, the country with more flexible labour markets can reallocate labour across and within industries more easily – leading to higher industry average productivity levels relative to the country with rigid labour markets." The industry-level shocks, which the authors term "industry volatility," interact with elasticity of labour markets to encourage comparative advantage in more volatile industries in countries where labour markets are more flexible.

Given the above analysis we can formulate the third hypothesis of this study as follows:

Hypothesis 3: **Countries with more flexible labour markets will specialize and have a comparative advantage in more volatile industries.**[7]

1.4.6 Financial Institutions

The idea that financial development can be an independent source of comparative advantage and economic growth dates back to the studies by Schumpeter (1912) and Goldsmith (1969). In a recent review of the literature on finance and its economic growth impact, Demirgüç-Kunt and Levine (2008) assert that "financial arrangements change the incentives and constraints facing economic agents. Thus financial systems may influence saving rates, investment decisions, technological innovation, and hence long-run growth rates." It is therefore natural to expect that financial development can influence production structure and comparative advantage and through that influence trade patterns and growth. Examples of such an impact abound. The emergence of efficient banking sector improves the allocation of credit within the economy. Likewise, well-defined contracts and strong enforcement mechanisms that assure economic agents of eventual repayment by customers and suppliers affect the way in which savings are allocated.

[7] The definition of volitile sectors is provided in section 3.4.

Levine (2005) identifies five broad functions performed by the financial system, each of which influences savings and investment decisions. In particular, financial systems make available ex ante information about capital allocation options and allow to monitor subsequent investment, facilitating corporate governance. They also make it possible to diversify and manage risk, as well as to pool and mobilize savings. Lastly, through these functions combined, financial systems facilitate the exchange of goods and services by economic agents.

Studies have shown that financial markets are more developed in countries with strong legal frameworks (La Porta et al. (1998), Beck et al. (2003) and Levine (2005)). In an environment where financial markets are more advanced, companies face fewer obstacles in raising capital to fund their investment needs and fuel expansion of productive activities (Ranjan and Zingales, 1998). A country's degree of financial development may thus have a direct bearing on firms' behaviour. To give an example, if firms in two separate countries face identical real interest rates but different financial institutions, they tend to develop different abilities to mitigate the negative effects of market imperfections and incur different costs of financial services (Belloc, 2006).

This relationship provides an avenue for strong financial institutions to unlock comparative advantage. The key assumption in this regard is that due to fundamental differences in the technology and organizational structures required for production processes, industries differ in their requirements for external finance. Therefore, a country with a well-developed financial sector will specialize (or have a comparative advantage) in goods or services whose producers have a higher reliance on external finance for their operation and development.

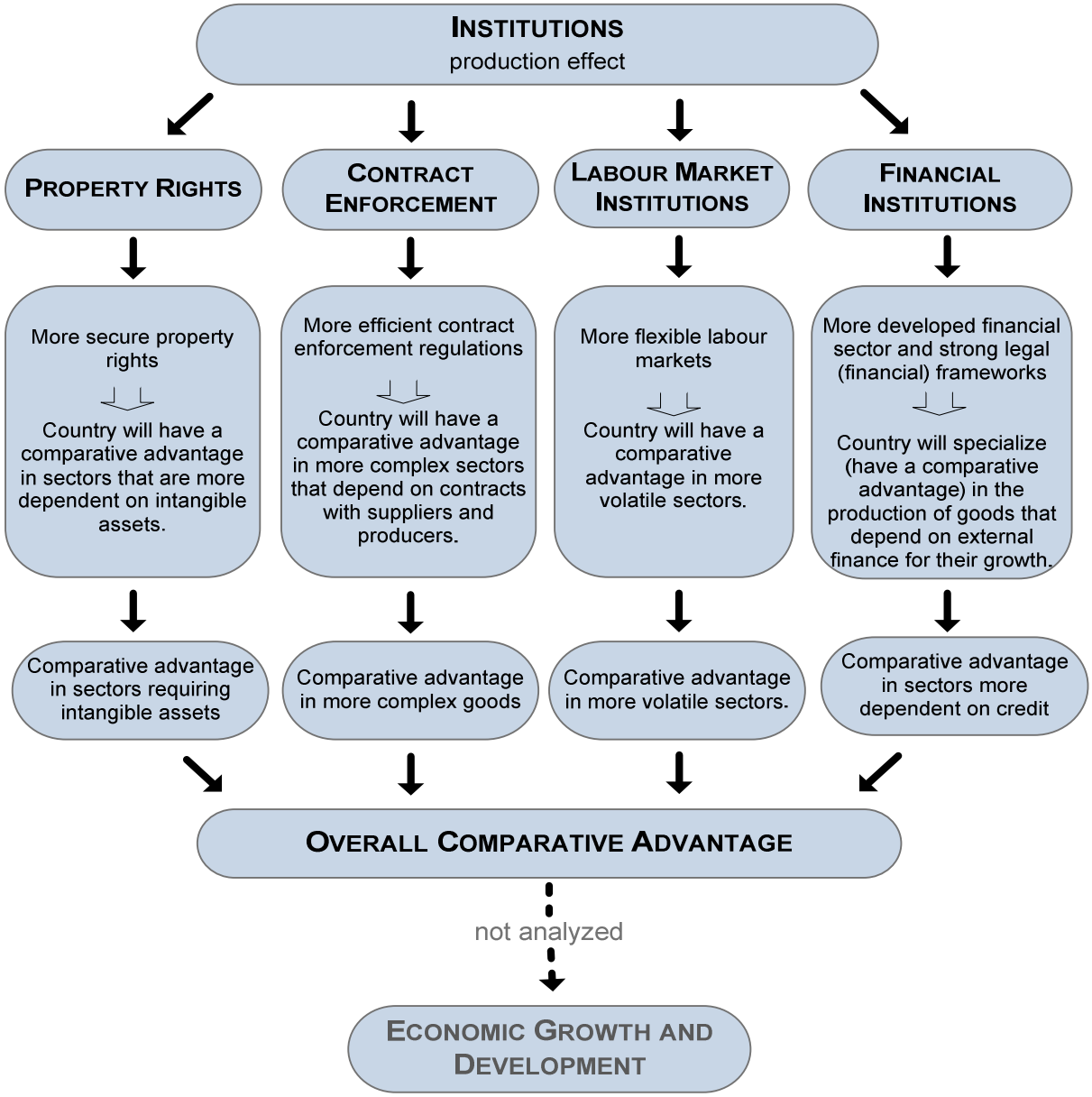
Given the above analysis we can formulate the final hypothesis of this study as follows:

Hypothesis 4: **Countries with higher level of financial development will specialize and have a comparative advantage in sector/industries that are more dependent on external finance for their growth.**

1.4.7 Research Hypothesis

Figure 1.3 provides a summary of the four main research hypotheses of this Thesis. Each institutional sub-component outlined above affects a given country's comparative advantage in a different way. Further sections of this Thesis aim to illustrate and expound on the importance of each sub-component in light of the research questions outlined in the previous sections.

Figure 1.3: Research Hypotheses: Impacts of Institutional Sub-components on Comparative Advantage



Assuming a priori that the research hypotheses are correct, another fundamental question is whether the institutional patterns of comparative advantage discussed in this study will actually lead to better overall developmental outcomes. This question requires a separate set of assumptions as well as additional empirical and qualitative testing, and generally falls outside the scope of this Thesis.

1.5 Structure of the Thesis

This chapter has, so far, defined the concept of institutions, identified the importance of strong institutional environment as key for economic development and demonstrated the ways in which institutions can shape trade patterns and counties' comparative advantage.

The following Chapter is a literature review which focuses in greater detail on aspects of the recent literature relevant to the research question. It surveys a full set of studies and provides a broader analysis of possible effects of institutions on trade as well as possible reverse causality considerations.

Chapter 3 introduces the qualitative and quantitative methodologies and overviews the data used in this Thesis, including its sources and methods of compilation. The chapter gives background information on different modelling procedures used in the empirical analysis and introduces the methodologies for the case study and the manufacturing surveys. Since different data are used for each analytical chapter, the context and descriptive statistics are provided in Chapter 3, and specific data requirements are discussed in respective empirical chapters.

Chapters 4 to 6 are the three main empirical sections of this Thesis. Chapter 4 provides the core analysis of the Thesis, examining how institutions affect trade flows. The investigation uses a gravity model of international trade to assess the types of impacts that contract enforcement, financial and labour regulations and property rights have on countries' exporting patterns. In order to test the research hypotheses highlighted in the introductory chapter, the gravity model analysis is conducted at industry level.

Chapter 5 continues with the analysis of the impact of institutions on trade patterns by asking the following question: How did institutions affect growth of trade and value-added in a particular sector over the past decade? The chapter builds an econometric model that aims to explain the pattern of sectoral growth rates. It endeavours to disentangle the impact of institutions by exploiting the fact that various institutional sub-components affect different industries in different ways, depending on industry-specific institutional requirements.

The final empirical chapter (Chapter 6) analyses whether the impact of institutions on trade patterns and comparative advantage can arise through its impact on firms' productivity. The chapter tests the assumption made by several theoretical and empirical studies that institutions

impact firms' productivity and give rise to different industries and trade patterns. It builds an industry-level productivity model using cross-country firm level data and assesses whether firms in countries with stronger institutions are more productive than those operating in weaker institutional environments. It also asks whether this impact is more vivid for sectors that are more in need of institutional environment for growth.

Chapter 7 tests the validity of the results obtained from the empirical analysis using a case-study approach. The aim of this chapter is to evaluate whether the emergence of a small but vibrant export-oriented industrial sector in Lesotho, a small landlocked country in Southern Africa, is the result of its strong institutional environment. To answer this question, the chapter presents the results of a survey of manufacturing firms conducted in the summer of 2010. The results of the manufacturing survey are supplemented with detailed review of relevant reports and studies that analyse the above question.

Finally, Chapter 8 provides a summary of the results of the Thesis. It highlights the key policy implication from the Thesis and overviews studies that aim to improve our understanding of policy and institutional reforms necessary to provide economic development through improvements in the institutional environment. The last Chapter also overviews key conclusions from these studies.

1.6 Conclusion

To summarise this chapter, this Thesis will use both empirical and qualitative research methods. Using a unified empirical framework, including a common dataset and rigorous econometric techniques, the Thesis assesses how institutional environment and in particular contract enforcement, property rights, labour market institutions and financial institutions affect comparative advantage and trade.

This introductory chapter argued that strong institutional environment can push economies into specialization in complex products which are dependent on external finance and flexible markets. All of the institutional features discussed above are key components of today's sophisticated economy. Therefore an understanding of the nature and magnitude of their underlying effects is important for shaping economic policies that can improve economic growth.

Chapter 2: Literature Review

2.1 Introduction

The preceding introductory chapter made several assumptions regarding institutions and their role in shaping comparative advantage and economic exchange patterns. First, we assume that institutions are a key determinant of long-term rates of growth and economic development. Second, we expect that because institutions affect the feasibility and profitability of economic activity, they also impact comparative advantage and hence the structure of economic exchange, both within and between countries. Third, we assume that institutions influence trade patterns by affecting both transaction and production costs. Further sections of the Thesis will examine these assumptions with focus on four specific sub-components of formal institutional environment: property rights, contract enforcement, financial regulations and labour market regulations. This chapter overviews theoretical literature that has addressed these topics over the past two decades, and establishes a theoretical and empirical basis for the remainder of the Thesis.

The structure of this chapter is as follows. Section 2.2 reviews research on the impact of the institutions on trade via the "trade transaction cost" effect. Section 2.3 reviews literature analysing the way in which formal institutions affect comparative advantage via the "production costs" effect. Each of the four institutional sub-components are analysed individually: contract enforcement regulations (in section 2.3.1), property rights (2.3.2), financial institutions (2.3.3) and labour market institutions (2.3.4). Section 2.4 reviews studies suggesting a mutually influential relationship between institutions and trade, and 2.5 summarizes the chapter's conclusions.

2.2 Institutional Quality and Trade: The "Transaction Cost" Effect

As highlighted in the introductory chapter, most traditional trade theories do not account for the fact that international trade is costly. But the exchange of goods and services is not free: trade and specialisation bring about *transaction costs*. The concept of trade transaction costs, defined as the "friction costs that appear while pursuing the gains of trade" (den Butter and Mosch, 2003), is a central theme of New Institutional Economics.[8]

[8] See Williamson (2000) for an overview of this field of research.

The current literature on the importance of institutions to exchange is rooted in Ronald Coase's theory of transaction costs. Coase (1992) pointed out that the effects of high transaction costs are "pervasive in the economy" and that "if the costs of making an exchange are greater than the gains which that exchange would bring, that exchange would not take place." In choosing the level and type of production, entrepreneurs must take these costs into consideration. Such transaction costs can arise, for example, from expenses incurred in finding a trading partner, negotiating a trade deal, overseeing contract execution and enforcing judicial sanctions if agreements get broken. Government-enforced trade barriers, such as tariffs and non-tariff barriers, also contribute to trade transaction costs (Baeten and den Butter, 2006).

In environments where obtaining information on the forthcoming transaction is expensive and where private property is less than perfectly protected, contracts are more difficult to specify and enforce for all possible eventualities. As a result, transaction costs increase, with negative consequences for productive activity. Shirley (2005) notes that "societies with persistently higher transaction costs have less trade, fewer firms, less specialization, less investment, and lower productivity. Institutions determine whether transaction costs are low or high."

Section 1.4 discussed the existence of the so-called "border effect," which refers to the fact that borders decrease trade to a significantly greater extent than objective trade barriers would indicate and that trade transactions are biased in favour of domestic markets. Key reasons behind this phenomenon lie in the discontinuity of political and legal systems between countries. Problems such as opportunities to cheat, asymmetric information and imperfect contract enforcement are magnified during international transactions. As just one example, when trading partners are based in distant countries, both the domestic judicial systems and the international courts are less able to enforce contracts.

In recent years, economic literature has given substantial attention to the impact of institutional environment on trade transactions costs. A seminal paper on the topic by Dixit (2003) uses game theory to analyse this linkage. The author develops a model that matches pairs of differentiated agents (or traders) and assumes that they are separated by geographic and economic barriers. Traders are then able to pick from two strategies, to cheat or to be honest, in a two-period model based on the prisoner dilemma. The author differentiates between geographically close and distant traders, with distance assumed to affect the frequency of meetings and hamper the flow of information about contract breaches. Honesty in

international transactions has a larger payoff for both parties, but honesty is only self-enforcing between traders that are relatively close to each other. Dixit notes that "global honesty prevails only in a sufficiently small world. The extent of self-enforcing honesty is likely to decrease when the world expands beyond this size. Costly external enforcement is useful only if the world is sufficiently large, and its net payoff need not be larger than that of a self-governing small community."

Anderson and Marcouiller (2002) present an analytical framework within a general equilibrium model in which economic agents rationally allocate resources (labour) across productive and predatory activities. Import demand is modelled in a framework of an insecure world. Their hypothesis is that uncertainty discourages trade among economic agents by increasing the price of traded goods. This hypothesis is confirmed by the model, which shows that the probability of a loss increases a product's price in a way that is similar to a hidden tax on trade.

Analogously, Anderson and Marcouiller (2005) show that imperfect contract enforcement in an importing country is equivalent to a tariff under the assumption of risk neutrality. The authors find that in the absence of contract-enforcing and risk-sharing institutions, "autarky is the *only* equilibrium … endogenous predation truly can be a barrier to trade" – a result that "underscores the importance of institutions for the support of trade." Considering a model where institutions are absent is similar to assuming international trade transaction costs to be infinite; trade then fails to take place at all.

Anderson and Marcouiller (2002) provide some empirical evidence, within a gravity model approach, for their international trade model. They show that international trade is considerably affected by countries' institutional environment, with better institutions leading to higher trade. Their gravity model contains 11 independent variables, including the degree of transparency, fairness of government policy and a measure of contract enforcement. They find that: (1) institutions support more secure international exchange by decreasing trade transaction costs, raising trade volumes; (2) omitting institutional indicators from the model creates an upward bias in the income coefficient and produces a "home bias" in trade; and (3) including institutional indicators in the model partially explains why trade between developed countries is higher than that foreseen by the gravity models.

Marin and Schnitzer (1995) present a theoretical framework where problems of contract enforcement between countries are resolved by "countertrade," such as through counter-

purchases (its dominant form), barter or buybacks. The authors assume the following scenario: a firm from a developed country with sophisticated technology wants to establish a plant in a relatively poorer country. The plant is assumed to be an export, hence its construction has to be paid in foreign currency. The model first analyses the situation where two opportunistic players, rich-country exporter and poor-country importer, both have incentives to cheat – the former on quality and the latter on paying back. The authors show that these incentives can be realigned through countertrade, i.e. by committing to a tied counter-purchase agreement that the exporter will later purchase some merchandise from the importer at a mutually profitable price. The authors show how such institutional arrangements can enhance the effectiveness of international trade in situations where traders have short-term temptations to renege on their deal.

2.3 Institutional Quality and Trade: The "Production Costs" Effect

Up to date there have been very few studies that take a holistic approach to studying the "production cost effect" of institutions on international trade. A notable exception and an article quite close to this Thesis in its focus is Chor (2010). In line with this work Chor analyses different sub-components of institutional quality and develops a model that measures the effects of factor endowments, Ricardian productivity and institutions. Chor, in his analysis, explores the influence of contractual and financial institutions as well as labour market regulation on comparative advantage. Two sets of results are presented, namely OLS regression outputs and a Simulated Method of Moments procedure. Both econometric techniques confirm the role of factor endowments and various types of institutions as a source of comparative advantage.

Chor provides theoretical foundations to the notion that institutions might impact on trade by affecting countries' comparative advantage. He extends the Eaton and Kortum (2001) model to include both Ricardian and HOV theories. According to Chor in the model "the productivity level of firms is composed of a systematic and a stochastic component, where the systematic component is driven by the interaction between country and industry characteristics". By applying this approach, Chor is able to provide theoretical foundation to the various sources of comparative advantage within a common framework. Much like this analysis, Chor's model describes global pattern of trade and specialization assuming that industries vary in the

dependence on institutions and countries differ in their abilities to meet these industry-specific requirements. Hence, comparative advantage stems from these country-industry matches.

In order to provide empirical validation to his trade model Chor employs a well-established gravity model. He analyses 3 different institutional sub-components: contract enforcement regulation, financial development and labour market institutions. Like this Thesis Chor's empirical results find a particularly strong effect of contract enforcement institutions on comparative advantage and trade but a smaller effect of financial institutions. This Thesis finds little evidence that labour market institutions impact significantly on trade which contradicts Chor's results who find a statistically significant impact. The study by Chor also differs to this Thesis in two important dimensions. First, Chor does not study the impact of institutions of property rights on international trade. Second, Chor's analysis is constrained to investigating the impact of institutions on trade using a gravity model whereas this work extends the investigations by analysing productivity and industry growth effects.

With the exception of the Chor (2010), and to the knowledge of the author, no other study has attempted to unify several strand of literature to analyse the impact of various institutional sub-components on international trade. The reminder of this section therefore surveys the studies that analyse the impact of the "production cost" effect of institutions defining institutions as contract enforcement regulation, financial development, property rights or labour market institutions.

2.3.1 Contract Enforcement Environment and Patterns of International Exchange

Recent research has given increasing attention to the role of contract enforcement regulation as key determinant of institutional comparative advantage. An assumption commonly made in this body of literature, which parallels the underlying assumption of this Thesis, is that different economic sectors have different degrees of institutional dependence. In particular, specific sectors may rely more heavily on institutions for industrial growth due to sector-specific technology needs and production processes.

One of the studies making this assumption is Levchenko (2004), whose model of international trade examines differences in institutional quality as the source of comparative advantage. Building his model on the framework of incomplete contracts, Levchenko assumes that

institutions "govern relationships between factors" and thus have a more complex impact on comparative advantage than manifesting themselves directly in productivity. The author shows that better institutional quality, and especially stronger contract enforcement, allows contract-dependent industries to capture larger shares of US imports. Importantly, the model indicates that poor countries with weak institutions may actually fail to benefit from trade, as trade pushes factor prices to diverge.

Nunn (2007) also studies the impact of contracting institutions on trade but his initial assumptions somewhat differ from Levchenko. He constructs a variable that estimates the number of intermediate inputs for a wide variety of products, using a classification originally developed by Rauch (1999). Rauch's classification distinguishes goods between those that have an organized exchange (market), those that have a reference price, and those that have neither organized exchange nor reference price. The author's key assumption is that a production input that is traded in a market with many buyers and sellers, it will be worth roughly the same both within and outside of the buyer-seller relationship. Such goods can be assumed not to be relation-specific and therefore less threatened by the hold-up problem. To assess the impact of contracting institutions on trade, Nunn computes contract-dependence values for every final goods sector. The author finds that countries with good contracting institutions tend to specialize in exports for which relation-specific investments are most important. His estimates show that the quality of contract enforcement explains a larger share of global trade patterns than counties' factor endowments.

Analysis by Costinot (2009) proposes a theoretical model seeking to explain how contract enforcement institutions affect comparative advantage. The author creates a simple theory of international trade where technological and productivity differences across countries are assumed to be endogenous. His analysis explores the underlying sources of comparative advantage, focusing on variables such as the degree of firms' division of labour and team size. Costinot (2009; p. 9) finds that:

> *The team size increases with the quality of institutions and the complexity of the goods, but decreases with the productivity of the workforce. Under free trade, the country where teams are larger – in efficiency units of labour – specializes in the more complex goods. In our set-up, it is the country where the product of institutional quality and workers' human capital is larger. Hence, better institutions and higher levels of education are complementary sources of comparative advantage in the more complex industries.*

Ranjan and Lee (2007) undertake an empirical analysis of the impact of contract enforcement on trade, demonstrating that trade volumes are more affected by contract enforcement quality in sectors that are more institutionally-intensive. This analysis uses Rauch's (1999) classification of internationally traded goods. In line with other studies, the authors find a positive correlation between the quality of contract enforcement and the volume of international trade, with this impact becoming more pronounced for more differentiated goods.

Berkowitz et. al. (2006) assess how the quality of national institutions, in particular those related to complex products whose distinctive features are hard to fully specify in a contract, affect international exchange. The authors show that well-designed institutions in an exporting country increase international trade. Institutions in both the importing and the exporting countries are assumed to influence transaction costs in simple and complex products. But "while international transaction costs affect the costs of trade, domestic transaction costs affect complex and simple products differently, thereby changing comparative advantage."

Finally, an academic paper by Schuler (2003) is one of the few studies on the topic concentrating on a specific region for its analysis. The author examines variations in the structure of international trade of post-Soviet economies and shows that as the institutional arrangements of the command economy disintegrated, net exports in institutionally intensive sectors shrunk to a greater extent than exports in industries with weaker reliance on institutions.

2.3.3.1 Contract Enforcement

As highlighted by Belloc (2006), "institutions and transaction costs may influence international competitiveness operating through their effects on the production structure by making some organizational arrangements more efficient than others." This observation echoes the discussion on the production effect of institutions in Chapter 1. A country's efficiency in producing a certain good depends on its capabilities with regard to production processes, idiosyncratic rules and norms of behaviour, and the prevailing organizational structures.

A large body of academic research integrates the assumptions of contract incompleteness within international trade models and analyses how this feature affects organizational structures of firms. One of the first studies on in the field is McLaren (2000) who examines how trade openness influences the organization of production in an industry equilibrium. In this

theoretical model, final good producers must decide whether to outsource production or to undertake vertical integration. This choice in turn determines whether their input suppliers produce highly specialized or more flexible components. The author argues that opening to trade has the effect of "thickening" the market, giving each firm a greater selection of procurement options from "downstream" suppliers. This in turn has the effect of "facilitating leaner, less integrated firms," allowing the author to conclude that "the effects of the opening up of trade on vertical structure are unambiguously efficiency enhancing."

Antràs and Helpman (2004) proceed from similar assumptions regarding firms' choices on final good production. The authors describe a North-South model of international trade, based on the notions of contract incompleteness and monopolistic competition, in which firms must decide between integration (either domestic or multinational) or outsourcing (either domestic or foreign). They show that when trade costs decline, final-good producers tend to rely more on foreign outsourcing than on the creation of multinational firms. Theoretical model by Grossman and Helpman (2002) also analyses the choice between integration and outsourcing, in closed and open economy frameworks. They find that international outsourcing depends on the thickness of the market for input suppliers, institutions of contract enforcement in a country, and costs of information regarding foreign and domestic markets.

Extending Grossman and Helpman's analysis, Antras (2003) creates a two-country, two-good (final and intermediate) model. In the model, final-good producers decide whether to share investment costs of intermediate input production with their suppliers. Investment-sharing is assumed to decrease the severity of the hold-up problem but become more difficult in labour-intensive sectors. Under these assumptions, vertical integration becomes more likely as the intermediate input becomes more capital-intensive.

Recent analysis by Ferguson and Formai (2010) focuses more on the empirical investigation of the problem, studying the relationship between vertical integration capacity on one hand and the link between institutions and trade on the other. The study's key contribution is to demonstrate that "organizational form matters when measuring the effect of institutions on comparative advantage." The authors observe that as firms become more vertically integrated, the effect of contract-enforcing capacity on a country's comparative advantage weakens – a result particularly relevant for complex goods. In addition, the authors discover that countries with well-developed financial institutions export relatively more in sectors that are more complex and have a higher propensity for vertical integration.

Ferguson and Formai first test their assumptions with a cross-sectional analysis, which exploits cross-country variation in institutional quality and cross-industry variation in complexity and vertical integration propensity. Following that, the authors test their assumptions with a panel and event study analyses, exploiting the available time variations in financial development provided by capital account liberalizations that occurred in several countries during the years 1984-2000. The authors note that the use of both cross section and panel analysis can give additional insights in the impact of institutions on trade patterns.

Contract incompleteness is not the only institutional characteristic shown to have an impact on industrial organization and trade. There is also evidence that institutional weaknesses in the form of excessive regulation can distort industrial organization. Fisman and Sarria-Allende (2004) show that sectors facing unwarranted bureaucratic procedures related to opening a business react to positive economic shocks (such as decreased trade barriers) through the growth of existing companies. In addition, in these environments sectors with large sales turnover tend to have just a few large firms. On the other hand, sectors operating under low entry barriers respond to positive shocks by creating new firms, and tend to have many small firms in sectors with large sales turnover. The authors therefore conclude that regulatory frameworks are capable of distorting the industry's structure and in some cases promote industry concentration.

2.3.2 Property Rights and Trade Patterns

Analysis by Mansfield (1995) is among the earlier studies examining the potential importance of property rights in firms' allocation of tangible to intangible assets. Analysing a survey of firm managers, he states that "most of the firms we contacted seemed to regard intellectual property rights protection to be an important factor influencing technology transfer and investment decisions."

A seminal study of the impact of property rights on comparative advantage is Claessens and Laeven (2003). The authors compute industry growth rates for a large set of developed and developing countries and find that countries with poor protection of property rights have lower growth rates in sectors that are more dependent on intangible assets. This empirical finding is in line with their key hypothesis, namely that "the degree to which firms allocate resources in an optimal way will depend on the strength of a country's property rights, with the allocation

effect being important for consequent firm growth." Claessens and Laeven show that investment allocation is less efficient in countries with week institutions. Firms in these countries tend to under-invest in intangible assets.

Apart from Claessens and Laeven, few studies have investigated the impact of property rights on shaping comparative advantage. Some studies do however investigate the impact of property rights on other economic outcomes. For instance, Chichilnisky (1994 p. 853) designs a model of international trade where dissimilarities between regions in the protection of property rights create an incentive for trade among otherwise identical countries. She describes his model as follows:

> *Two regions with identical technologies, endowments, and preferences will trade if one, the South, has ill-defined property rights on environmental resources. Trade with a region with well-defined property rights transmits and enlarges the problem of the commons: the North over consumes under-priced resource-intensive products imported from the South. This occurs even though trade equalizes all prices, of goods and factors, worldwide. Taxing the use of resources in the South is unreliable as it can lead to more over extraction. Property-rights policies may be more effective.*

Johnson, McMillan and Woodruff (2002) analyse the impact of property right in Eastern Europe and the former Soviet Union. Using a sample of firms from the region, they show that weaker properly rights discourages companies from investing their profits, even if bank loans are readily available. According to the authors, this relationship suggests that appropriate protection of property rights is both a necessary and a sufficient condition for entrepreneurial investment.

Finally, Stern, Porter, and Furman (2000) assess how the security of intellectual property rights affects the capacity to innovate. Based on a cross-country sample, the authors find that countries with better intellectual property right protection indeed exhibit higher rates of innovation, as measured by the degree of international patenting.

2.3.3 Financial Development and Comparative Advantage and Trade Patterns

A burgeoning volume of literature suggests linkages between the quality of financial institutions and comparative advantage in sectors dependent on financial systems. Analysis indicates that across countries, industries relying more on external capital tend to grow faster in environments with more developed financial systems. In the case of financial markets,

institutional quality underscores the ability of the financial system to diversify risks and provide insurance.

A seminal study by Rajan and Zingales (1998) assesses the impact of financial development. Although they do not analyse trade patterns, their results can be easily extended to issue of trade. The authors ask "whether industrial sectors that are relatively more in need of external finance develop disproportionately faster in countries with more developed financial markets." They find this to be true for a large sample of countries – a result that is unlikely to be affected by omitted variables, outliers or reverse causality. In a similar study, Carlin and Mayer (2002) examine the relationship between the institutional structures and industry characteristics. The study, based on a sample of industries in OECD countries, analyses sectoral growth in the period from 1970 to 1995. The authors show that there is a relation between institutional characteristics of the financial systems, sectoral characteristics, and the growth and investment of industries in different countries.

Manova (2008) provides evidence that credit constraints are an import determinant of trade patterns. The author develops a model of international trade based on three assumptions, namely that (1) firms are heterogeneous in nature; (2) countries vary in their levels of financial development; and (3) industries differ in their dependence on external finance. Manova finds that credit constraints driven by the countries' levels of financial development influence trade patterns. In particular, she finds that countries with sophisticated financial sectors have a higher probability of trading among themselves and have higher export volumes when they become exporters. This effect is particularly strong in industries that have a higher reliance on external finance for growth and/or fewer collateralizable assets.

Ju and Wei (2005; p. 1) develop a theory of international trade in which financial development and factor endowments jointly determine the patterns of comparative advantage. The authors describe their model as follows:

> *We apply the financial contract model to the Heckscher-Ohlin-Samuelson (HOS) model in which firms' dependence on external finance is endogenous, and the demand for external finance is constrained by financial development. If the external finance constraint is binding, a part of the capital endowment may be unemployed. [Then] financial development increases the relative output of the capital intensive industry, and therefore reduces its price. Both owners of unemployed capital and labour benefit from financial development, while owners of the incumbent capital are worse off. In this sense, financial development depends on the relative strength of political forces*

among labour, unemployed (or potential) capital owners, and incumbent capital owners.

Using data for 65 countries over a 30-year period, Beck (2002) confirms that financial development has a large effect on the volume of exports and trade balance of manufactured goods. Controlling for country-specific effects and the possibility of reverse causality, the author finds that the outcomes of trade-related reforms on export volumes and export-import balance depend on the degree of financial development prevailing in a country. Finally, Do and Levchenko (2004) show that financial systems in countries with more substantial financially-intensive economic sectors tend to be more developed.

2.3.4 Labour Market Institutions and Trade Patterns

Several studies investigate the assertion that labour market institutions affect comparative costs. One of the most influential analyses is Cuñat and Melitz (2006). The authors hypothesize that flexibility of labour markets can be a source of institutional comparative advantage. Their model investigates the relationship between volatility, labour market flexibility and trade volumes. Cuñat and Melitz note that cross-country differences in the flexibility of labour markets may influence the ability of firms in different environments to adjust to idiosyncratic labour market shocks in different ways. Holding other factors constant, countries with more flexible labour markets appear to specialize in high-volatility industries. The authors support these findings with empirical analysis, which samples numerous developed and developing countries to demonstrate that countries with flexible labour markets export more in volatile sectors.

Belloc (2004) analyses the ways in which differences in institutional structures affect labour markets, within the framework of the standard production function. She develops an international trade model that assumes the level of workers' effort to be endogenously given. The level of effort can then be influenced by labour market institutions prevailing in a given country; through this effect, institutional environment can determine comparative advantage of countries. Belloc empirically tests the validity of the model on a sample of OECD countries, showing that labour market institutions explain a large share of performance differences in several manufacturing sectors. In particular, well-designed labour market institutions support the development of capital-intensive sectors and disadvantage labour-intensive ones.

Esfahani and Mookherjee (1995 p. 11) adopt a slightly different angle in analysing the impact of institutional environment on labour markets. The authors assess the source of significant cross-country differences in labour productivity, with focus on incentive contracts (mechanisms to set "the incentive systems for their workers and other input suppliers"). They argue that:

> *The prevalence of low-powered incentive contracts in LDC [least-developed-country] firms can be attributed to externalities in contract choice that happen to be large under typical LDC conditions – in particular, situations of relatively abundant labour and high effective discount rates. In choosing the incentive systems ..., firms weigh the savings from productivity gains against the 'informational rents' required for creating strong performance incentives. The former largely depend on the opportunity cost of labour, while the latter are strongly influenced by the effective rates of discount. As a result, in labour abundant and high-discount rate countries, firms often find it profitable to forgo productivity gains and save on informational rents, by opting for low-powered contracts.*

A more recent study of labour market institutions and trade examines a previously unexplored hypothesizes. Tang (2010) focuses on skill acquisition and the way in which labour market institutions influence comparative advantage through this effect. He hypothesizes that higher employment protection encourages workers to acquire firm-specific skills. This in turn implies that companies in countries with more protective labour markets will have a comparative advantage in sectors that require workers to have more sector specific-skills relative to others.

2.4 Integration and Institutions: Reverse Causality?

So far this chapter overviewed studies and theoretical models suggesting that differences in institutional environment among countries partially determine the structure and volume of their exports. There are also several theoretical assumptions and empirical evidence that institutional environment can in turn be altered by international trade. In particular, recent evidence indicates that enhanced competition resulting from foreign trade affects institutional governance; in this way, trade policy can indirectly support the fight against corruption.

As noted by Winters (2004), "the less restrictive is trade policy, the lower are the incentives for corruption while simpler more transparent and non-discretionary policies reduce the scope for corruption." Empirical evidence for this assertion is offered by Ades and Di Tella (1999), who show a correlation between economic rents resulting from trade restrictions, active industrial policy measures and higher corruption rates. Corruption, as demonstrated by Mauro (1995), lowers investment and economic growth.

Wei (2000, cited in Winters, 2004) examines another potential reason for the relationship between corruption and trade openness: “open countries face greater losses from corruption than less open ones, because corruption impinges disproportionately on foreign transactions. As a result they have greater incentives to develop better institutions.” Wei (2000) supports this hypothesis through a cross-country panel analysis. The author shows that corruption is associated with what he terms “natural openness” (the share of trade that can be attributed to clear exogenous variables such as distance, population and land area), but not with “residual openness.” The latter term Wei defines as the difference between actual and natural openness which can be related to the economic policies implemented by a country.

Interestingly, by extension Wei’s model also implies that “natural openness” rises with average income per capita and decreases with income inequality, hence countries that are richer and more equitable should be inherently less corrupt. He finds that his indicators of governance, corruption and relative public sector wages are related to natural openness. In other words, Wei shows that economies with a higher level of “natural openness” have lower corruption and that these economies have better civil servant compensation, which, according to Wei, indicates that these economies value governance to a larger extent.

As mentioned above, Wei’s (2000) crucial contention is that openness leads to higher competition in a market and makes poor-quality institutions more costly to maintain for governments and hence openness can facilitate institutional reform. A study by Acemoglu, Johnson and Robinson (2005) seeks to substantiate this assertion. The authors show that the emergence of transatlantic trade in the 1800’s expanded the demand for high-quality institutions that enhanced trade.

More recently, Do and Levchenko (2007) have shown, based on data from 96 countries in the period from 1970 to 1999, that the demand for external finance tends to increase with increased degree of specialization, and that in this way specialization reinforces the development of financial institutions.

Marin and Verdier (2005) suggest that openness to international trade can not only affect financial institutions but also facilitate the development of decentralized corporate hierarchies. Using a sample of 660 German and Austrian firms, the authors show that international competition leads to “inter-firm reallocations towards more productive firms,” usually those in

which CEOs have greater executive power. They attribute this fact to the hypothesis that CEOs are more apt to manage a company in the face of international competition.

The concept of reverse direction of causality, from industrial organization to the structure of financial systems, was discussed in detail by Williamson (1988), who assessed financial system structure and whether they are based on debt or equity. In the author's analysis as well as in the transaction cost economic framework more broadly, evidence suggests that "the technological system endogenously selects the most efficient financial arrangements involving complementarities and leading to alternative equilibrium solutions" (Belloc, 2006). Finally, Svaleryd and Vlachos (2005) find that strong financial institutions enable a country to more successfully open its economy to global competition.

2.5 Conclusion

The relationship between institutional quality and international trade patterns is a complex and multi-dimensional phenomenon with mutual feedback effects, which magnifies the challenge of identifying the magnitude and direction of causality. Through a detailed literature review, this chapter highlighted some of the complexity pervasive in the existing body of literature addressing the impact of institutions on trade.

Because of the issue's complexity, we need to circumscribe the field of analysis. As previously indicated, the focus of this study will be on the *production effect,* i.e. the specific avenue of institutional impact that influences production costs and hence the patterns of comparative advantage.

This chapter summarized empirical and theoretical evidence that the chain of causality runs from better institutions to improved export performance, and through that effect enhances economic growth and incomes. Some evidence also support the reverse causality hypothesis, which would indicate that increasing trade openness improves governance and institutions, in particular by lowering corruption. Further sections of the Thesis test the direction of causality and the hypothesis contained in chapter 1, starting with a description of the methodology and data in the following chapter.

Chapter 3: Methodology and Data

3.1 Introduction

This chapter introduces the methodologies and data used in the Thesis. The core methodology used in this study is an econometric or quantitative analysis of patterns of trade, industry growth and productivity. The quantitative methodology is also supplemented with a qualitative case study approach, which uses a survey of manufacturing firms to verify the results of the econometric enquiry. In addition this chapter explains why a particular methodology was chosen.

This chapter contains a full description of the econometric methodologies, including any modelling issues and problems, as well as provides techniques for solving these problems. The empirical chapters focus more on the actual methodology of estimation of the models. In order to improve the "flow" of the Thesis in some limited instances this chapter repeats information also contained in the empirical chapters. This applies in particular to the actual equation that the econometric models calculate.

A similar approach has been followed in the section describing the data. The chapter therefore provides detailed background information regarding all the data used in this study. Empirical chapters in turn provide more details regarding the data and their particular application in the methodology. This study is structured in this way to ensure that the flow of the Thesis is maintained, and that the discussions are in their most suitable contexts.

Chapter 3 is structured as follows. Section 3.2 begins with an overview of the gravity model used in Chapter 4, trade and industry growth model applied in Chapter 5 and the firms' productivity model employed in Chapter 6. Section 3.3 provides an overview of the case study methodology. Section 3.4 describes the data used in the Thesis. The second part of Section 3.4 describes additional data that are required for estimation of the gravity, productivity and trade, and industry growth models. Section 3.5 highlights some data management issues and finally, Section 3.6 concludes.

3.2 The Quantitative Methodology

3.2.1 Gravity Model

The gravity model is the key baseline model that estimates the impact of trade on trade flows. It is derived from Isaac Newton's law of gravity, which assumes that:

$$F_{ij} = \frac{\mathrm{G\ M_i M_j}}{D_{ij^2}} \qquad (3.4)$$

Where F is the attractive force of objects *i* and *j*; M stands for mass; D is distance and G is a constant term.

The gravity model applied to international trade is a simple extension of the above. This model is as follows:

$$X_{ij} = \frac{K\ \ Y_{i^\infty}\, Y_\beta}{T_{ij^\theta}} \qquad (3.5)$$

Where X is exports; i and j are two distinct countries; Y is a proxy for a country's economic size, such as GDP and population, and T are trade costs. Therefore the main assumptions of the model are that trade rises with the size of the economies and falls with higher trade costs. The model has often been used to estimate the effects of trade costs and a variety of policy issues including RTAs, customs and currency unions, and the impact of WTO and GATTS membership.

Since its first application by Tinbergen (1962) and Polhonen (1963) the model was heavily criticised for its lack of theoretical underpinning. Recent development in trade theory has, however, provided a strong theoretical basis for the gravity model. Anderson (1979) derives a gravity like equation from a general equilibrium model. Deardorf (1998) show that the gravity model can arise from traditional factor proportions explanation of trade. Anderson and Van Wincoop (2003) draw it from a model of monopolistic competition in differentiated products while Helpman *et al.* (2004) obtained it from a theoretical model of international trade in differentiated goods with firm heterogeneity (WTO, 2005). In fact, Baldwin and Taglioni (2005) argue that the gravity model has a more solid theoretical foundation than any other available

trade model. Moreover, it remains the most empirically robust model available to describe bilateral trade flows between countries.

On important econometric problem of gravity models is highlighted by Anderson and Van Wincoop (2003). The authors show in their theoretical framework that "bilateral trade is determined by relative rather than absolute trade costs." Hence, a country's trade with any given partner is dependent on remoteness to the rest of the world. Therefore, for example, the US and Canada trade more with each other than the gravity model predicts because there are not many other large markets in the vicinity. On the other hand Poland and Spain trade less with each other than standard theory would predict, as there are many other large trading partners between these two countries to trade with. In other words, a country's distance from the rest of the world is important for the way that a country trades. To control what Anderson and Wincoop call "multilateral resistance" we include a remoteness term in our model. Head (2003) has introduced a remoteness term in the gravity model as a control for "multilateral resistance". He defines remoteness as:

$$remote_j = \frac{1}{\sum_k^N \frac{GDP_k}{D_{kj}}} = \frac{1}{\frac{GDP_1}{D_{1j}}} + \frac{1}{\frac{GDP_2}{D_{2j}}} + \ldots\ldots + \frac{1}{\frac{GDP_j}{D_{jj}}} + \ldots\ldots + \frac{1}{\frac{GDP_N}{D_{Nj}}} \qquad (3.6)$$

Where N is the total number of trading partners, D_{jk} is the distance between country *j* and country *k*, and GDP_k is country *k's* GDP. $Dist_{jj}$, the internal distance of country *j*, is calculated as the square root of country *j's* total land area. We apply Head's methodology to calculate the remoteness term in this study.

3.2.2 Trade and Industry Growth Modelling

The basic methodology applied in this study is the difference-in-differences approach. The difference-in-differences methodology is often used in studies where a researcher designs a treatment and control groups. In this situation the researcher compares the performance of the treatment group pre- and post-treatment relative to the performance of the control group pre- and post-treatment. This is done in order to investigate whether the "treatment" has induced a different outcome in the control group.

An exposition of a typical difference-in-difference approach as presented in Meyer (1994) is included in Appendix 1. The approach in this Thesis is in essence similar to the one described in Meyer (1994). The key difference is that this analysis does not explicitly have a treatment and control group but analyses differences within countries and sectors in a similar fashion. The study compares how country differences in institutional endowments affect industries within these countries. The first "level" of difference is at country level and the second "level" is at an industry level – hence difference-in-differences. Details regarding the methodology are included in section 5.2.2. It is also important to add that all of empirical chapters use a variation of this methodology as all the chapters attempt to analyse the within-country and within-industry variations.

3.2.3 Productivity Analysis

The approach in this study is to disentangle the impact of institutional environment on firms' productivity. But before we proceed, it is necessary to clarify what is meant by total factor *productivity*. Total factor productivity (TFP) refers to "the effects of any variable different from the inputs labour (L), intermediate materials (M) and capital services (K) - affecting the production (sales) process" (Escribano and Gausch, 2005). The assumptions in the productivity literature are that "the unobserved firm-specific effects can be calculated from a production function as the difference between the productivity that the model predicts and that actually observed in reality" (Van Biesebroeck, 2007).

To calculate the impact of institutional variables on productivity we use two approaches: the Levinsohn and Petrin procedure (2003) and Escribano and Gausch (2005) methodology which are explained in details in Section 6.2.2. Here it is sufficient to note that for both methodologies we assume the standard neo-classical Cobb Douglas production function and this in essence is the estimated equation in this part of the analysis:

$$Y = A_{it} K_{it}^{\beta(k)} L_{it}^{\beta(l)} \qquad (6.1)$$

3.2.4 Two Stage Least Squares

Chapter 2 has emphasised that institutions and trade might both be determining each other, i.e. better institutions might enhance trade but also higher trade might improve countries' institutions. In order to isolate the effect of institution on trade and determine which way the causality goes, researchers often utilise the so-called instrumental variable approach. In the

case of this research an instrumental variable is a variable which correlates highly with countries' institutions but is unlikely to affect trade patterns. Two-Stage-Least-Squares (2SLS) is an econometric methodology that makes use of an instrumental variable and is outlined below. In its simplest form 2SLS uses a standard regression model:

$$y=\alpha+\beta x+\varepsilon \qquad (3.29)$$

where *y* is the dependent variable, x is the independent variable, and α and β are estimable parameters; ε is the error term. If y and x are joint determinants of each other, then x and ε are likely to be correlated. This violates one of the key assumptions of the regression framework and can lead to inconsistent estimates. 2SLS is a technique that mitigates this problem. Let us denote *z* as the instrumental variable(s). The 2SLS model then is calculated by obeying the following two procedures:

- a simple OLS regression is run of x on z and this will yield predictions for $\hat{x}$ (x hat). The second stage involves:
- regressing y on $\hat{x}$

By forming predictions for x in the second stage through the instruments z, we correct for the correlation between the error term and the independent variable. [9]

3.3 The Qualitative Methodology

3.3.1 Case Study Approach

Orum (2002) defines the case study as "a research strategy with special implications for theoretical analysis and data collection". In this methodology, "a single case of a particular phenomenon is examined intensively for the light that it can shed on a specific problem or question".

The first approach for providing a scientific background to a case study approach was already made by John Stuart Mills (George and Bennett, 2001). It was further refined by Alexander George (1979) who advocated notions such as "congruence testing" and "process tracing". According to George "congruence testing" is a case study method where the researcher checks

[9] Here it is important add that throughtout the quantitiave analysis the following nomenclature will be used: *will indicate statistical significance at 10% level; ** - at 5% level and; *** - at 1% level.

whether the prediction of a theory in a specific case and taking account of the values of the case's independent variables, is congruent with the actual outcome." George specifies "process tracing" as an "examination of whether the causal process of a theory hypothesizes in a case is in fact evident in the sequence and values of the intervening variables in that case."

Case study approaches have been used in fields as diverse as sociology, biology, history and economics for several decades and account for a large share of academic research. The underlying methodology of the case study approach is based more on logical and intuitive analysis rather than on statistical inference. Orum (2002) notes that a "lack of formalization of the logic of case study methods inhibited them achieving their full potential for contributing to the progressive and cumulative development of theories." Only in the past thirty years have academics "formalized case study methods and linked them to underlying arguments in the philosophy of science" (Orum, 2002). More recently there is an increasing understanding and consensus among scholars that statistical methods and case study approaches are largely complementary, and that combined they are able to achieve a deeper understanding of an issue under investigation than either of the two approaches could do alone.

Jütting (2003; p. 36) with specific reference to studying the impact of institutions in economics highlights that:

> *The challenge researchers will need to address is the trade-off between the need to zoom down to a specific case study scenario where one has the possibility of identifying otherwise neglected links and the wish to generalise findings beyond the particular context. To learn from "successful examples" requires a benchmark and reference points that guide the application of potential changes in different environments. A comparative case study approach could be useful to derive policy conclusions that would go beyond the individual case study whilst remaining precise enough to formulate precise policy recommendations.*

Finally, Shirley (2003; p. 37) highlights the importance of case studies:

> *It may be possible to fill the gap in our understanding with a pincer movement. Statistical analyses are already moving from aggregation to specificity; case studies will need to move from sui generis to comparative. Case studies can be powerful tools when they are analytical narratives, cases that test hypotheses with methodological rigor and also describe historical context, norms and beliefs and institutional adaptations, all the rich nuances of the institutional setting.*

George (1979, cited in Orum, 2002) also develops a methodology of conducting case studies which he calls “structured focused comparison”. In line with the empirical methodology outlined above the method entails several methodological steps:

1. specification of the research problem and the class of events to be studied;
2. definition of the independent, dependent variables of the problem to be analysed;
3. selection of the case(s) study to be investigated
4. design of the research questions to be studied in the case study

The important characteristics of a case study method discerned in the literature are the distinction between the “case study methods” which refers to an internal examination of a single case, and “comparative methods” which applies a comparison methodology among some cases. For the purposes of this Thesis a mixture of the two approaches will be used. The country chosen for the case study will be analysed both in comparison to other countries in the region and the world, and its idiosyncratic traits will also be examined.

A given institutional setting can provide a rich amount of information on institutional structures and incentives to different individuals, depending upon their economic and political setting. Furthermore, the literature highlights that policy advice on institutional change should be country-specific and tailored to particular settings; hence a case study seems to be an appropriate methodology to complement the empirical analysis.

There are several advantages of the case study approach as highlighted by Bennett (2002):

1. A case study methodology allows for the analysis of a specific question or event in a high degree of detail, or in other words the methodology allows for a larger amount of specific knowledge about the case in question that would be impossible in a quantitative analysis.
2. A case study approach also allows for the study of the historic and political contexts in greater detail, and this is regarded as essential to understanding the nature of the phenomenon.
3. Focusing on one case study also allows for an alternative approach to analysing empirical data. By focusing on one case and making some comparisons it is possible to provide a different angle to the multidimensional empirical analysis.

4. A case study methodology is also sometimes chosen because it represents an independent entity that allows scholars to examine a phenomenon.
5. Lastly, case study is a good methodology to show a special illustration of the phenomenon under investigation. The methodology can highlight exceptions to the rules, or deviant cases, therefore allowing the researcher to analyse the problem in more detail.

It is however important to highlight the limitations of case study methods. The most important one is the "potential for indeterminacy when attempting to sort out rival explanations in a small number of cases" (Orum, 2002). Also, it can be difficult to obtain a detailed understanding of more than a few cases, and hence lead to broad generalisations on the basis of a small numbers of cases.

This case study chapter will use the four-step methodology described above to carry out a case study of the potential impact of institutions on enhancing trade in Lesotho, a small landlocked country in Southern Africa. Chapter 7, which is the case study chapter, provides a detailed explanation for the choice of Lesotho as a case study. Chapter 1 has already provided a detailed identification of the research question to be studied, which is the first part of the methodology of the case study.

The case study will use both primary and secondary data to draw conclusions on the importance of institutions for trade patterns in Lesotho. The primary data source, i.e. a data source that is generated by the researcher, will be a detailed manufacturing survey conducted in Lesotho in July-August 2010.

3.4 Data Used in the Study

3.4.1 Institutional Quality Data

In the past decade several international institutions and think-tanks have developed cross-country measures of institutional quality that assess a wide range of institutional sub-components. The vast majority of these measures are based on perceptions of managers across the world and therefore can suffer from perception biases. The main source of data for institutional quality for this study is obtained from the World Bank's Doing Business project. The project assesses institutional quality across the world be measuring the cost and time of procedure for doing business. The key assumption is that the cheaper and faster it is to obtain

licences, open a business or enforce contracts, the better the country's institutional environment. The Doing Business project therefore has an advantage over other measures of institutional quality in that it is not based on peoples' perceptions.

According to the Doing Business Indictors (DBIs) website[10]:

> *The project provides objective measures of business regulations and their enforcement across 183 economies and selected cities at the subnational and regional level. By gathering and analysing comprehensive quantitative data to compare business regulation environments across economies and over time the DBIs offer measurable benchmarks for reform; and serves as a resource for academics, journalists, private sector researchers and others interested in the business climate of each country.*

The data for DBs are collected using a standardised survey. The methodology to carry out the survey is as follows. The World Bank Doing Business Project presents a unified business case to all surveyed entities in order to ensure comparability across countries and over time. This includes standardised assumptions about the firm size, location, sector of operations and the legal form of the business. The survey is carried out by over 8,200 local experts including accountants, freight forwarders, business consultants, lawyers, etc. According to the DBIs project, several robustness tests are carried out to ensure that the information contained in the indicators does not contain errors and omissions.

The vast majority of indicators of institutional quality are constructed using data contained in the DBIs. In order to ensure that the results obtained in the econometric analysis are robust to alternative specification, several other indicators are also utilised and are described below.

3.4.1.1 Contract Enforcement Indicator (Country Level)

The main contract enforcement indicator is constructed using information related to the cost and effectiveness of regulation from the DBIs. The DBIs contains information on enforcing contracts by quantifying the effectiveness of the courts in solving a business dispute. The statistics are made based on a fictional case of a commercial sale dispute before a court. To ensure comparability across countries, the case has several assumptions. These assumptions are that the value of the dispute exceeds 200 per cent of countries' GDP and that the dispute takes place in the largest commercial centre of a country.

[10] www.doingbusiness.org

The DBIs collect three types of information regarding the above case. First, the DBIs collect data and provide a list of procedures for each country that traces the sequence of events of a commercial dispute before the court. The Doing Business project defines a procedure as "any interaction, required by law or commonly used in practice, between the parties or between them and the judge or court officer" (World Bank, 2011). Secondly, the DBIs collect the time it takes from the moment the plaintiff decides to file the lawsuit in court until payment. Then, the average time for each state of the dispute resolution process is documented. Third, the project collects information regarding the costs of the legal procedures, which is recorded as a percentage of the claim. Three types of costs are recorded: legal fees, judicial costs and enforcement costs.

Using the DBIs index of quality of contract enforcement is calculated. This index consists of the following subcomponents:

- number of procedures in a court case involving bridging a contract;
- time in calendar days to resolve the dispute;
- cost in court fees and attorney fees, where the use of attorneys is mandatory or common, expressed as a percentage of the debt value.

Table 3.1 (below) provides a summary of the contract enforcement measures that will be used in the Thesis.

Table 3.1: Indicator of Country Level Quality of Enforcement of Contracts (2009)

Country	Enforcing Contracts (Rank)	Procedures (no)	Time (days)	Cost (% of claim)
Afghanistan	162	47	1642	25
Albania	89	39	390	35.7
Algeria	127	46	630	21.9
Angola	181	46	1011	44.4
Antigua and Barbuda	73	45	351	22.7
Argentina	45	36	590	16.5
Armenia	63	49	285	19
Australia	16	28	395	20.7
Austria	9	25	397	18
Azerbaijan	27	39	237	18.5
Bahamas, the	120	49	427	28.9
Bahrain	117	48	635	14.7
Bangladesh	179	41	1442	63.3
Belarus	12	28	225	23.4
Belgium	21	26	505	16.6
Belize	168	51	892	27.5
Benin	177	42	825	64.7
Bhutan	33	47	225	0.1

Bolivia	136	40	591	33.2
Bosnia and Herzegovina	124	37	595	40.4
Botswana	70	29	625	28.1
Brazil	98	45	616	16.5
Brunei Darussalam	159	58	540	36.6
Bulgaria	87	39	564	23.8
Burkina Faso	108	37	446	81.7
Burundi	171	44	832	38.6
Cambodia	142	44	401	102.7
Cameroon	173	43	800	46.6
Canada	58	36	570	22.3
Cape Verde	38	37	425	21.8
Central African Republic	173	43	660	82
Chad	164	41	743	45.7
Chile	68	36	480	28.6
China	15	34	406	11.1
Colombia	150	34	1346	47.9
Comoros	152	43	506	89.4
Congo, Dem. Rep.	172	43	625	151.8
Congo, Rep.	158	44	560	53.2
Costa Rica	130	40	852	24.3
Côte d'Ivoire	126	33	770	41.7
Croatia	47	38	561	13.8
Cyprus	104	43	735	16.4
Czech Republic	78	27	611	33
Denmark	30	35	410	23.3
Djibouti	160	40	1225	34
Dominica	167	47	681	36
Dominican Republic	84	34	460	40.9
Ecuador	100	39	588	27.2
Egypt, Arab Rep.	143	41	1010	26.2
El Salvador	51	30	786	19.2
Equatorial Guinea	72	40	553	18.5
Eritrea	48	39	405	22.6
Estonia	50	36	425	26.3
Ethiopia	57	37	620	15.2
Fiji	63	34	397	38.9
Finland	11	32	375	13.3
France	7	29	331	17.4
Gabon	148	38	1070	34.3
Gambia, the	67	32	434	37.9
Georgia	41	36	285	29.9
Germany	6	30	394	14.4
Ghana	45	36	487	23
Greece	88	39	819	14.4
Grenada	161	47	688	32.6
Guatemala	101	31	1459	26.5
Guinea	130	50	276	45
Guinea-Bissau	139	40	1140	25
Guyana	74	36	581	25.2
Haiti	91	35	508	42.6
Honduras	175	45	900	35.2
Hong Kong	2	24	280	19.5
Hungary	22	35	395	15
Iceland	3	27	417	8.2
India	182	46	1420	39.6
Indonesia	154	40	570	122.7
Iran	49	39	505	17

Iraq	141	51	520	28.1
Ireland	37	20	515	26.9
Israel	96	35	890	25.3
Italy	157	41	1210	29.9
Jamaica	128	35	655	45.6
Japan	19	30	360	22.7
Jordan	129	38	689	31.2
Kazakhstan	36	38	390	22
Kenya	125	40	465	47.2
Kiribati	80	32	660	25.8
Korea, Rep.	5	35	230	10.3
Kosovo	155	53	420	61.2
Kuwait	114	50	566	18.8
Kyrgyz Republic	54	39	260	29
Lao PDR	110	42	443	31.6
Latvia	14	27	309	23.1
Lebanon	122	37	721	30.8
Lesotho	116	41	785	19.5
Liberia	166	41	1280	35
Lithuania	17	30	275	23.6
Luxembourg	1	26	321	9.7
Macedonia, FYR	65	37	370	33.1
Madagascar	153	38	871	42.4
Malawi	121	42	312	94.1
Malaysia	59	30	585	27.5
Maldives	92	41	665	16.5
Mali	133	36	620	52
Marshall Islands	62	36	476	27.4
Mauritania	83	46	370	23.2
Mauritius	61	36	645	17.4
Mexico	81	38	415	32
Micronesia	147	34	965	66
Moldova	20	31	365	20.9
Mongolia	35	32	314	30.6
Montenegro	135	49	545	25.7
Morocco	106	40	615	25.2
Mozambique	132	30	730	142.5
Namibia	41	33	270	35.8
Nepal	123	39	735	26.8
Netherlands	29	26	514	24.4
New Zealand	9	30	216	22.4
Nicaragua	66	35	540	26.8
Niger	138	39	545	59.6
Nigeria	97	40	457	32
Norway	4	33	280	9.9
Oman	104	51	598	13.5
Pakistan	155	47	976	23.8
Palau	145	38	885	35.3
Panama	119	31	686	50
Papua New Guinea	163	42	591	110.3
Paraguay	107	38	591	30
Peru	110	41	428	35.7
Philippines	118	37	842	26
Poland	77	38	830	12
Portugal	24	31	547	13
Puerto Rico	99	39	620	25.6
Qatar	95	43	570	21.6
Romania	54	31	512	28.9

Russian Federation	18	37	281	13.4
Rwanda	39	24	230	78.7
Samoa	82	44	455	19.7
São Tomé	179	43	1185	50.5
Saudi Arabia	140	43	635	27.5
Senegal	148	44	780	26.5
Serbia	94	36	635	28.9
Seychelles	69	37	720	15.4
Sierra Leone	144	40	515	149.5
Singapore	13	21	150	25.8
Slovak Republic	71	31	565	30
Slovenia	60	32	1290	12.7
Solomon Islands	108	37	455	78.9
South Africa	85	30	600	33.2
Spain	52	39	515	17.2
Sri Lanka	137	40	1318	22.8
St. Kitts and Nevis	115	47	578	20.5
St. Lucia	165	47	635	37.3
St. Vincent and the Grenadines	103	45	394	30.3
Sudan	146	53	810	19.8
Suriname	178	44	1715	37.1
Swaziland	170	40	972	56.1
Sweden	52	30	508	31.2
Switzerland	28	31	417	24
Syrian Arab Republic	176	55	872	29.3
Taiwan, China	90	47	510	17.7
Tajikistan	40	34	430	25.5
Tanzania	32	38	462	14.3
Thailand	25	36	479	12.3
Timor-Leste	183	51	1285	163.2
Togo	151	41	588	47.5
Tonga	56	37	350	30.5
Trinidad and Tobago	169	42	1340	33.5
Tunisia	78	39	565	21.8
Turkey	26	35	420	18.8
Uganda	113	38	490	44.9
Ukraine	43	30	345	41.5
United Arab Emirates	134	49	537	26.2
United Kingdom	23	28	399	23.4
United States	8	32	300	14.4
Uruguay	102	41	720	19
Uzbekistan	44	42	195	22.2
Vanuatu	76	30	430	74.7
Venezuela, R.B.	74	29	510	43.7
Vietnam	31	34	295	28.5
West Bank and Gaza	93	44	540	21.2
Yemen, Rep.	34	36	520	16.5
Zambia	86	35	471	38.7
Zimbabwe	110	38	410	113.1

Source: Doing Business Indicators

In order to ensure compatibility between the various variables the above data was indexed and rescaled to vary from 0 to 1 so that smaller number of procedures and lower costs correspond to higher values of the index.

3.4.1.2 Property Rights Indicator

For the indicator of property rights we use the International Property Rights Index (IPRI). The IPRI is a recent initiative by the International Property Rights Alliance. According to the 2007 (p. 7) IPRI Annual Report, the indicator is:

> *The first international comparative study that measures the significance of both physical and intellectual property rights and their protection for economic well-being. The Program will contribute to developing accurate and comprehensive measures regarding property rights (PR) on an international scale. The International Property Rights Index will provide the public, researchers and policymakers, from across the globe, with a tool for comparative analysis and future research on global property rights.*

The index collects various indicators of property rights from organisations such as the World Bank, World Economic Forum, Heritage Foundation, etc. It focuses on three areas: Legal and Political Environment (LP), Physical Property Rights (PPR), and Intellectual Property Rights (IPR), and is available for 130 countries that represent over 95 per cent of the world's GDP. In this Thesis we use the overall composite index as our measure of cross-country property rights. Table 3.2 (below) contains the IPRI index of security of property rights for all available countries.

Table 3.2: International Property Rights Index (2010)

Country	Property Rights Index	Country	Property Rights Index	Country	Property Rights Index
ALBANIA	4.4	INDIA	**5.6**	SAUDI ARABIA	6.5
ALGERIA	4.3	INDONESIA	**5**	SENEGAL	4.7
ANGOLA	3.6	IRAN	**4.2**	SERBIA	4.2
ARGENTINA	4.7	IRELAND	**7.6**	SINGAPORE	8.3
ARMENIA	4.2	ISRAEL	**6.3**	SLOVAKIA	6.3
AUSTRALIA	8	ITALY	**6**	SLOVENIA	5.8
AUSTRIA	7.9	JAMAICA	**5.4**	SOUTH AFRICA	6.6
AZERBAIJAN	4.4	JAPAN	**7.6**	SOUTH KOREA	6.3
BAHRAIN	6.7	JORDAN	**6.1**	SPAIN	6.5
BANGLADESH	3.6	KAZAKHSTAN	**4.4**	SRI LANKA	5
BELGIUM	7.5	KENYA	**4.4**	SWAZILAND	5.2
BENIN	5.3	KUWAIT	5.9	SWEDEN	8.5
BOLIVIA	3.9	LATVIA	5.5	SWITZERLAND	8.2
BOSNIA AND HERZEGOVINA	4.1	LEBANON	4.4	SYRIA	4.8
BOTSWANA	6.3	LIBYA	3.7	TAIWAN	7.1
BRAZIL	5.3	LITHUANIA	6	TANZANIA	5.1
BRUNEI	5.7	LUXEMBOURG	8.2	THAILAND	5.3

BULGARIA	5.3	MACEDONIA	4.7	TRINIDAD AND TOBAGO	5.6
BURKINA FASO	5	MADAGASCAR	4.3	TUNISIA	6
BURUNDI	3.6	MALAWI	5.2	TURKEY	5.3
CAMEROON	4.2	MALAYSIA	6.1	UGANDA	4.6
CANADA	8	MALI	4.8	UKRAINE	4
CHAD	4	MALTA	6.8	UNITED ARAB EMIRATES	7.2
CHILE	6.7	MAURITANIA	4.6	UNITED KINGDOM	7.7
CHINA	5.5	MAURITIUS	6.3	UNITED STATES	7.5
COLOMBIA	5.1	MEXICO	5	URUGUAY	6.1
COSTA RICA	5.9	MOLDOVA	3.9	VENEZUELA	3.4
COTE D'IVOIRE	3.7	MONTENEGRO	5.2	VIETNAM	4.9
CROATIA	5.3	MOROCCO	5.3	ZAMBIA	4.8
CYPRUS	6.9	MOZAMBIQUE	4.7	ZIMBABWE	3.5
CZECH REPUBLIC	6.5	NEPAL	4.4		
DENMARK	8.1	NETHERLANDS	8		
DOMINICAN REPUBLIC	4.6	NEW ZEALAND	8.2		
ECUADOR	4.4	NICARAGUA	4.1		
EGYPT	5.2	NIGERIA	3.9		
EL SALVADOR	4.9	NORWAY	8.2		
ESTONIA	6.7	OMAN	6.7		
ETHIOPIA	4.5	PAKISTAN	4.1		
FINLAND	8.5	PANAMA	5.6		
FRANCE	7.3	PARAGUAY	4		
GEORGIA	4.1	PERU	4.9		
GERMANY	7.8	PHILIPPINES	4.7		
GHANA	5.6	POLAND	6.2		
GREECE	5.8	PORTUGAL	6.9		
GUATEMALA	4.5	PUERTO RICO	6.5		
GUYANA	4.6	QATAR	7.1		
HONDURAS	4.7	ROMANIA	5.5		
HONG KONG	7.8	RUSSIA	4.6		
HUNGARY	6.4	RWANDA	5.6		

Source: IPRI, 2009

3.4.1.3 Financial Development Indicator

The literature on finance and growth highlights that an ideal index-measuring financial development should quantify the extent to which the financial system supports the flow of information and transactions in order to ensure an efficient allocation of capital. In particular, as noted by Rajan and Zingles (1998) “the best indicator should measure the efficiency with

which financial systems study firms, and recognise bankable investments, support adequate risk management and mobilise savings." In reality it is very difficult to compile such an indicator therefore researchers have often used proxy measures to measure financial development.

Partly due to these problems in this study we use two measures of financial development. The first one is an output measure of financial development and the second one is a measure of the structure and efficiency of financial regulations and structures based on the DBIs.

As mentioned above, the first indicator of financial development is an output-based indicator, i.e. an indicator that measures the actual development of the financial system rather that the quality of the regulatory environment that can lead to such a development. Levine, Loayza and Beck (2000) have developed a well-known 'Database of Financial Development and Structure' The database contains a wide range of proxies for financial development, such as liquid liabilities to GDP ratio, central bank assets to GDP ratio, and bank deposit to GDP ratio. These indicators are available for over 150 countries in the world and the database is available on the World Bank's website.[11] The proxy for financial development used in this study will be private credit to GDP ratio. A study by Levine, Loayza and Beck (2000) highlighted that private credit is a good predictor of financial development. There is wide variation in private credit, ranging from 0.1 per cent in Sudan to 202 per cent in the United States. Table 3.3 shows the ratio of private credit to GDP for all the countries in the Levine, Loayza and Beck's dataset.

Table 3.3: Private Credit to GDP Ratio

Albania	25%	Dominican Rep.	19%	Latvia	82%	Serbia	28%
Algeria	12%	Ecuador	24%	Lesotho	9%	Seychelles	36%
Angola	8%	Egypt	44%	Lithuania	51%	Sierra Leone	4%
Argentina	13%	El Salvador	41%	Luxembourg	168%	Singapore	92%
Armenia	10%	Estonia	84%	Macao, China	39%	Slovak Republic	39%
Australia	114%	Ethiopia	19%	Macedonia	33%	Slovenia	69%
Austria	111%	Fiji	48%	Madagascar	9%	Solomon Islands	33%
Bahamas, The	83%	Finland	77%	Malawi	14%	South Africa	152%
Bangladesh	34%	France	99%	Malaysia	101%	Spain	169%
Belgium	85%	Gabon	11%	Mali	16%	Sri Lanka	31%
Belize	57%	Georgia	22%	Malta	112%	St. Kitts and Nevis	68%
Benin	16%	Germany	105%	Mauritius	72%	St. Lucia	104%
Bhutan	21%	Greece	84%	Mexico	20%	St. Vincent	56%
Bolivia	35%	Grenada	80%	Moldova	30%	Sudan	0%

[11] The World Bank's website is: www.worldbank.org

Botswana	19%	Guatemala	32%	Mongolia	36%	Suriname	23%
Brazil	43%	Guinea-Bissau	4%	Morocco	61%	Sweden	116%
Bulgaria	53%	Guyana	55%	Mozambique	13%	Switzerland	169%
Burkina Faso	16%	Haiti	11%	Nepal	44%	Tanzania	12%
Burundi	23%	Honduras	47%	Netherlands	179%	Thailand	83%
Cambodia	14%	Hong Kong	132%	New Zealand	140%	Timor-Leste	28%
Cameroon	9%	Hungary	57%	Niger	8%	Togo	18%
Canada	157%	India	43%	Nigeria	17%	Tonga	66%
Cape Verde	45%	Indonesia	23%	Oman	32%	Trinidad.	34%
Chad	3%	Iran	45%	Pakistan	27%	Tunisia	61%
Chile	80%	Ireland	184%	Panama	79%	Turkey	26%
China	71%	Israel	87%	Papua New Guinea	18%	Uganda	7%
Colombia	36%	Italy	96%	Paraguay	17%	United Kingdom	174%
Congo, Dem.	3%	Jamaica	24%	Peru	19%	United States	202%
Congo, Rep.	2%	Japan	97%	Philippines	28%	Uruguay	23%
Costa Rica	38%	Jordan	89%	Poland	35%	Vanuatu	47%
Côte d'Ivoire	14%	Kazakhstan	48%	Portugal	160%	Venezuela, RB	18%
Croatia	67%	Kenya	23%	Romania	28%	Vietnam	77%
Cyprus	182%	Korea, Rep.	101%	Russia	32%	Yemen, Rep.	7%
Czech Rep.	43%	Kuwait	62%	Samoa	44%	Zambia	10%
Denmark	192%	Kyrgyz Republic	11%	Saudi Arabia	43%		
Dominica	60%	Lao PDR	6%	Senegal	21%		

Source: Levine, Loayza, and Beck Database

The second measure of financial development is based on DBIs. The indicator called "Getting Credit" measures the procedures for obtaining a commercial loan. The index consists of two sub-indicators. According to World Bank (2010; p. 81):

> *The first sub-indicator evaluates legal rights of borrowers and lenders with respect to secured transactions. The second sub-indicator assesses the extent of sharing of credit information. In particular, the first set of indicators describes how well collateral and bankruptcy laws facilitate lending. The second set measures the coverage, scope and accessibility of credit information available through public credit registries and private credit bureaus. The ranking on the ease of getting credit is the simple average of the per centile rankings on its component indicators.*

Regarding the second sub-component, the index also includes depth of credit information. This index measures "rules and practices affecting the coverage, scope and accessibility of credit information available through either a public credit registry or a private credit bureau" (World Bank, 2010).

As in the previous cases, the overall index obtained from the DBIs are adjusted to vary from 0 to 1 and is rescaled so that better institutional quality corresponds to higher values of the index.

3.4.1.4 Labour Market Institutions Indicator

The DBIs are designed to evaluate labour market institutions, specifically assessing the rigidity of that market. This part of the DBIs measures how the regulation of employment affects the hiring and redundancy of workers and the rigidity of working hours. It main index is the rigidity of employment index which the World Bank (2010; p. 82) defines as follows:

> *The rigidity of employment index is the average of 3 sub-indices: a difficulty of hiring index, a rigidity of hours index and a difficulty of redundancy index (table). All the sub-indices have several components. And all take values between 0 and 100, with higher values indicating more rigid regulation. The difficulty of hiring index measures (i) whether fixed-term contracts are prohibited for permanent tasks; (ii) the maximum cumulative duration of fixed-term contracts; and (iii) the ratio of the minimum wage for a trainee or first-time employee to the average value-added per worker. An economy is assigned a score of 1 if fixed-term contracts are prohibited for permanent tasks and a score of 0 if they can be used for any task. A score of 1 is assigned if the maximum cumulative duration of fixed-term contracts is less than 3 years; 0.5 if it is 3 years or more but less than 5 years; and 0 if fixed-term contracts can last 5 years or more. Finally, a score of 1 is assigned if the ratio of the minimum wage to the average value-added per worker is 0.75 or more; 0.67 for a ratio of 0.50 or more but less than 0.75; 0.33 for a ratio of 0.25 or more but less than 0.50; and 0 for a ratio of less than 0.25. A score of 0 is also assigned if the minimum wage is set by a collective bargaining agreement that applies to less than half the manufacturing sector or does not apply to firms not party to it, or if the minimum wage is set by law but does not apply to workers who are in their apprentice period. A ratio of 0.251 (and therefore a score of 0.33) is automatically assigned in 4 cases: if there is no minimum wage, if the law provides a regulatory mechanism for the minimum wage that is not enforced in practice, if there is no minimum wage set by law but there is a wage amount that is customarily used as a minimum or if there is no minimum wage set by law in the private sector but there is one in the public sector.*

Furthermore, the rigidity of employment index is defined by the DBIs as follows World Bank (2010; p. 83):

> *"The difficulty of redundancy index has 8 components: (i) whether redundancy is disallowed as a basis for terminating workers; (ii) whether the employer needs to notify a third party (such as a government agency) to terminate 1 redundant worker; (iii) whether the employer needs to notify a third party to terminate a group of 9 redundant workers; (iv) whether the employer needs approval from a third party to terminate 1 redundant worker; (v) whether the employer needs approval from a third party to terminate a group of 9 redundant workers; (vi) whether the law requires the employer to reassign or retrain a worker before making the worker redundant; (vii) whether priority rules apply for redundancies; and (viii) whether priority rules apply for reemployment. For question (i) an answer of "yes" for workers of any income level gives a score of 10*

and means that the rest of the questions do not apply. An answer of "yes" to question (iv) gives a score of 2. For every other question, if the answer is "yes," a score of 1 is assigned; otherwise a score of 0 is given. Questions (i) and (iv), as the most restrictive regulations, have greater weight in the construction of the index."

Also, in this case the original index is adjusted to vary from 0 to 1 and is rescaled so that higher quality of regulation corresponds to higher values of the index. Details of the Rigidity of Employment index are included in Table 3.4 below.

Table 3.4: "Employing Workers" Indicator from the DBIs (2009)

Economy	Employing Workers	Economy	Employing Workers	Economy	Employing Workers
Afghanistan	69	Greece	147	Panama	177
Albania	105	Grenada	49	Papua New Guinea	26
Algeria	122	Guatemala	127	Paraguay	179
Angola	178	Guinea	79	Peru	112
Antigua and Barbuda	54	Guinea-Bissau	175	Philippines	115
Argentina	101	Guyana	87	Poland	76
Armenia	62	Haiti	28	Portugal	171
Australia	1	Honduras	168	Puerto Rico	22
Austria	60	Hong Kong	6	Qatar	68
Azerbaijan	33	Hungary	77	Romania	113
Bahamas, the	42	Iceland	56	Russia	109
Bahrain	13	India	104	Rwanda	30
Bangladesh	124	Indonesia	149	Samoa	18
Belarus	32	Iran	137	São Tomé	180
Belgium	48	Iraq	59	Saudi Arabia	73
Belize	23	Ireland	27	Senegal	172
Benin	139	Israel	90	Serbia	94
Bhutan	12	Italy	99	Seychelles	130
Bolivia	183	Jamaica	39	Sierra Leone	166
Bosnia and Herzegovina	111	Japan	40	Singapore	1
Botswana	71	Jordan	51	Slovak Republic	81
Brazil	138	Kazakhstan	38	Slovenia	162
Brunei Darussalam	4	Kenya	78	Solomon Islands	65
Bulgaria	53	Kiribati	29	South Africa	102
Burkina Faso	82	Korea, Rep.	150	Spain	157
Burundi	88	Kosovo	34	Sri Lanka	96
Cambodia	134	Kuwait	24	St. Kitts	19
Cameroon	126	Kyrgyz Rep.	47	St. Lucia	20
Canada	17	Lao PDR	107	St. Vincent	57
Cape Verde	167	Latvia	128	Sudan	153
Central African Rep.	144	Lebanon	66	Suriname	70
Chad	118	Lesotho	67	Swaziland	55
Chile	72	Liberia	121	Sweden	117
China	140	Lithuania	119	Switzerland	16
Colombia	63	Luxembourg	170	Syria	91
Comoros	164	Macedonia	58	Taiwan, China	153
Congo, Dem. Rep.	174	Madagascar	152	Tajikistan	143
Congo, Rep.	169	Malawi	92	Tanzania	131

Costa Rica	110	Malaysia	61	Thailand	52
Côte d'Ivoire	129	Maldives	41	Timor-Leste	89
Croatia	163	Mali	100	Togo	159
Cyprus	93	Marshall Isl.	4	Tonga	11
Czech Republic	25	Mauritania	125	Trinidad	45
Denmark	9	Mauritius	36	Tunisia	108
Djibouti	151	Mexico	136	Turkey	145
Dominica	80	Micronesia,	14	Uganda	7
Dominican Rep.	97	Moldova	141	Ukraine	83
Ecuador	160	Mongolia	44	UAE	50
Egypt, Arab Rep.	120	Montenegro	46	United Kingdom	35
El Salvador	106	Morocco	176	United States	1
Equatorial Guinea	182	Mozambique	156	Uruguay	64
Eritrea	86	Namibia	43	Uzbekistan	95
Estonia	161	Nepal	148	Vanuatu	75
Ethiopia	98	Netherlands	123	Venezuela, R.B.	181
Fiji	31	New Zealand	15	Vietnam	103
Finland	132	Nicaragua	84	West Bank	135
France	155	Niger	173	Yemen, Rep.	74
Gabon	165	Nigeria	37	Zambia	116
Gambia, the	85	Norway	114	Zimbabwe	142
Georgia	9	Oman	21		
Germany	158	Pakistan	146		
Ghana	133	Palau	8		

Source: Doing Business Indicators

3.4.2 Dependence on institutions data

This study uses a range of proxies for industry-specific dependence on institutions. In order to carry out the industry-level analysis of the impact of contract enforcement, financial and labour regulations as well as strength of property right, it is necessary to have a measure of industry dependence on each of these institutional sub-components. This requires detailed data and analysis of industrial structure. Data is often not available for the majority of countries in our sample, therefore we apply a commonly-used assumption that industrial structure and sectoral dependence on institutions in particular do not change significantly between countries. The first paper that made the above assumption was Rajan and Zingles (1998) and since then a number of other studies have followed suit (Nunn, 2007; Levchenko, 2007; Claessens and Laeven, 2003).

We therefore use data from the US as a proxy for industrial dependence on institutions for all countries in our sample. In the construction of these indicators we assume that there is a technological reason why some industries depend on institutional environments more than others. Furthermore, this analysis assumes that these sectoral differences in production processes persist across countries. This assumption allows us to use, for example, indicators for

US industries' sectoral dependence on contracts to measure contract-dependent industries in other countries.

Acknowledging that there are enormous technological and income differences across countries, we assume, following previous research, that institutional dependence follows a similar pattern across countries. Therefore, if the machinery sector requires a significantly larger amount of contracts to be enforced than the textiles sector in the United States, this would also be true for the industry in Tanzania or Taiwan.

One primary reason why a US industrial structure might be a good proxy also for sectoral dependence on institutions around the world is that the industrial structure of the US economy is among the most advanced in the world. The dependence on institutions of US firms might represent the desired and most efficient level of industrial structure where US institutions are utilised efficiently. Therefore, even if the institutional dependence in other countries differs to the one of the US, these countries might want to strive to achieve a structure of institutional dependence of industries similar to that of the United States.

There is also another reason as to why a US industrial structure could be a good proxy for institutional dependence of sectors also in other countries. This is due to the fact that as the world economy becomes increasingly more globalised and competitive, production processes become more unified in a cross-country perspective.

Chapter 5 of the Thesis provides an indirect test for the assumption that US industrial structure is an adequate proxy for the sectoral dependence on institutions of all other countries. In section 5.3.1 we show that the growth of US industries in the nineties does not significantly alter our baseline results of the impact that institutional factors have on industry level growth. The results of this indirect test show that the growth patterns of US industries do a poor job of explaining sectoral growth in other countries but US industries' dependence on institutional quality interacted with countries' institutional quality does. This result therefore hints that US industrial structure might actually be an adequate proxy for dependence on institutions also in other countries.

The key database from which several indicators of industry-specific dependence on institutions are calculated is the National Bureaus' of Economic Research (NBER) and U.S. Census Bureau's Center for Economic Studies (CES) Manufacturing Productivity Database of the United States.

The database contains information on 450 4-digit Standard Industrial Classification (SIC) manufacturing industries in the period from 1950s through to 2005. The information in the database is collected from many official sources. The most important of these sources is the Annual Survey of Manufacturers and Census of Manufacturers. The database provides estimates of Total Factor Productivity (TFP) for each industry, as well as other variables such as value-added, employment, payroll, costs of material, capital expenditure and structure.

The second key database is the Standard and Poor's Compustat North America Database. The database is mostly used by money managers and hedge funds to inform them about investment decisions but can also be used by researchers. It provides vital company data and industry information based on companies' financial statements, and provides it in a consistent, comparable framework. The Compustat North America Database covers all publicly traded firms in the United States, and includes, amongst other data, yearly sales and employment since the 1980s.

Furthermore, another large US database used in the calculation of measures of industry dependence on institutions is the Bureau of Economic Analysis (BEA) Input-Output Tables. The Tables are freely available online at http://www.bea.gov/industry/io_benchmark.htm.

The reminder of this section describes five indicators of dependence on institutions used in this study. These indicators are: (1) sectoral dependence on contracts, (2) industry-specific dependence on external finance for growth, (3) sectoral volatility, (4) dependence on intangible assets, and (5) vertical integration propensity.

3.4.2.1 Dependence on Contracts for Production Indicator

The dependence on contracts measure is taken from a study by Nunn (2007). As already mentioned in Chapter 2, Nunn's measure of the dependence on contract is based on the classification in Rauch (1999) which disaggregates goods that can be purchased on an organised exchange, have a reference price or neither of the two. He constructs a variable that directly measures the relationship-specifity of each input used in the production process. His measure of institutional dependence is based on the idea of the 'hold-up' between producers and input suppliers.[12] According to Nunn (2007), "when investments are relationship-specific, underinvestment will occur if contracts cannot be enforced. An investment is "relationship-

[12] A description of the problem was included in Chapter 1 section 1.4.3.

specific" if its value within a buyer-seller relationship is significantly higher than outside the relationship." The most common case when a 'hold-up' problem arises is in the case of a final goods producer and an input supplier who manufactures relation-specific intermediate goods. To quantify the importance of relationship-specific investments across industries, Nunn (2007) constructs a variable that measures, for each commodity, the proportion of its intermediate inputs that are relationship-specific. He uses the 1997 United States I-O Use Table to classify which inputs are utilised, and in what amounts, in the production of all final goods. After aggregation, Nunn (2007) quantifies the share of inputs in each I-O category. Based on this and coupled with data from the US Input-Output Table which contains data on inputs that are used in the manufacture of each final good, Nunn constructs a measure of the share of its intermediate inputs that are relationship-specific:

$$z_i^{rs} = \sum \theta_{ij} R_j^{neither}$$

where $\theta_{ij} = u_{ij}/u_i$ and u_{ij} the value of input *j* used to produce goods in industry *i* and u_i is the total value of all inputs used in industry *i*; $R_j^{neither}$ is the proportion of inputs *j* that are neither sold on an organised exchange nor reference-priced. The measures classify inputs that are neither bought nor sold on an exchange nor reference-priced as being relationship-specific.

3.4.2.2 Dependence on External Finance Industry-Level indicator

The compilation of a proxy for external capital dependence is calculated from data from Compustat North America and follows the procedure first implemented by Rajan and Zingles (1998). The authors argue that "in order to construct a proxy for external finance dependence one needs to first calculate an industry specific measure of the amount of desired investment that cannot be financed through internal cash flows." Hence, Rajan and Zingles (1998) define a firm's dependence on external finance as the difference between capital expenditure, which is variable no. 128 in Compustat, and cash flow from operations divided by capital expenditure. In order to make this calculation Rajan and Zingles need to calculate a firm's overall cash flow. They assume that overall cash flow is the sum of cash flow from operations (Compustat variable no. 110) plus decreases in inventories, receivables, and increases in payables. Once the data on external capital requirement is computed, the industry with the least requirement of external finance is Tobacco and the industry with the highest requirement is electronics and electrical equipment (see Table 3.5).

3.4.2.3. Industry-Level Sectoral Volatility

The industry-level volatility is calculated from firm level data following a procedure developed by Cunat and Melitz (2003). The source of the data, is again Standard and Poor's Compustat North America. Cunat and Melitz show that there is a direct relationship between "the standard deviation of firm-level shocks and the standard deviation of the growth rate of firm sales." Assuming the above, Cunat and Melitz (2003) use "the standard deviation of the annual growth rate of firm sales measured as year-differenced log sales" as a proxy for industry level volatility.

3.4.2.4 Sectoral Requirement for Intangible Assets

This indicator for industry-specific requirements for intangible assets is taken from a study by Claessens and Laeven (2003). The authors call sectoral requirement on intangible assets "intangible intensity". This indicator is calculated as a ratio of intangible to fixed assets in a US industry. The following two paragraphs provide some details for the calculations of this indicator.

The Standard and Poor's Compustat North America database category 33 is 'Net value of Intangible Assets'. This category includes items such as franchises, patents, copyrights, trademarks, computer software patent costs, blueprints or building designs, licenses, client lists, and organisational costs. Intangibles according to the definition by Claessens and Laeven "are assets that have no physical existence in themselves but represent rights to enjoy some privilege." Category 8 of Compustat North America is called fixed assets and is an ideal indicator of a firm's tangible assets. This category is defined as gross property, plants and equipment. From category 8, Claessens and Laeven subtract category 7 - accumulated depreciation, depletion, and amortisation. The data in Compustat is available in US SIC 4 digit classification. The data is then aggregated to two digit SIC classification.

Claessens and Laeven (2003; p. 15) note that:

> *"The total number of firms used to calculate the intangible intensity index is 5,241. The average intangible intensity ratio in US manufacturing firms is 77 per cent. There are large differences across industries in their dependency on intangible assets. For example, this ratio in the petroleum and coal products industry is only 2 per cent but in the printing and publishing industry the ratio amounts to 454 per cent. The general trend of the indicator is in line with what is generally agreed to be a capital and knowledge intensive industry."*

3.4.2.5 Measure of Vertical Integration Propensity

Hypothesis 1a (Section 1.4.3.1) states that better contracting institutions are more conducive for exports of more complex industries but this impact is decreased if some industries are inherently more capable of vertically integrating. Hence to test whether firms' organisation choice has an impact on the way institutions drive comparative advantage in complex goods, we need an industry-specific measure of the ease with which firms can integrate vertically.

Currently the only available measure of sectoral propensity to vertically integrate is provided by Acemoglu *et al.* (2009). The authors use detailed firm-level data from a large database of companies called WorldBase. The database is collected by Dun & Bradstreet and is the largest databank of firms in the world. It contains information on millions of public and private firms around the world. The aim of the database is to facilitate business contacts but it can also be used for research purposes. WorldBase provides information on the primary industry of activity of a firm and up to five secondary industries classified by a four-digit SIC code.

In order to compute a measure of vertical integration propensity, Acemoglu *et al*. (2009) need to combine information on the firms' sector of economic activity from WorldBase with the US I-O tables. In particular, they compute for each company in the sample the dollar value of inputs from industries in which the firm operates that is required to produce one dollars' worth of the companies' primary output. Afterwards the authors compute a similar index for secondary industries in which the company also operates. The actual index measuring vertical integration propensity is calculated as the average of these two indices. In order to obtain a direct measure of vertical integration propensity, Acemoglu *et al*. (2009) run a series of regressions where final index is regressed on a set of industry-specific dummies. The coefficients on the dummy variables show the mean level of vertical integration in each sector in the US. Acemoglu *et al.* (2009) compute an indicator which is entirely based on industry-level features and is based on actual and observed vertical integration outcomes.

A summary of the data on the dependence on institutions is provided in Table 3.5 below.

Table 3.5 Industry-level dependence on institutions

	Contract Dependence	External Finance Dependency	Intangible Intensity	Sectoral Volatility
Food and kindred products	0.78	0.63	0.30	0.68

Tobacco	0.03	0.31	0.20	0.58
Textile mill products	0.19	0.78	0.08	0.74
Apparel and other textile products	0.08	0.57	0.21	0.70
Lumber and wood products	0.14	0.71	0.48	0.73
Furniture and furniture fixtures	0.04	0.69	0.20	0.60
Paper and allied products	0.19	0.66	0.08	0.52
Printing and Publishing	0.19	0.67	0.62	0.56
Chemicals and allied products	0.33	0.69	0.38	0.67
Petroleum and coal products	0.43	0.58	0.01	0.65
Rubber and miscellaneous plastics	0.14	0.68	0.18	0.71
Leather and leather products	0.05	0.63	0.13	0.49
Stone, clay and glass products	0.03	0.75	0.02	0.51
Primary metal industries	0.10	0.56	0.04	0.84
Fabricated metal products	0.22	0.69	0.12	0.74
Industrial machinery and equipment	0.47	0.81	0.10	0.78
Electrical and electronic equipment	0.36	0.98	0.31	0.84
Transportation equipment	0.97	0.79	0.10	0.63
Instruments and related products	0.13	0.92	0.36	0.80
Misc. manufacturing products	0.04	0.73	0.92	0.78

Source: Hausmann, Hwang, and Rodrik (2006), Nunn (2006), Cuñat and Melitz (2009), Ranjan and Zingales (1998) ; Acemoglu *et al*. (2009); Compustat.

3.4.3 Additional Data for the Gravity Model

3.4.3.1 Trade Data

The trade data is taken from the United Nations' Commodity Trade Statistics Database (UN COMTRADE). It contains detailed import and export statistics reported by statistical authorities of almost 200 countries. The dataset provided by the UN has yearly trade statistics from 1960s to the most recent year. According to the UN website[13]:

> *"COMTRADE is considered the most comprehensive trade database available with more than 1 billion records. A typical record is – for instance – the exports of cars from Germany to the United States in 2004 in terms of value (US dollars), weight and supplementary quantity (number of cars)."*

The data are obtained for the statistical authorities responsible for compiling trade statistics around the world. Once the data are transferred to the UN Statistics Division, they are standardised and included in the UN COMTRADE database.

[13] www.comtrade.un.org

A well-known problem in the UN COMTRADE database is that there is often a discrepancy between the export data provided from one country with a corresponding import from another country. An approach that is often used in the literature to remedy this problem is to use import data from countries that are known to have 'good quality' data collection systems. In this analysis we assume that countries that are categorised as least developed (LDC) and lower middle income countries are likely to have data that are of poorer quality than other countries. We therefore use import data from other countries instead of export data from LDC and lower middle income countries.

3.4.3.2 GDP and Population Data

The World Bank has recently provided free Internet access to the world's most comprehensive dataset regarding countries' development – The World Development Indicators. The dataset contains 420 indicators covering 209 countries from 1960 to 2009. According to the World Bank website, the indicators are grouped into ten groups, which are: Agriculture and Rural Development, Aid Effectiveness, Economic Policy and External Debt, Education, Energy and Mining, Environment, Financial Sector, Health, Infrastructure, Poverty, Private and Public Sector, Social and Urban Development. In addition, the database contains the most up-to-date statistics on GDP and population, and it is from this database that our measures of GDP and population are taken.

3.4.3.3 Trade Cost and Distance

Distance between countries is usually used in a gravity model as an indicator of trade costs between these countries. The estimation of the distance between countries in a gravity model is normally based on the great circle distance formula. The data is available from the Centre d'Etudes Prospectives et d'Informations Internationales' (CEPII) website at http://www.cepii.org/francgraph/bdd/distances.htm.

The problem with estimation of distance between countries with the great circle distance formula is that it underestimates the actual distance as transportation routes are affected by the presence of land, sea and ice barriers. The great circle distance measures the shortest distance between countries disregarding these land barriers. Furthermore, distance between capitals does not seem to be an accurate proxy for trade costs related to transport. For example, countries' economic centres can be located elsewhere. Despite this, distance has been used extensively in gravity models and is found to be impeding trade. Leamer (2006), for

example, in his analysis of the impact of distance on international trade, said that it is "probably the only finding that has withstood the scrutiny of time and the onslaught of economic technique". Head and Disdier (2006) provide an analysis of over 100 studies of the impact of distance within a gravity model and find that in nearly all these studies distance was a significant determinant of trade.

3.4.3.4. Regional Trade Agreements (RTA) Variable

This variable measures the impact of trade policies on trade flow. It is assumed that if two countries join a RTA trade costs between these countries decrease. The source of the data is Andrew K. Rose's database available online at www.haas.berkeley.edu/~arose. The data was supplemented with information from the World Trade Organization (WTO). This gravity model analysis uses the standard approach in gravity modelling. It uses a binary variable, taking on the value 1 for members of the regional agreement and 0 otherwise. If the variable is positive and significant, this would indicate that trade creation is taking place due to regional trade integration.

3.4.3.5 Common Language

Another variable that is assumed to impact on trade costs is whether a pair of countries speaks a common language or not. A common language variable has also been obtained from the database of Andrew K. Rose and was supplemented with information from the Central Intelligence Agency's (CIA) World Factbook. The variable ranges from 0 to 1. It takes into account common national languages even if these languages are not national. The following languages were included: Arabic, Amerindian, Cantonese, Dutch, English, French, German, Irish, Greek, Italian, Japanese, Mandarin, Malay, Portuguese, Russian, Spanish, Swedish, Swahili and Turkish. Andrew K. Rose distinguishes primary and secondary languages. In his analysis a secondary language may not be official and can include languages spoken by large communities of immigrants, such as Moroccan immigrants in France and Latin-American immigrants in the USA. In this way the variable attempts to capture the influence of diaspora on trade. The common language variable can take the following values: 0, 0.25, 0.5 and 1. 1 is allocated if a pair of countries has a common official language. 0.5 is assigned if a pair of countries has a common language that is an official language in one country and is a secondary language in the other country. 0.25 is allocated if a pair of countries shares a common secondary language. Finally, zero is allocated if two countries do not share a common language.

3.4.3.6 Tariff Data

The data on bilateral tariffs is obtained from the United Nation's (UN) Trade Analysis and Information Systems (TRAINS) Database which is a comprehensive computerised information system containing data on tariffs around the world. The database is comprised of measures of tariffs, para-tariffs, non-tariff measures and imports. The database is available at HS 6-digit level. The database is available for 161 countries or 956 country/years since 1988 and also including preferential rates such for RTAs. The data are available from 1988 until the most recent year. Following Francois et al. (2006) we use the following formula for applied tariffs:

$$\ln T_{j,,t} = \ln (1 + t_{,j,,t}). t_{,j,t}$$

where t indicates the applied tariff rate offered by importer j to the rest of the world exporter in period $_t$.

3.4.3.7 Remoteness

Remoteness data is calculated following a formula (3.2). Data for GDP are obtained from the World Development Indicators, and data for distance are obtained from a database provided by Andrew K. Rose.

3.4.3.8 Geographic Variables

Gravity models often assume that location of countries is important in determining trade costs, and therefore variables determining whether a country is an island, is landlocked or is a pair of countries sharing a common border are often included in these models. This analysis also includes such variables. The data are obtained from a database of Andrew K. Rose and supplemented with information from the CIA Factbook. The assumption is that countries which are landlocked or are an island economy have higher trade costs as these geographic characteristics might impose additional challenges for trade. Hence, it is important to control for this in a gravity model. These variables take a value of one if a country is an island or is landlocked, and 0 otherwise. If indeed being landlocked or an island economy impedes trade, the coefficient of the binary variable should be statistically significant and negative.

A further assumption commonly made in gravity models is that if two countries have a common border, this might enhance trade. This analysis therefore includes a variable that takes a value of 1 if a pair of countries shares a common border and 0 otherwise. The assumption is that if

sharing a common border enhances trade the coefficient on that binary variable should be positive and statistically significant.

3.4.3.9 Colonial Heritage

Previous studies employing gravity models to estimate trade flows have often included whether countries have shared colonial history. This analysis includes a variable that indicates whether two countries have been in a colonial relationship. The variable is also taken for a database kindly provided by Andrew K. Rose. The variable equals to one if a pair of countries has been in a colonial relationship since 1945 and zero otherwise.

3.4.3.10 Country Level Skills Abundance

The abundance of skilled labour $skillab_i$ is measured by the human capital to labour ratio, which is based on the education levels reported in Barro and Lee (2000). The authors created a well-known database that provides a measurement of educational attainment for a broad group of developed and developing countries.

3.4.3.11 Country Level Capital Abundance

The abundance of capital $capitalab_i$ is measured by an investment based measure of the capital to labour ratio, sourced from Hall and Jones (1999). These measures are available for most of the 109 countries in our sample. As these data refer to some countries that no longer exist, or do not match with countries available in trade dataset, we have imposed some matching rule between countries.[14]

3.4.5 Additional Data for the Industry Growth Model

3.4.5.1 Industry Growth Data

The data for growth of industrial value-added is taken from the United Nations Industrial Development Organization's (UNIDO) Industrial Statistics Database. The records in the database are disaggregated according to the 3-digit level of the International Standard Industrial Classification (ISIC) and are available for the 80s and 90s. The UNIDO's Industrial Statistics Databases contains data broken down by country, industry and year for variables such as: gross

[14] These matching rules mostly refer to new countries that have been created in the past 20 years. So for example we assume that all countries following the collapse of the Soviet Union, which are available in the Hall and Jones' dataset, have the skill and capital abundance of that country.

fixed capital formation, employment, number of establishments, index of industrial production, output, wages and salaries, value-added.

3.4.5.2 Industry Level Indicator for Skill (Labour) Intensity

This variable is taken from the NBER-CES Manufacturing Productivity database. Following the literature (Ranjan and Zingles, 1998; Claessens and Laeven, 2003) we define skill intensity as log of the ratio of non-production workers to total employment. The data are provided at 4-digit SIC level and are aggregated to a 2-digit level for the purpose of the empirical analysis. It is important to note that the skills and capital intensities are also used in the gravity model analysis as controls.

3.4.5.3 Industry Level indicator for Capital Intensity

Capital Intensity (K) is also taken from the NBER-CES Manufacturing Productivity database and is defined as the ratio of real capital stock to total employment. As with other variables in this database it is available at the 4-digit SIC.

3.4.5 Additional Data for the Productivity Analysis

3.4.5.1 Productivity and Investment Climate Survey

In Chapter 6 we estimate the impact of institutional characteristics on firm level productivity. In the past decade the World Bank has undertaken several projects to provide data for firms' productivity across the world. The most important of these projects was the World Bank's Productivity and Investment Climate Surveys (PICSs) and this is the source of data used in this Chapter. The surveys were conducted between 2000 and 2007 and sampled over 20,000 firms in 32 developing countries. These surveys, based on large random samples of firms, provide comparable evidence on experiences of firms with bureaucratic procedures, sources of credit and investments, corruption infrastructure quality, etc.

According to the World Bank (2003a) the PICSs "provide a standardized way of measuring and comparing investment climate conditions in a country and are aimed at generating statistical information for formal assessments of investment climates or regulatory environment in international and regional perspectives." PICSs use a standard questionnaire that includes questions intended to support the calculation of firms' productivity. Sample sizes per country are relatively large (up to 1,500 or so) although vary significantly depending on the size of the country.

There are two distinct parts in the PICS questionnaire. The first part is the core questionnaire which asks details about the firm, including the investment climate in which it operates. It is important to note that the first part asks for the manager's opinion on the business environment. In particular, this part of the survey asks about the following issues:

- Overall data regarding the firm: industry, location, ownership (private or public).
- Sales and supplier: supply and demand conditions, imports and exports, competition in the market.
- Business climate indicators: evaluation of general obstacles.
- Infrastructure and services: business services, computers, power, transport, water.
- Finance: auditing, financial services, land ownership, sources of finance, terms of finance,
- Labour relations: over-employment, skill availability, status and training, unionisation and strikes, worker skills.
- Business-government relations: quality of public services, consistency of policy and administration, customs processing, regulatory compliance costs (management time, delays, bribes), informality, capture.
- Conflict resolution/legal environment: confidence in legal system, resolution of credit disputes.
- Crime: security costs, cost of crimes, use and performance of police services.
- Innovation, capacity, learning: experience, new products, planning horizon, sources of technology, worker and management education.

The questionnaire is given out to the director or his deputy, who has direct influence over firm's decisions. The second part of the core survey is smaller and contains questions regarding manufacturing costs, investment flows, balance sheet information and labour statistics. This section is administered to the accounting department, book keeper or human resources manager.

Usually the PICS are targeted to manufacturing and retail or wholesale enterprises with at least five full-time employees. The survey is usually carried out in major urban centres of countries.[15]

[15] It is also important to highight World Bank's definition of what is meant by the manufacturing and retail/wholesale industries, an establishment, full-time employees, and major urban centres. Defnitions are provided below:

According to the World Bank's description of the PICS questionnaire, the definition of urban centres includes companies outside the boundaries of a municipality but located within a metropolitan area.

3.5 Data Management Issues: Industry Concordances

The description of data to be used in the Thesis points out to an important problem. The different data assembled for the study come in different trade and industrial classifications. In particular, the data for the US industrial structure come in SIC classification whereas data on trade and industry level growth are in ISIC rev 2 3-digit classification. We therefore map the SIC industry data with ISIC rev. 2 data using a concordance attached in Appendix 7. In order to make the necessary calculation the data was first matched from SIC to ISIC rev. 3 2-digits and only than mapped onto ISIC rev. 2 3-digit level.

3.6 Conclusion

This chapter has provided a detailed description of the methodologies and data to be used in the analytical part of the Thesis. It has shown that the Thesis will use a range of sophisticated econometric approaches to assess how institutions impact on trade patterns, and that these techniques will require a wide range of data obtained from a variety of sources. The chapter has also highlighted that the empirical methodology will use the most recent techniques that aim to control the potential econometric biases and problems.

The vast majority of data used in this study were obtained from international and national datasets that are freely available to researchers and the general public. Institutions such as the World Bank, UNCTAD, and UN Statistical Division, NBER (US) as well as several prominent academics have graciously shared their datasets and provided open access to them.

Manufacturing refers to the mechanical or chemical transformation of materials or substances into new products. Manufacturing operations are generally conducted in facilities described as plants, factories, or mills, and characteristically use power-driven machines and materials-handling equipment. In addition, the assembly of components of manufactured products is considered manufacturing, as in the blending of materials. For the purposes of the PICS, only activities that are undertaken for the production of goods the establishment itself produces are of concern. If an establishment purchases and resells these items, the revenue it earns from the goods it resells is considered revenue from commerce and not manufacturing. For example, an establishment may manufacture and sell men's shirts, but must buy some shirts from other manufactures in order to complete orders. Revenue from manufacturing refers only to the sales that come from the shirts actually produced in the respondent's factories.

The following chapters provide the core analysis of the Thesis and apply the methodology described in this Chapter to analyse how institutions impact on trade.

Chapter 4: Institutions and Trade Flows: A Sectoral Gravity Model Approach

4.1 Introduction

It is natural to commence the analysis of the impact of institutions on trade with a detailed examination of trade patterns and how they relate to institutional quality. This examination is the focus of Chapter 4, which seeks to answer the fundamental questions of the Thesis: does the institutional environment enhance exports? And, if so, how? The methodology of this enquiry rests on the established gravity model. The model relates bilateral export performance to the economic sizes of importing and exporting countries and to trade costs between them. This analysis assumes that trade and production costs differ among industries and depend on the quality of the institutional environment. We test all four hypotheses of the Thesis and hence separately analyse the impact of four institutional subcomponents – contract enforcement, financial and labour regulations and property rights systems – as determinants of trade patterns.

Several studies have so far attempted to assess the impact of institutional quality on trade patterns (for instance, Berkovitz et al., 2004; Anderson and Marcouiller, 2002; Den Butter and Mosch (2003). The majority of these studies focused on how institutions affect the total value of trade, thus giving less attention to discerning their impact on specific sectors of the economy. The novel approach in this Chapter is to estimate the gravity model at the disaggregated industry level. This allows to evaluate whether the influence of the institutional environment on exports differs depending on the sector of economic activity.

This chapter is structured as follows. Section 4.2 provides additional details on the data used in this analysis. Section 4.3 explains the methodology of the study. Section 4.4 analyses the obtained results, and Section 3.5 concludes.

4.2 Data

The dataset constructed for this study is quite large. It contains nearly 670 000 observations of bilateral trade for 109 developed and developing countries classified according to the 29 ISIC rev. 2 manufacturing industries.[16] Table 4.1 below lists the countries included in the dataset.

Table 4.1: Countries Included in the Dataset of the Gravity Model

Albania	China	Honduras	Mongolia	Singapore
Argentina	Colombia	Hungary	Mauritius	Sri Lanka
Armenia	Cote'd'Ivore	India	Malawi	Slovakia
Australia	Costa Rica	Ireland	Malaysia	Slovenia
Austria	Croatia	Israel	Netherlands	Spain
Azerbaijan	Czech Rep.	Iceland	Niger	Syria
Belgium	Denmark	Italy	Norway	Thailand
Burkina Faso	Ecuador	Jamaica	New Zealand	Trinidad & Tobago
Belarus	Egypt	Jordan	Pakistan	Tunisia
Brazil	Estonia	Japan	Panama	Turkey
Bulgaria	Finland	Kazakhstan	Peru	Ukraine
Bolivia	Fiji	Kenya	Philippines	Uganda
Belarus	France	Korea, Dep. Rep.	Poland	Uruguay
Belgium	Gabon	Lebanon	Portugal	United Kingdom
Bangladesh	Georgia	Lithuania	Paraguay	United States
Bulgaria	Germany	Latvia	Romania	Venezuela
Cambodia	Ghana	Morocco	Russia	Vietnam
Canada	Guatemala	Madagascar	Seychelles	Zambia
CAR	Guyana	Mexico	Sweden	Zimbabwe
Chile	Hong Kong	Mali	Senegal	

The data for trade values is obtained from UN Comtrade database. We define the manufacturing sector as commodities in categories 311-390 of ISIC rev. 2. Following the literature, we exclude from the analysis the metals sector (ISIC 37 Basic Metal Industries, which includes two sub-sectors: ISIC 371 Iron and Steel Industries and ISIC 372 Non Ferrous Metals). Standard variables used in gravity model analysis are included in our model as described in Chapter 3. Acknowledging the recent observation by Jensen and Nordas (2004) that trade policy is an important omitted variable in standard gravity equations, we include a measure of simple average tariffs obtained from TRAINS database. Anderson and van Wincoop (2003) show that bilateral trade is determined by relative rather than absolute trade costs, and to control for this factor the model includes a remoteness term. As a proxy for market size, we include nominal GDP per capita at constant 2000 prices from the World Development Indicators. Other variables intended to capture variation in trade costs between country pairs are taken from Rose (2004)

[16] We are constrained to a 2-year period because data for institutional variables are only available from 2003 for most of the countries in our sample.

database.[17] These variables include distance, membership in regional trade agreements, adjacency and possible common bonds between countries such as a common language or colonial past.

In line with this study's approach, we use four measures of institutional quality, each encompassing a different subcomponent of the institutional environment: contract enforcement, labour and financial institutions and property rights. For each, a similar methodology is applied. An interaction variable is created, by taking the product of a measure of each sector's dependence on institutions $inst_s$ and a country-level indicator of institutional quality $inst_i^t$. (See section 3.4 for details on these indicators.) These interaction variables constitute key independent variables in the gravity model. Finding these interaction variables to be positive and significant would indicate that, ceteris paribus, countries with better-quality institutions export more in sectors more dependent on these institutions. Four distinct interaction variables are created, each measuring a different institutional sphere.

Four measures of institutional quality used in this study are as follows:

- **Contract enforcement regulation**: a product of (1) Contract Enforcement Quality Index obtained from DBIs, and (2) a measure of sectoral dependence on contracts obtained from Nunn (2004). This variable is called ***ContEnf*ContDep***.
- **Financial regulation**: a product of (1) industry-specific measure of dependence on external finance or financial dependence, and (2) ease of getting credit. This variable is called ***FinDev*FinDep***.
- **Property rights**: a product of (1) sectoral dependence on intangible assets, and (2) country indicator of the strength of overall property rights and intellectual property rights. This variable is called ***IntaInt*Property***.
- **Labour institutions**: a product of (1) the measure of volatility of a sector, and (2) country indicator of labour market flexibility. This variable is called ***SecVol*Flex***.

The Heckscher-Ohlin theory indicates that trade patterns are determined by the relative abundance of countries in labour and capital. Within our methodology we also need to control for these factors and hence we need a measure labour and capital intensity. To construct these

[17] I am deeply grateful to Andrew Rose for kindly sharing his datasets which are available on his website at http://faculty.haas.berkeley.edu/arose/RecRes.htm.

indicators we use a similar methodology as outlined above. We create an interactive term, using a measure of sectoral capital and labour dependency and a country-specific indicator of capital and labour abundance. We follow the literature (Romalis, 2004) in taking the measures of relative factor abundances from Hall and Jones (1999) and Barro and Lee (2000). The abundance of skilled labour $skillab_i$ is measured by the human-capital-to-labour ratio, based on education levels reported in Barro and Lee (2000). The abundance of capital $capitalab_i$ is measured by the capital to labour ratio, sourced from Hall and Jones (1999). These measures are available for most of the 109 countries in our sample.

We use sector-specific data for factor intensities. $Capitalint_s$ is a measure of capital intensity, and is equal to one minus the share of total compensation in value-added. $Skillint_s$ is a measure of skilled labour intensity, and is equal to the ratio of non-production workers to total employment, multiplied by the total share of labour in value-added. $Unint_i$ is the intensity of unskilled labour, and is equal to the ratio of production workers to total employment multiplied by the total share of labour in value-added. The definition of these variables is the standard way of measuring capital and labour intensity in different industries (see for example Rajan and Zingles, 1998).

4.3 Methodology

As discussed in Chapter 3, a standard methodological approach that quantifies export performance in relation to trade costs is the gravity model, and this econometric tool will also be used in this chapter.[18] Despite early criticism of Tinbergen's (1962) original application of the gravity model in terms of its lack of theoretical underpinning, recent developments in trade theory have strengthened the theoretical basis for the model, confirming its usefulness in empirical testing of bilateral trade flows (Baldwin and Taglioni, 2006).

In this study a gravity model carried out at industry level will be undertaken. Some theoretical bases have also been provided for the gravity model disaggregated to analyse countries' sectoral exports. Bergstrand (1985) has been one of the first to provide theoretical foundations to the gravity model at industry level. In his model Bergstrand derives a gravity-like equation from the HOV model with multiple countries and sectors and two factors of production. The

[18] See Piermartini and Teh (2005) for a discussion of theoretical underpinnings and research questions analysed in a gravity model framework. Additional analysis is provided by Greenaway and Milner (2002) and Anderson and Wincoop (2003).

model also explicitly accounts for intra industry trade. Bergstrand tests his model by estimating a gravity model at a one-digit STIC industry level for a large sample of countries in the 1960s and 1970s and yields predicted results.

Since the study of Bergstrand (1985) industry level gravity model has been used by researcher to investigate various effects. Head and Mayer (2000) investigated the "border effect" highlighted in Chapter 1; Rauch (1999) analysed the role of networks in international trade; Badinger and Breuss (2005) studied the relationship between trade and productivity. More recently within a sectoral gravity model Chen and Novy (2009) examined the impact of trade integration and Dutt and Traca (2010) the role of corruption in international trade.

Standard gravity models assume that the volume of trade between two countries is positively related to the size of these economies as measured by GDP, and negatively related to the trade costs between them. The basic structure of the gravity model that is often estimated by researchers is as follows:

$$\ln (TRADE_{ij}^{t}) = \beta_0 + \ln \beta_1 SIZE_i^t + \ln \beta_4 DISTANCE_{ij} + \ln \beta_7 REMOTENESS_i + \beta_9 dCONTROL\ VARIABLES_{ij} + \alpha_{ijt} + e_{ji}^{t}$$

where *i* denotes the exporter, j denotes the importer, t denotes a year. Variable TRADE can be approximated by total trade, exports or imports. The DISTANCE between two countries can be measured as, for example, the distance between countries' capitals or commercial centres. Variable REMOTENESS is calculated as in equation 3.6. Our methodology augments the "standard" gravity model with policy variables that proxy the institutional environment and assesses their relative importance in determining export performance. Our interest lies in understanding sectoral differences in the importance or dependence on institutions. We thus estimate the gravity model at the industry level. The basic structure of the augmented model is as follows:

$$\ln EXP_{ijs}^{t} = \beta_0 + \ln \beta_1 GDP_i^t + \ln \beta_2 GDP_j^t + \ln IMPORTS_{js} + \ln \beta_5 D_{ij} + \ln \beta_6 REMOTE_i + \ln \beta_7 TARIFF_{js}^{t} + \beta_9 BORDER_{ij} + \beta_{10} dLANG_{ij} + \beta_{11} dCOLONY_{ij} + \beta_{12} dISLAND_{ij} + \beta_{13} dLANDL_{ij} + \ln \beta_{14} INST_i^t + \alpha_{ij}^{t} + e_{ij}^{t} \quad (4.1)$$

where *i* denotes the exporter, *j* denotes the importer, *s* denoted sector, *t* denotes a year (t=2003, 2004) and the variables are defined as follows:

- EXP *ijt* denotes exports in manufactured products from *i* to *j* at time *t*.
- GDP_i and GDP_j is the real GDP of the exporting and the importing country, respectively.
- $IMPORTS_{js}$ is a variable that proxies the size of an importing market. It is defined as the total imports from all destinations of importing country *j* in sector *s* at time *t*.
- D is the distance between *i* and *j*.
- REMOTE is the remoteness variable weighted by GDP.
- TARIFF is a simple average tariff levied by country *j* on the rest of the world's goods in sector *s*.
- LANG is a binary dummy variable, which is unity if *i* and *j* have a common language and zero otherwise.
- COLONY is a binary variable, which is unity if *i* and *j* were colonies after 1945 with the same colonizer.
- BORDER is a binary dummy variable, which is unity if *i* and *j* share a common border.
- ISLAND is a variable which assumes the value of 1 if one of the trade partners is an island economy, 2 if both partners are island economies, and 0 otherwise.
- LANDL is a variable which assumes the value of 1 if one of the trade partners is landlocked, 2 if both partners are landlocked, and 0 otherwise.
- INST is the variable measuring quality of institutions of the exporting country *i* or the importing country *j*.
- $\alpha_{i(j)t}$ is a set of time "fixed effects."
- e_{ij}^{t} is the error term that is assumed to be normally distributed with a mean of zero.

We estimate the model with two-year data running from 2003 to 2004 for 109 countries.[19] We include a full set of industry-specific and time-specific (yearly) dummies in all regressions.[20]

[19] Ideally we would use panel data rather than cross-sectional data. Panel data estimates are much less sensitive to omitted variable bias because they do not assume that one year of data is representative of the long-run equilibrium (Blonigen, 2005 cited in Lesher and Miroudot, 2006). Due to data availability, however, we are unable to use panel techniques.

[20] Our methodological approach imposes the assumption that the error terms are normally distributed. However this assumption is often violated in large datasets where the error term is heteroskedastic. We thus use robust standard errors without specifying a cluster group in all the regressions.

Recent literature indicates that a sample selection bias can arise if the gravity model is estimated as in (4.1). Helpman *et al.* (2006) show that almost half of countries don't trade with each other and that a rapid growth of trade between 1970-2000 was predominantly due to the growth of the volume of trade among countries that already traded with each other, rather than due to the expansion of trade among new trade partners. With the standard logged specification (4.1) the gravity model does not allow for trade values to take the value of zero. Two common approaches to handle the presence of zero trade include simply discarding the zeros from the sample or adding a constant factor to each observation on the dependent variable. This strategy is correct as long as the zeros are randomly distributed. However, if the zeros are not random, as is usually the case, then this induces a selection bias. Even though the proportion of observations with zero trade may vary somewhat depending on, among other things, the size of the sample, it is usually quite significant to suggest that the proper handling of these zeros is potentially very important. In our sample, for example, over 10 per cent of the trade volumes are zeros.

Helpman (2006) proposes to use Heckman's two-step procedure to solve the sample selection bias, and this is the approach used in this paper. Firstly, a probit model that determines whether a country pair engages in trade at all is estimated and then the standard gravity regression is run to estimate the level of trade. This is based on the following two latent variable sub-models:

$Exp_1 = \alpha X + u_1$

$Exp_2 = \beta Z + u_2$

where X is a k-vector of regressors, Z is an m-vector of regressors, and u_1 and u_2 are the error terms, which are jointly normally distributed independently of X and Z, with zero expectations. The variable Exp_1 is only observed if $Exp_2 > 0$. The variable Exp_2 takes the value of one if Exp_1 is observed, while it is 0 if the variable Exp_1 is missing. In our regressions, Exp_1 is the value of manufacturing exports, while Exp_2 is a dummy variable taking the value one if trade occurs or zero otherwise. The former equation displays how the value of exports is impacted by different factors, while the latter provides some insight as to why trade is taking place between a pair of countries. In order to correct the sample selection bias we need an identification variable(s), i.e. a variable that influences the probability of engaging in trade but does not affect its volume. Helpman *et al*. (2006) show empirically that "a common religion variable, defined as the probability that two randomly drawn persons, one from each country, share the same religion,

satisfies this condition." In our results we confirm the result of Helpman and use the common religion variable for the identification procedure.

Our approach based on estimating the gravity model at the sectoral level further requires controls related to relative abundance and intensity of skill and capital in country *i* and sector *s.* The motivation behind this is that keeping productivity constant, economies where skilled labour or physical capital is relatively inexpensive should export relatively more in industries which use this factor intensively. As mentioned above, to control for skill abundance and intensity we compute two interaction variables: a proxy for sectoral skill intensity and a proxy for skill abundance. Our focus is on the institutional variables while controlling for labour and capital abundance. The augmented gravity model that focuses on sectoral variation in institutional environment is thus as follows:

$$\ln EXP_{ijs}^{t} = \alpha + \beta' C_{it}\omega_j + \beta_1 inst_i^t * inst_s + \beta_2\, skillint_s * skillab_i + \beta_3\, capitalint_s * capitalab_i + e_{it}$$

where:

- $\beta' C$ is a vector of importing and exporting country characteristics impacting export performance, such as GDP, distance, tariffs or contingency which is identical to the control variables in (4.1).
- $inst_i^t * inst_s$ is an interaction variable that captures sectoral differences in dependence on institutions.
- $skillint_s * skillab_i$ is an interaction variable that controls for skill abundance and intensity of country *i* and sector *s*.
- $capitalint_s * capitalab_i$ is an interaction variable that controls for capital intensity and abundance.

An additional potential problem with our methodology is that policy variable can be endogenously determined with trade. We cannot refute a reverse causation hypothesis that changes in trade volumes are the drivers of the variation in institutional quality. In order to control for the endogeneity problem we use the instrumental variable technique.[21] In a paper analysing the impact of trade facilitation on international trade, Djankov *et al.* (2006) note that "it is possible to instrument the quality of institutional environment with objective data from

[21] Section 3.2.6 provides details regarding this empirical technique.

the Doing Business Indicators DBIs."[22] The authors use the required number of signatures for exports and imports. They argue that "the number of signatures is a measure of excessive bureaucracy that slows down trade facilitation, but is not a result of shipping volumes." A similar logic can be applied to instruments for other components of the institutional environment, like financial development or the contracting environment; we therefore construct similar instrumental variables based on the DBIs.

4.4 Results

The results of applying the model described in section 4.3 are presented in Table 4.1. The table is separated into two parts. The top part (page 96) provides the control variables in the gravity model while the bottom part (page 97) shows results of beta coefficients for the institutional variables which are the subject of the analysis. Both tables show second-stage Heckman procedure results that give the unbiased estimates for the model and include a selectivity term included that controls for sample selectivity bias.[23]

[22] Section 3.4.1 provides details regarding the Doing Business Indicators

[23] Results of the whole Heckman procedure are included in Appendix 6. The results show that our identification variable (the probability that two randomly drawn people from a country pair share the same religion) is insignificant in GLS estimates of trade volumes but seems to be important in determining that a country pair engages in trade at all. Econometrically, this provides the needed exclusion restriction for identification of the second stage trade flows equation. Common religion variable is, thus, used as an exclusion variable in the construction of the inverse of mills ratio for the second stage Heckman procedure.

Table 4.2: Gravity Model Results (Standard and Control Variables)

Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP	1.49*** (.002)	1.476*** (.002)	1.51*** (.002)	1.50*** (.002)	1.46*** (.002)	1.45*** (.002)	1.43*** (.002)	1.477*** (.002)	1.44*** (.002)	1.47*** (.002)
GDP partner	.190*** (.003)	.190*** (.003)	.191*** (.003)	.190*** (.003)	.201*** (.003)	.217*** (.003)	.198*** (.003)	.197*** (.003)	.192*** (.003)	.191*** (.003)
Total Imports Partner	.792*** (.003)	.791*** (.003)	.791*** (.003)	.791*** (.003)	.780*** (.003)	.768*** (.003)	.798*** (.003)	.773*** (.003)	.796*** (.003)	.797*** (.003)
Distance	-1.17*** (.005)	-1.18*** (.005)	-1.19*** (.005)	-1.17*** (.005)	-1.16*** (.005)	-1.13*** (.005)	-1.19*** (.005)	-1.19*** (.005)	-1.18*** (.005)	-1.18*** (.005)
Remoteness	.030*** (.001)	.028*** (.001)	.024*** (.001)	.022*** (.001)	.031*** (.001)	.025*** (.001)	.023*** (.001)	.023*** (.001)	.022*** (.001)	.023*** (.001)
Tariffs	-.018*** (.004)	-.017*** (.004)	-.018*** (.004)	-.018*** (.004)	-.019*** (.004)	.003 (.004)	-.018*** (.004)	-.014*** (.003)	-.016*** (.004)	-.019*** (.003)
Border	2.41*** (.032)	2.43*** (.032)	2.38*** (.032)	2.32*** (.028)	.042*** (.012)	.096*** (.012)	2.44*** (.032)	2.47*** (.032)	2.35*** (.032)	2.36*** (.025)
Colony	1.38*** (.050)	1.44*** (.050)	1.39*** (.050)	1.27*** (.055)	.359*** (.014)	.333*** (.014)	1.33*** (.050)	1.43*** (.050)	1.33*** (.050)	1.24*9* (.052)
Language	1.68*** (.015)	1.63*** (.015)	1.67*** (.015)	1.67*** (.015)	2.43*** (.032)	2.36*** (.032)	1.66*** (.015)	1.64*** (.015)	1.69*** (.015)	1.61*** (.012)
Island	.388*** (.014)	.196*** (.015)	.451*** (.014)	.407*** (.011)	1.70*** (.015)	1.66*** (.015)	.387*** (.014)	.194*** (.015)	.452*** (.014)	.401*** (.013)
Landlocked	.035*** (.012)	.107*** (.012)	.103*** (.012)	.101*** (.010)	1.39*** (.010)	1.44*** (.010)	.038*** (.012)	.108*** (.012)	.108*** (.012)	.102*** (.010)
SkillInt* Skillab.	.068*** (.007)	.068*** (.007)	.068*** (.007)	.080*** (.007)	.069*** (.007)	.068*** (.007)	.087*** (.007)	.068*** (.007)	.068*** (.007)	.066*** (.009)
CapitalInt* CapitalAb	.12*** (.010)	.12*** (.010)	.12*** (.010)	.12*** (.010)	.12*** (.010)	.12*** (.010)	.12*** (.010)	.13*** (.010)	.12*** (.010)	.11*** (.01)
Selectivity Term	-1.56*** (.374)	-.963*** (.293)	-.852*** (.173)	-1.56*** (.374)	-.963*** (.293)	-.853*** (.175)	-1.54*** (.376)	-.966*** (.295)	-.851*** (.173)	-.964*** (.291)
No. of observations	646925	646925	646925	646925	646925	646925	646925	646925	646925	55614
R^2 / Pseudo R^2	0.5004	0.5087	0.4895	0.5364	0.5985	0.5457	0.5264	0.5374	0.5386	0.4445
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 4.2: Gravity Model Results, the Effects of Institutions

Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Contract enforcement	1.13*** (.019)									
Financial development		.779*** (.021)								
Property rights			.489 (0.38)							
Labour market flexibility				.113 (0.124)						
ContEnf*ContDep					.189*** (.03)				.177*** (.05)	
FinDev*FinDep						.149*** (.06)			.142*** (.08)	.149*** (.07)
IntaInt*Property							.093* (.07)		.091* (.07)	.088* (.06)
SecVol*Flex								.82 (.76)	.75 (.66)	.69 (.59)
ContEnf*ContDep*Ver										.137*** (.019)

Table 4.3: Gravity Model Results with Instrumental Variables as Proxies for Institutional Subcomponents

Explanatory Variable	(1-IV)	(2-IV)	(3-IV)
ContEnf* ContDep	.145*** (.015)		
FinDev* FinDep		.103*** (.01)	
IntaInt* Property			.094*** (.023)
No. of Ob	646925	646925	328468
R^2 / Pseudo R^2	0.434	0.3964	0.3572
Prob > F	0.00	0.00	0.00

The top part of column 1 in Table 4.1 indicates that trade cost variables related to geography and culture are important for export performance. Both distance from trade partners and remoteness from the rest of the world exert a negative and statistically significant effect on bilateral trade flows. Also, common language and colonial heritage continue to play a significant part in determining bilateral trade patterns. Being a landlocked economy has a statistically significant negative effect on export performance. Trade policy variables also exert an impact on trade volumes. The coefficient on importing country's tariffs is negative and significant for export performance but its magnitude is small (around -0.01). This suggests that tariffs still suppress trade, but this effect diminishes as manufacturing tariffs decrease. The fact that the "standard" variables of the gravity model are also significant and have the correct sign when applied to a model at sectoral level indicates the validity and the feasibility of the approach taken in this chapter. Furthermore, the variable that attempts to capture sectoral market size as proxied by total imports of importing country *j*, $IMPORTS_{js}$, is positive and significant, which further strengthens the above conclusion.

The top part of Table 4.1 also includes variables that aim to control for skills and capital abundance in line with Hecksher-Ohlin theory. We therefore include variables that are products of factor intensity and abundance, $skillint_s*skillab_i$ and $capitalint_s*capitalab_i$. These variables appear to be significant for trade pattern, suggesting that countries that are labour- or capital-abundant export more in more labour- or capital-abundant industries, confirming that HOV theory forces are still pertinent for exports.

The bottom part of Table 4.1 (page 96) summarizes the results of the impact of institutional variables on trade patterns. Results for the four spheres of institutional environment emphasized in this study can be summarized as follows:

- **Contract enforcement**: Regression results in column 1 include an indicator for institutional environment based on the quality of contract enforcement obtained from DBIs. Results of the regression show that this variable is positive, suggesting that, on average and ceteris paribus, countries with better contract enforcement regulations have higher manufacturing exports in a cross-section of countries and industries.
- **Financial sector**: Column 2 of Table 4.1 includes gravity model results with institutional environment proxied by financial development. This variable is likewise positive and significant, indicating the importance of institutions for export performance.

- **Property rights**: Column 3 shows regression results with institutional variable based on the strength of property rights. Property rights seem to be important for manufacturing exports, as the proxy for property rights is statistically significant and positive.
- **Labour market**: Column 4 shows regression results with institutional variable based on the strength of labour market institutions. Labour market institutions indicator is also positive, but it is insignificant, highlighting that countries with more flexible labour markets do not appear to export more than other countries, based on our sample.

The results of this analysis clearly indicate that institutions are important for manufacturing exports. Overall, countries that have better contract enforcement, more secure property rights and more mature financial markets exhibit higher export volumes in manufacturing products. This result holds when we control for countries' relative factor endowments (labour and capital) and export market size as well as for a range of indicators that proxy trade costs.

Quantitatively, our results imply that, ceteris paribus, a 10 per cent improvement in the "quality" of contract enforcement will result in raising manufacturing export performance by 12 per cent. An identical improvement in the quality of financial institutions would increase exports by a little over 8 per cent, and similar progress in property rights protection would yield a rise in exports of about 5 per cent. Because the coefficient on labour market institutions is not significant, it is assumed that it does not have an effect on trade patterns.

Columns 5 to 8 of Table 4.1 show the results of the gravity model with additional interaction variables, products of a measure of institutional dependence in each sector with country-level indicators of institutional quality. The logic behind such an interaction is the following: finding this variable to be positive and significant in the gravity model will indicate that countries with better institutions export relatively more in more institutionally-dependent industries. Findings per each institutional subcomponent are as follows:

- **Contract enforcement**: Column 5 includes the interaction variable *ContEnf*ContDep*, which evaluates the impact of contract enforcement regulation. Much like the overall indicator of quality of contract enforcement regulation, this interaction variable is likewise positive and significant in the gravity model. This finding suggests that countries with stronger contract enforcement export more in more contract-dependent industries.

- **Financial sector**: Column 6 includes the interaction variable *FinDev*FinDep*, which is a product of financial development indicator and sectoral dependence on external finance for growth. The results indicates that, ceteris paribus, countries with higher financial development export more (or specialize) in sectors that are more dependent on external finance.
- **Property rights**: Column 7 introduces *IntaInt*Property*, which is the product of an indicator for property rights security and a measure of sectoral dependence on intangible assets. This indicator is also positive and significant, but only at 10 per cent level.
- **Labour market**: Finally, column 8 includes institutional indicator *SecVol*Flex*, which consists of a measure of labour market flexibility and sectoral volatility. In this case, however, the variable is not significant, indicating that countries with more flexible labour markets do not seem to export more in volatile industries.

In Column 9 we include all the interaction variables in order to assess the relative magnitudes of their effects. Importantly, when one also takes into account the "specialization effects" of institutions, the ranking of importance of institutional subcomponents for manufacturing exports remains the same, but the magnitudes of the coefficients (and hence the "effects" themselves) are much smaller. As before, contract enforcement regulations exert the most robust effect on trade, followed by financial regulations and property rights. Labour market institutions seem to not be important for trade flows.

Column 10 investigates hypothesis 1a (described in section 1.5.3.1), namely that contract enforcement regulations are likely to have a reduced effect on comparative advantage of complex goods when firms producing them can more easily undertake vertical integration. In order to test this assumption, we create a triple interaction variable. We interact the *ContEnf*ContDep* variable with industry-level propensity to vertically integrate. This variable, called *ContEnf*ContDep*Ver*, captures whether vertical integration lessens the impact of contract enforcement on comparative advantage of complex goods.

Our results confirm this hypothesis. The coefficient of the triple interaction variable remains positive and significant, suggesting that contract enforcement regulation is still important for exports of complex products. But the magnitude of this coefficient decreases by about 30 per cent. This shows that in industries that can undertake vertical integration more easily, the impact of contract enforcement on specialization in complex goods is diminished. Rather, firms become adept in "internalizing" some of the costs of imperfect contract enforcement.

We have also tested for reverse causation, as improvements in export performance could influence institutional quality. In order to control for this possible source of bias, we use a novel set of instruments from a variety of sources. In particular, we use 2SLS econometric techniques described in Section 3.2. The results of the second-stage regression, including our instruments to proxy institutional environment, are included in Table 4.2. As an instrument for contract enforcement regulation, we use the number of procedures involved in a court case when breaking a contract. The intuition behind the choice of this instrument is as follows: the number of procedures in a court case involving bridging is a measure of excessive bureaucracy that slows down the judiciary system or business processes, but it is not the result of better export performance or a country's overall income level. Column 1 shows that this instrumental variable is positive and statistically significant, confirming that contracting environment is an important determinant of export volumes. This finding confirms that causality runs from strong institutions to trade volumes rather than the reverse.

Column 2 of Table 4.2 shows results of regression analysis that attempts to instrument for financial development. Up to date, academic literature provided very few instruments for financial development. The approach in this study is to instrument for financial development with data from the DBIs. In particular, we use the "Getting Credit" index that benchmarks procedures required for obtaining credit for over 180 countries in the world.[24] The intuition behind this instrument is similar to the one for contracting institutions: procedures for getting credit are a measure of excessive bureaucracy that slows down judiciary procedures or business processes but are not the result of better export performance or overall income levels. Table 4.2 shows that instrumenting for financial development with data from the DBIs yields positive and statistically significant results, indicating that the development of financial institutions will increase manufacturing exports rather than the reverse.

Column 3 in Table 4.2 shows results of 2SLS regressions, using an instrumental variable for property rights based on settlers' mortality rates, following Acemoglu et al. (2001). As discussed in Chapter 2, Acemoglu et al. use mortality rates of colonial-period settlers as an instrumental variable to proxy property rights institutions. Here, the assumption is that depending on mortality rates, European settlers established either extractive colonies with little incentives for institution-building or permanent settlements that imitated institutional environments of the old world. Via

[24] Details on the "Getting Credit" database are provided in Section 3.4.

these channels, settlers' mortality influenced the historical development of the state-society relations and the degree of property rights enforcement today. Thus, colonial-era settlers' mortality rates will be correlated with property rights in a colony but are unlikely to be the outcome of increasing growth rates and export levels. In this case, the results are positive and statistically significant, suggesting that causality runs from strong property rights to improved exports. Given that labour market institutions were not a significant determinant of export volumes, we do not attempt to instrument this measure of institutional quality.

An important robustness test carried out in this Chapter is to repeat the gravity model analysis separately for each industry. These regressions are included in Appendix 4. The results of this analysis broadly confirm the results outlined above. Table A1 provides the results of the gravity model at industry level with the quality of contract enforcement regulations as the institutional variable. The Table shows that although contract enforcement variable is positive and statistically significant for the vast majority of industries there is a clear hierarchy in this relationship. The coefficient is of a higher magnitude for more contract dependant industries. This relationship can be traced on Table A1 which plots on the y-axis the magnitude of the coefficient for contract enforcement and on the x-axis the indicator of dependence on contracts. The graph provides a clear indication of a positive relationship indicating by the upward sloping line of best fit. This further highlights that the positive impact from "good" contracting institutions is higher in industries that are more dependent on contracts for their growth.

We also undertake the gravity model analysis separately for each industry with an indicator of financial institutions included. The results further strengthen our conclusions regarding the impact of financial institutions on trade. As in the case of contracting institutions also financial institutions are important for exports at industry level. Table A2 shows that the estimated coefficients are positive and statistically significant for the vast majority of industries. There is also a clear relationship between the magnitude of the coefficients and the indicator of dependence on external finance for growth. As can be seen in Table A2 the magnitude of the coefficients and the indicator of dependence on external finance for growth are positively correlated. This further indicates that the impact of financial development on exports is more important in industries for which access to the credit market is important.

In addition to the robustness tests highlighted above, we undertook two more tests. The first aimed to test the sensitivity of the results to changes in the sample of countries, as well as to

ensure that the results are not driven by one or two influential observations. The robustness test repeated our baseline specification with all four institutional interaction variables, but removed one country at a time from the regression. The test found that these country-by-country omissions did not produce significant differences in the overall results. In over 95 per cent of regressions, the estimated coefficients did not differ from baseline specifications by more than 20 per cent, and remained positive and significant as hypothesized. In the remaining specifications, coefficients were significant but diverged from baseline specification by between 20 per cent to 40 per cent.

The final robustness test excluded one industry at a time from the model. Doing so did not result in any significant changes to the general results. The results of the estimated coefficients remained to be statistically significant and positive.

4.5. Conclusion

Several important conclusions emerge from the preceding empirical exercise.

- First, the same set of gravity model variables related to country size and geography are important for export performance at the aggregate as well as the sectoral levels.
- Second, institutional environment – as proxied by contract enforcement, property rights and financial development – is a robust determinant of export performance at the sectoral level.
- Third, results demonstrate that stronger institutions induce what some commentators call the "institutional comparative advantage," leading countries to specialize in different industries depending on institutional strengths. Results show that countries with stronger contacting institutions tend to export relatively more in the more complex or contract-dependent industries; countries with more mature financial markets export more in sectors reliant on external finance; and countries with more secure property rights specialize in sectors dependent on intangible assets for production. We found no corresponding effect for labour market institutions, as measured by this study.
- Fourth, results of the gravity model provide further evidence in confirmation of the HOV theory. Results show that countries abundant in capital export capital-intensive goods, and labour-abundant countries export labour-intensive goods. The latter result is outside the formal focus of this study but is, in itself, an important and interesting implication.

It is also important to note that the impact of institutions on trade in not trivial. The magnitudes of the coefficients imply that countries with better institutions export significantly more than countries with poor institutions. Moreover, this impact is particularly pronounced for institutionally-dependent industries. Therefore if the government objective is to enhance trade in more complex manufacturing products, an important policy component is improving the institutional environment.

The results in Chapter 4 seem to be robust to various specifications. We have used a variety of approaches to control for the fact that institutions and trade can be mutually influential, and have shown that it is institutions that "cause" trade patterns rather than the reverse.

This chapter demonstrated that institutions influence the types of goods that countries export, but has said little about how or through which channels this impact is exerted. These questions are the focus of the following two empirical chapters, which study the impact of institutional factors on firms' productivity and industry-level growth and hence on trade.

Chapter 5: Trade and Industry Growth Rates and Institutions: An Industry Level Analysis

5.1 Introduction

As emphasised in previous chapters, a wide body of both empirical and theoretical evidence suggests that institutional environment is an important determinant of trade patterns. In particular, section 1.4.2 argues that the "production cost" effect of institutions on trade pronounces itself by impacting on firms productivity and industry level growth.

In this chapter we use Rajan and Zingles' (1998) industry-level methodology to test whether institutional environment will be more important for enhancing sectoral growth in more institutionally-dependent industries. The hypothesis is that institutions can disproportionately support firms, or sectors, that inherently hinge on institutional environment for growth. Rajan and Zingles (1998), in their study of the financial development, find that industries that are "more dependent on external financing have relatively higher growth rates in countries that have more developed financial markets."

Our hypothesis implies that industries such as "Transport Equipment" or "Machinery" have an intrinsic dependence on institutions for production. They therefore should grow relatively faster than "Tobacco", which seems not to be dependent on institutions, in countries that have better institutional quality. To give an example, China, Costa Rica and Kenya were all low-income countries in 1980 with significantly divergent institutional environments. Consistent with the hypothesis, in Costa Rica – a country with relatively good quality institutions - sectors such as "Professional and Scientific Equipment" grew at four per cent annual rate of growth higher than "Tobacco". In China, which had about an average quality of legal environment in the same sector, grew three per cent higher than "Tobacco". In Kenya, whose institutional environment was below average, in 1980 its "Tobacco" sector actually grew faster than "Professional and Scientific Equipment".

In this chapter we test this hypothesis more formally. As before, four sub-components of institutional quality, namely contract enforcement, financial development, property rights and labour institutions, will be analysed. Using an econometric modelling methodology this chapter will assess whether the above-mentioned institutional sub-components have an impact on trade and industry growth. A difference-in-differences methodology is employed, which tests whether

the institutional sub-components are a significant determinant of industry and export growth at a sectoral level.

The reminder of the chapter is structured as follows. Section 5.2 provides an overview of the methodology and data used for the study. Section 5.3 shows the results from the application of this methodology, and finally section 5.4 concludes.

5.2 Data and Methodology

5.2.1 Data

The data used in this study has been explained in detail in section 3.4. This section builds on section 3.4 and highlights specific data management tasks that have been undertaken to construct the dataset for econometric analysis.

In the study we use industry- and country-specific data from a variety of sources. The dependent variable is constructed using data from a United Nations Industrial Development Organization (UNIDO) databases. We assemble data on industry growth from UNIDO's Industrial Statistical Yearbook (2002), which provides data on wages, employment, output, sectoral value-added, and number of firms for several countries throughout the world in the 80s and 90s. We would like to have information regarding the maximum amount of firms. The binding constraint to achieve that is the availability of data on value-added. We therefore construct ten-year average growth rates spanning from 1980-89 and five-year average growth rates spanning from 1990-95. In the dataset we exclude any year-to-year industry growth rates that exceed -100 per cent or 100 per cent and we follow the literature (Raja and Zingles, 1998; Claessens and Laevne, 2003) with this assumption. This is due to the fact that we assume that any industry growth rates that are below -1, indicating that average industry growth rate was below -100 per cent, are flawed. Such growth rates would simply indicate that the industry has disappeared. Similarly we discard any industry level growth rates that are above 100 per cent. A year-on-year growth rate of above 100 per cent indicates that the fairly broad economic sector has doubled in size in the space of only one year, and therefore these data points were also excluded.

The dataset gives us a total of 47 country data for the 1980s and 37 country data for the 1990s. Table 5.1 provides a list of countries included in the dataset.

Table 5.1: List of Countries Included in the Industry Growth Model

Australia	Greece	Netherlands	United Kingdom
Austria	Guatemala	New Zealand	USA
Austria	Hungary	Norway	Uruguay
Bangladesh	India	Pakistan	Venezuela
Belgium	Indonesia	Panama	Zimbabwe
Bolivia	Israel	Peru	
Canada	Italy	Philippines	
Chile	Japan	Poland	
Costa Rica	Jordan	Senegal	
Denmark	Kenya	Singapore	
Ecuador	Korea, Rep. of	South Africa	
Egypt	Malaysia	Spain	
El Salvador	Mauritius	Sri Lanka	
Finland	Mexico	Sweden	
France	Morocco	Turkey	

The data are available in ISIC rev. 2 three-digit industry level. We delete from the dataset all countries that did not provide data to UNIDO that are separated by at least three years. We also drop two industries from the analysis – 353 Petroleum Refineries and 354 Miscellaneous Petroleum and Coal Product – as these two industries have particularly poor data availability.[25] Furthermore, data for the 1990s contain a significant amount of missing industry value-added data, therefore some countries contain less than a full set of 27 industries. Data in the UNIDO database are given currency $US. We transform the current dollars to constant 1990 US$ by deflating the value-added by the PPI obtained from the IMF.

5.2.2 Methodology

Although difference-in-differences methodology was initially utilised to analyse policy changes in labour or health economics, where it is relatively easy to identify and compare before and after changes between the treatment and control groups, this methodology is also ideal to analyse the impact of institutional environment on industry growth. Our approach tests for a differential effect of institutional environment depending on the sector of economic activity. Thus, the difference-in-differences methodology applied in this study compares the industry growth rates for countries with good institutions in institutionally dependent industries with countries with weak institutions in institutionally dependent industries. Conversely, our methodology compares the industry growth rates for countries with "good" and "weak" institutions in the least institutionally dependent industries.

[25] This is presumably because some governments classify information on petroleum production as restricted and do not release this information to UNIDO.

We use a censored probit model methodology to execute the model. This methodology also allows us to use country and industry fixed effects to control for observable and unobservable country and industry characteristics. Furthermore, it alleviates the problem of endogeneity of institutional environments present in cross-country analysis. As mentioned in the introduction, to claim endogeneity one would have to argue that across countries, high growth rates in some sectors determine the quality of institutional environment in the whole country.

In the first part of the analysis, the dependent variable is an average annual real growth of value-added in industry *j* in country *k*. *A priori*, we assume that if we can measure industry *j's* institutional dependency and country *k's* institutional environment, then after correcting for country and industry effects we should find that the coefficient of the interaction terms between institutional dependency and institutional quality is positive. In the second part, we focus on growth in the manufacturing trade, and therefore our dependent variable is the average annual growth rate trade of exports in industry *j* in country *k*. The model we want to estimate is as follows:

$$Growth_{jk} = \alpha + \beta_1 IndDum_j + \beta_2 ConDum_k + \beta_3 Indshare_{j,k} + \beta_4 Instdep_j * InstQ_k + e^j_{it} \qquad (5.1)$$

Where $Growth_{jk}$ is either the average annual growth of value-added in industry *j* and country *k* or average annual growth of exports in industry *j* and country *k.* $IndDum_j$ and $ConDum_k$ are industry and country dummies, respectively. $Indshare_{j,\ k}$ is the industry share of manufacturing value-added. Finally, $Instdep_j * InstQ_k$ is our variable of interests. Depending on specification it consists of either *ContEnf*ContDep, FinDev*FinDep, IntaInt*Property, SecVol*Flex.*

5.3 Results

The results of applying the model described in the previous section are presented in Tables 5.2 and 5.3. Table 5.2 shows the results of an econometric model where the dependent variable is value-added and hence the model tests the effects of institutional quality on value-added growth. The results of this analysis are presented in Table 5.2. Column 1 in this table shows the results of our benchmark model (equation 5.1) which includes a full set of country and industry dummies, industry share in manufacturing value-added in 1980 or 1990 as the only control variable, and our interaction variable of interest. In addition, this analysis contains dummies for the two time periods used in the analysis. As already mentioned these time periods are the 1980's and 1990's.

Industries' market share in total manufacturing in a specific country is denoted *IndustryShare* and has a negative sign, and is statistically significant in all regressions. This result is in line with that of Rajan and Zingles (1998) and suggests that there is some form of industry-specific convergence.

In terms of the main hypothesis, we find in column 1 of Table 5.2 that the interaction coefficient, *ContEnf*ContDep*, is positive and significantly. This indicates that throughout the 1980s and 1990s industrial sectors that were dependent on contract enforcement regulation for their growth, grew relatively faster in countries which had better quality contract enforcement regulation. In order to infer the economic significance of the contract enforcement regulation on industry growth, we assess how much higher the growth rate of an industry at the 75th per centile of contract dependency would be compared to an industry at the 25th per centile level, when the industries are located in a country at the 75th per centile of contract enforcement regulation quality, rather than in a country at the 25th per centile.[26] The industry at the 75th per centile, printing and publishing, has a contract dependence value of 0.713. The industry at the 25th per centile of contract dependence, pottery, china and earthenware, has a value of 0.329. The country at the 75th per centile of the quality of contract enforcement regulation, Hungary, has a value of 0.85 and the country at the 25th per centile, Sri Lanka, has a value of 0.55. The estimated coefficient for the interaction term in column 1 of Table 5.2 equals 0.029 ≈ 0.003 and we can set the industry's initial share of manufacturing at its overall mean. The regression coefficient estimates therefore predict the difference in growth rates between the 75th and 25th per centile contract-dependent industry to be 0.3 per cent per year higher in a country with a quality of contact enforcement index of 0.85 compared to one with an index of 0.6. In comparison, the average growth rate is 3.4 per cent per year. Therefore, a differential rate of 0.3 per cent due to an improvement in contract enforcement index from 0.65 to 0.85 represents approximately a ten per cent increase in growth rates.

The relative importance of contract enforcement regulation can also be made by comparison of two mid-income economies, Chile and Bulgaria. Bulgaria is a country with a relatively low level of contract enforcement regulation having a value of 0.6 (at the 25th per centile of contract enforcement regulation quality) while Chile is a country with relatively "good" quality of contract enforcement regulation having a value of 0.85 (at the 75th per centile of contract enforcement regulation). The regression coefficient estimates predict that if Bulgaria had had the same quality of contract enforcement regulation as Chile then the growth rate of value-added to its industry at

[26] This presentation of results broadly follows the one used in Claessens and Laevne (2003).

the median level would be 0.27 per cent higher per year. This effect seems to be relatively large in magnitude.

In column 2 of Table 5.2 we present results of the regression where we include an interaction variable between industry-level dependence on external finance and countries' financial development. As before this variable is named *FinDev*FinDep* in Table 5.2. The estimated coefficient is positive and statistically significant, indicating that industries that are more dependent on external finance grew relatively faster in countries that had better financial development in the 1980s and 1990s. This result is in line with the results of Rajan and Zingles (1998) study. In order to infer the economic effect of the estimate coefficient we imply the same methodology as before, i.e. we estimate how much higher the growth rate of an industry at the 75th per centile of institutional dependency would be compared to an industry at the 25th per centile level, when the industries are located in a country at the 75th per centile of institutional quality, rather than in a country at the 25th per centile.

The estimated coefficient for the interaction term in column 2 of Table 5.2 equals 0.0019 ≈ 0.002 and we again set the industries' initial share of manufacturing at its overall mean. The regression coefficients therefore predict the difference in growth rates between the 75th and 25th per centile contract dependent industry to be 0.24 per cent per year higher in a country with a quality of financial development index of 0.82 compared to one with an index of 0.63. As before, the average growth rate is 3.4 per cent per year.

In column 3 of Table 5.2 we assess the impact of property rights on value-added growth by including *IntaInt*Property* in the baseline model. The coefficient of interest is positive and statistically significant but its magnitude is smaller than that of the corresponding coefficients on *FinDev*FinDep* and *ContEnf*ContDep.* This highlight that security of property rights is indeed important for industrial value-added and that this is more important for sectors requiring intangible assets for production, but this effect is less pronounced than that of contract enforcement or financial development.

Finally, in column 4 of Table 5.2 we have included the variable *SecVol*Flex* in order to test whether value-added in industries that are intrinsically more volatile grew relatively more in countries that have more flexible labour markets. This variable was not statistically significant

which shows that security of property rights was not an important determinant of sectoral value added in our sample of industries and countries.

In order to test the robustness of our results in column 5 of Table 5.2 we have included in the same regression all four institutional variables of interest. As indicated in Chapter 1, the correlation between these variables is not significant, therefore the econometric problem of collinearity should not be a problem. This regression allows us to infer which institutional sub-component is the most important for enhancing industry value-added. As in the analysis of manufacturing exports, also the analysis of industry-level value-added indicates that contract enforcement and financial development are key in supporting industry level value-added. In this Chapter the magnitude of the effect of financial development is slightly higher than that of contract enforcement. The strength of property rights does seem to exert an effect on industry value-added but that effect is of a smaller magnitude. Labour market institutions do not seem to have an effect on value-added. This pattern of results is in line with the results obtained in Chapter 4; hence we can conclude that in our sample flexibility of the labour market seems not to be a source of 'institutional comparative advantage'.

An additional factor we wish to investigate is whether growth opportunities differ across industries and countries in such a way that the relationships between our institutional variables and industry growth rates might become spurious. In particular, it is feasible that our institutional variables are proxies for growth opportunities at the industry level. It is foreseeable that if a country's institutional environment is at a minimal level conducive for growth, it may not be those industries that depend more on institutions that have higher growth rates, but those that display better growth opportunities. In a situation where growth opportunities are correlated with the institutional quality indicators, a bias in the estimations can occur.

We would also like to test the following hypothesis. Countries with similar levels of institutional development may experience the same growth trends across industries because their companies face similar trends regarding growth prospects, and not necessarily due to the fact that their levels of institutional development entail a higher provision of resources for companies or a better allocation of resources by companies. Furthermore, countries that diverge in institutional quality may also diverge in growth opportunities, and consequently their growth patterns may differ, not because of differences in institutional quality.

In recent papers, Fisman and Love (2002) and Claessens and Laevne (2003) explore this hypothesis focusing on financial development. They use the actual U.S. sales growth at the sectoral level, obtained from the NBER-CES Manufacturing Database, as a measure for industry level growth opportunities at a worldwide level. When they substitute the actual sectoral growth of sales for the sectoral external financial dependence ratio in the interaction term with financial development, they find that the estimated coefficient for the new interaction variable is positive and statistically significant.

In addition, when including both the new and old interaction variables Claessens and Laevne (2003) find that the interaction variable with external financial dependence is no longer statistically significant. The authors conclude that, "if indeed actual U.S. sales growth rates are a good proxy for (global) growth opportunities, that it is the similarity (or difference) in growth opportunities for countries at similar (or different) levels of financial development that leads to the positive relationship between growth and the interaction variable external financial dependence times countries' financial sector development."

A similar possibility may arise with respect to our institutional variable. If growth opportunities systematically vary across countries with the degree of institutional development, then a statistically significant coefficient for our interaction variable could be inaccurately interpreted as support for the impact of the institutional environment hypothesis. To investigate this possibility, we use the same approach as Fisman and Love (2000). Specifically, we interact all four of our measures of institutional quality with U.S. sales growth and include them in a regression that also includes *ContEnf*ContDep, FinDev*FinDep, IntaInt*Property, SecVol*Flex.* This regression is included in column 6 of Table 5.2. As a note of clarification in this extended version of the model we include growth opportunities of industry *j* interacted with institutional quality measure in country *k*. The USSales**ContEnf* and *USSales*FinDev* are statistically significant and positive indicating the U.S. sectoral growth is a good determinant of cross-country growth in value-added. Of particular interest for this analysis, *ContEnf*ContDep* and *FinDev*FinDep* continue to be positive and statistically significant, although the statistical significance for our main result decreases somewhat. This suggests that the bias arising from growth opportunities was somewhat significant in our sample but does not refute the overall results of the significance of institutional variables. The conclusion regarding the bias in *IntaInt*Property* is different. After the inclusion of *USSales*Property variable,* which is a product of U.S. sales growth indicator and a strength of property rights index, the statistical significance of *IntaInt*Property* disappears,

highlighting that the above-mentioned bias related to growth opportunities was significant for the impact of property rights on sectoral value-added. As before, labour market institutions were not assessed given that it was already insignificant in the baseline specification.

We would like to also verify whether investment opportunities are different from those in the United States due to differences in the general level of a countries' development rather than differences in institutional quality. It might be the case that, for example, that a rich country with a similar quality of institutions as a poor country will have relatively higher growth rates in 'institutionally dependent' industries due to their generally higher level of development, rather than institutional quality. Any relationship between growth in value-added and our interaction terms may therefore be biased because it highlights divergence in growth opportunities. Claessens and Laevne (2003) and Rajan and Zingles (1998) test for this hypothesis by adding an additional interaction variable to the baseline regressions. This interaction term is a product of an indicator of financial dependence of industries and countries' per capita GDP. The assumption is that per capita GDP is a proxy for the overall level of a country's economic development and of corresponding country-level investment opportunities. We create four additional variables that are a product of a country's GDP per capita and industry dependence on institutions. These variables are named: *GDPpc*ConDep, GDPpc*FinDep, GDPpc*IntaInt*.[27]

Column 7 in Table 5.2 includes results of a regression that controls for differences in the level of development in the way described immediately above. Inclusion of additional interaction variables seems not to alter our main result since the new interaction variables are not statistically significant, while our old interaction variables remain significant. We can therefore conclude that across countries, different growth patterns do not seem to be due to simple differences in investment opportunities related to the level of development, but rather due to differences in sectoral institutional dependence chosen in response to variations in institutional quality.

Although our methodological approach based on industry-level analysis decreases potential problems of endogeneity, some concerns may remain. The methodology controls for the fact that countries that grow faster may improve their institutions rather than vice versa, but there remains a possibility that sectors that are more dependent on institutional quality may seek better institutional quality for their industry (and thus have an effect on countries' overall

[27] Like before, we exclude the labour market indicator as it is not a significant determinant of value added growth.

institutional quality). In order to control for this bias, and following the approach in the previous Chapters, we use instrumental variables obtained from World Bank's Doing Business Database and Acemoglu, Johnson and Robinson (2001). We therefore use the number of procedures in a court case involving bridging a contract as an instrument for contract enforcement quality. The instrumental variable for property rights quality will be, as in Chapter 4, colonial-era settler mortality, and for financial development the "Getting Credit" Indicator from the DBIs. We use the 2SLS procedure for the analysis of these instrumental variables. In Table 5.3 we have separately included interaction terms of these instrumental variables with the corresponding indicators of "dependence on institutions". The results indicate that all three instrumental variables are positive and significant, imply that reverse causality was not a significant problem in this model. We exclude labour market institutions from this analysis as the results in Table 5.2 column 4 have shown that these types of institutions are not a robust determinant of industry value-added.

Finally for both of our models we want to perform an additional robustness check. It is well known that cross-country analysis often suffers from a lack of robustness. To test for this possibility we re-run our baseline estimates in Table 5.2, excluding one country or one sector at a time. The results show that our main results presented in this section are robust to changes in specification.

Table 5.2: Industry Growth Model Regression Results

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Industry Share	-.876*** (.363)	-.782*** (.359)	-.882*** (.373)	-.867*** (.323)	-.863*** (.395)	-.835*** (.362)	-.830*** (.345)
ContEnf*ContDep	.0029** (.0013)				.0022** (.0009)	.0016** (.0011)	.0017** (.0009)
FinDev*FinDep		.0019*** (.00001)			.0016*** (.00001)	.0011** (.0005)	.0014*** (.00001)
IntaInt*Property			.00025* (.00012)		.00021* (.00010)	.00015 (.00010)	.00022* (.00012)
*SecVol*Flex*				.0008 (.0002)	.0008 (.0002)	.	.
USSales*ConEnf						.0122** (.0054)	
USSales*FinDev						.0023* (.0013)	
USSales*Property						.0022*** (.00009)	
*GDPpc*ConDep*							.0033 (.0023)
GDPpc*FinDep							.0021 (.0010)
GDPpc*IntaInt							-.00008 (.0007)
Industry & Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Ob	2076	2076	2076	2076	2076	2076	2076
R^2 / Pseudo R^2	0.095	0.132	0.138	0.143	0.138	0.165	0.132
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5.3: Industry Growth Model Results with Instrumental Variables as Proxies for the Institutional Sub-Components (2SLS)

Explanatory Variable	(1-IV)	(2-IV)	(3-IV)
ContEnf* ContDep	.009*** (.001)		
FinDev* FinDep		.007** (.004)	
IntaInt* Property			.002* (.001)
No. of Ob	2076	2076	875
R^2 / Pseudo R^2	0.0198	0.0236	0.015
Prob > F	0.00	0.00	0.00

5.4 Conclusion

This chapter has investigated the impact of contract enforcement, property rights, financial development and labour market institutions on growth in manufacturing value-added. It has analysed a large cross-country UN database of industry value-added. Several important conclusions emerge from this analysis. Firstly, countries with better contract enforcement regulation and higher financial development displayed higher industry-level growth in sectors that are more dependent on contracts and external finance. Secondly, we also find some impact of more secure property rights on the growth rate of value-added and trade, however this effect is less robust to different econometric specifications. Thirdly, we find little evidence that in our sample of countries, sectors that are intrinsically more volatile grew faster in countries that have more flexible labour markets.

This chapter provided further empirical evidence regarding the importance of institutions for countries' comparative advantage. We have shown that institutions not only determine trade volumes (as indicated in Chapter 4) but are also important for the pattern of industrial growth. The channel through which institutions affect trade seems to be via its impact on firms' value-added. This chapter has shown that sectors that are more dependent on institutions had a higher growth rate of value-added in countries that have "good" institutional environment. Since value-added increased more in institutionally dependent industries, these industries became more competitive on the international market and were able export larger amounts of goods. Our findings give empirical validation to the notion of the "production effect" of institutions as a source of comparative advantage. Since institutions influence countries' structure of production by affecting sectoral growth in value-added they are also likely to determine trade patterns in the same way.

In the next chapter this hypothesis will be investigated further as the sources of firms' productivity will be examined.

Chapter 6: Institutions, Firms' Productivity and the Patterns of Comparative Advantage

6.1 Introduction

This chapter contributes to the recent, but rapidly growing, literature on the impact of institutional environment on firms' productivity and trade propensity (Elbadawi, 2001; World Bank, 2004). It analyses a comparable cross-country, firm-level survey to determine these effects. The chapter investigates a previously unexplored question: How much of the observed productivity differentials are due to institutional environment differences between locations? Literature on the impact of institutional environment has created a robust link between better institution and higher growth rates, GDP, but research on the impact of institutions on firm-level productivity dispersions has been limited. This study would like to fill this gap by analysing the World Bank's Productivity and Investment Climate Surveys (PICS), which is a standardised survey of firms conducted in over forty developing countries.

The research hypothesis (see Section 1.4) highlights that the impact of institutions on trade through the "production effect" ought to first impact on firms' productivity, as institutions support the adoption of certain technologies and only later have an effect on firm and industry export patterns. This chapter therefore constitutes an integral part of the research hypothesis and attempts to investigate how institutions affect export patterns by initially affecting firms' productivity.

Following the approach in previous chapters, this chapter will also investigate sector-specific differences in the dependence on institutions for production processes, and how institutional environment affects firms' productivity within that context.

The results of an econometric enquiry contained in this chapter show that firms' productivity and their trade performance are robustly related to institutional environment. We find that although institutional environment is important for all sectors, there is significant heterogeneity in the magnitude of that impact. Institutional environment is relatively more important for high value-added industries that are more dependent on institutions.

The chapter is structured as follows: Section 6.2 provides an additional literature review on the impact of institutions on firms' productivity; Section 6.3 gives details regarding the methodology and data used in the Chapter. Section 6.4 presents the results. Finally, section 6.5 concludes.

6.2 Literature Review of Previous Studies on the Impact of Institutions on Productivity

In the past decade there has been a rise in the studies focusing on the impact of institutions and business climate on firm level productivity. This is essentially for two reasons. First, the availability of new cross-country firm-level datasets that allow for comparison of firms productivity and, second due to the fact that, as noted by Pangan and Udry (2005), "the cross country literature on institutions and growth has served its purpose and is essentially complete as the number of instrumental variables is limited and their coarseness prevents close analysis of particular casual mechanisms form institutions to growth". Attention has, thus, shifted to indirect evidence that examine the steps in the casual relationship between institutional environment and income levels. The main issue here is the effect on firm level productivity. While macro studies have suggested the link between institutions and firms' productivity, the enterprise level research have overwhelmingly given direct evidence on that link.

One of the first studies on the topic was conducted by Dollar et al (2005). The authors restrict their attention to investment climate noting that 'this concept is closely related to what some authors in the macroeconomics literature have called high-quality institutions or social infrastructure'. They use only 'objective' measures of the investment climate collected in surveys similar to the ones we use in this Thesis, restrict their attention to firms in the garment industry. They find that investment climate matters for the level of productivity, value added, wages, profit rates, and the growth rates of output, employment, and capital stock. A related study by Ayyagari, Demirgüç-Kunt and Maksimovic (2006) shows that a large set of institutional indicators such as maintaining political stability, keeping crime under control, and undertaking financial sector reforms to relax financing constraints, are likely to be the most effective routes to promote firms' growth.

Bastos and Nasir (2004) attempts to identify which dimensions of the investment climate matter most for productivity. Their results, based on a firm level survey of four transition economies indicate that competitive pressure is the most critical factor in the investment climate,

accounting for more variation in firm-level productivity than infrastructure provision or issues related to government rent-seeking and bureaucratic burdens.

Scarpetta et al. (2002) undertake an empirical investigation of the role that policy and institutional environment has on productivity and firm dynamics. The authors use a firm-level database for ten OECD economies and combine it with a range of indicators of regulation and institutional settings in product and labour markets. The authors find that industry productivity performance is negatively affected by strict product market regulations. This effect is especially pronounced if there is a significant technology gap with the technology leader. Moreover, the authors find that oppressive regulations on entrepreneurial activity as well as high costs of adjusting the workforce seem to negatively affect the entry of new firms.

Kinda, Plane and Véganzonès-Varoudakis (2011) analyse companies' productivity in the Middle East and North African region in eight manufacturing industries. Their empirical analysis indicates that institutional factors matter for firm productivity through the quality of infrastructure, the experience and education of the labour force, the cost and access to financing.

Focusing on China, Hallward-Driemer et al. (2006) find evidence that institutional characteristics and investment climate measures matter for the investment rate, TFP and sales growth. The author show that light regulatory burdens, limited corruption, technological infrastructure to have a positive impact on firms' economic outcomes.

6.3 Data and Methodology

This Chapter uses two key methodologies:

- The first methodology is to calculate productivity at firm-level using the Levinsohn and Petrin (2004) method, and then to regress the obtained measures of productivity on a range of possible explanatory variables, including institutional variables.
- The second methodology is a methodology developed by Escribano and Gausch (2005) explained in detail below.

Before moving on to a detailed analysis of the methodologies in Section 6.3.2, the following section (6.3.1) describes the data used in the study.

6.3.1 Data

The data come primarily from the World Bank's Productivity and Investment Climate Surveys conducted in the years 2000-07, which sampled over nearly 20,000 firms around forty countries around the world. These surveys, based on large random samples of firms, give firm-level experiences of specific regulatory burdens, sources of finance, the quality and access to infrastructure services, security of property rights and corruption. PICSs utilise a standard core questionnaire that includes questions intended to support the calculation of firms' productivity. The variables for estimating firm level productivity; *Y, K, M* and *L* are derived from the survey data as follows[28]:

- Value-added (*Y*) is calculated by subtracting raw materials used from the total value of sales;
- Capital *(K)* is defined as the total book value of assets;
- Labour *(L)* is defined as the total number of employees (including contractual employees) working at the firm's main production facility at a given time; and,
- Raw Materials *(M)* are defined as direct raw material costs (used as a proxy for unobservable productivity shock in the Levinsohn and Petrin (2003) procedure).

In order to ensure cross-country compatibility between estimates of production function we convert the values expressed in local currencies to current dollars and exclude outliers, which are defined as those plants which report the ratios of materials to sales larger than one.

Core productivity data is available for around 23,000 firms in ten industries. Table 6.1 shows the number of firms included in each of these industries as well as the year that the survey was taken. There is an adequate spread of firms across industries. The average number of firms in each sector is equal to 2,340 (maximum sample is 4,626 in garments sector and the minimum sample is 468 in paper sector).[29] Sectors with below 1,000 observations are leather and agro-industry. There is also an adequate spread across firm size groups, though in African and Latin American cases, more firms are micro, small and medium companies.[30]

[28] In the regressions we also use firm level characteristics such as firm's size, ownership or age. For the definition of these firm characteristics please consult Table 6.3.
[29] Table 6.2 provides a full list of firms sampled in the dataset according to industry type. Industries with below 400 observations were dropped.
[30] Furthermore, there are 6,372 micro and small enterprises for which productivity and regulatory quality data are available.

Table 6.1: Industry breakdown of the Dataset

Industry	No of Firms
Textiles	3,964
Leather	913
Garments	4,626
Agro-industry	481
Food	4,318
Metals and machinery	2,827
Electronics	1,709
Chemicals and Pharmaceutics	2,761
Wood and furniture	1,829
Non-metallic and plastic materials	1,848
Paper	468

Source: Productivity and Investment Climate Survey

A full list of countries included in the dataset is contained in Table 6.2. The Table shows that India is the country for which the dataset contains the largest number of firms. In 2000, the PICS contained 1,628 firms for India and in 2002 the survey sampled an additional 2,786 companies. The firm level survey of Peru contained the smallest number of companies with only 128 firms, closely followed by Poland with 129 firms. Overall the dataset contains more than 15,000 firms throughout the world.

Table 6.2: Countries included in the dataset

Country	Year	Sample Size	Country	Year	Sample Size
Bangladesh	2002	1,940	Morocco	2000	1,163
Benin	2004	250	Morocco	2004	1,666
Cambodia	2003	242	Pakistan	2002	1,874
Chile	2004	1,874	Peru	2002	128
Costa Rica	2005	559	Philippines	2003	1,189
Ecuador	2003	505	Poland	2003	129
Egypt	2004	1,416	South Africa	2003	878
Ethiopia	2002	687	Syria	2003	221
Guyana	2004	305	Tajikistan	2003	188
India	2000	1,628	Tanzania	2003	282
India	2002	2,786	Thailand	2004	2,465
Kyrgyzstan	2003	188	Turkey	2005	1,156
Madagascar	2005	253	Uzbekistan	2003	187
Malawi	2005	274	Vietnam	2005	2,233
Mauritius	2005	223	Zambia	2002	323

Source: Productivity and Investment Climate Survey

Since the survey years vary from country to country we use yearly dummies in all parametric regressions to control for time-varying effects. Furthermore, we have time-varying observations (T=2) for a two-year period for most variables. However, for the institutional variables we have observations only for the actual sample year. Following Escribano and Gausch (2005) we assume that institutional quality indicators do not change much from one year to the other.

We use objective data from PICS that contains information on time and money spent on bureaucratic procedures to construct institutional indices for contract enforcement regulation. The use of objective proxies for regulatory quality gives a more precise and consistent account of regulatory or institutional efficiency. For financial development we were unable to use such an objective indicator as the PICS database did not contain a usable proxy. We therefore have to use a perception-based indicator, which is described in detail below.

In this chapter we analyse only two above-mentioned sub-components of institutional environment for two reasons. Firstly, in previous chapters contracting environment and financial development were the most robust determinants of propensity to trade and value-added. Secondly, adequate proxies measuring the enforcement of property rights and labour market institutions were not available in the PICS dataset. We therefore restrict our analysis only to contract enforcement institutions and financial development.

We derive the contract enforcement regulations index from the following survey question:

- *Average time for a court case involving bridging a contract* (Question c247g: On average, how many weeks did those court cases take to resolve?)

The financial development indicator measures bureaucratic requirements faced by a firm and consists of the following indicator:

- Please tell us if access to finance (collateral) is a problem for the operation and growth of your business. If the issue poses a problem, please judge its severity as an obstacle on a four-point scale (Question 19k).

In addition to the variables already described above, we also control for a wide range of firm-level characteristics such as ownership structure, age, size, etc. All these additional control variables are described in detail in Table 6.3 below.

Table 6.3: Firm Level Characteristics – Variable Definition

Variable Name	Variable Description
Exporter dummy	Dummy takes a value of 1 if a firm exports more than 25% of output
Foreign-owned dummy	Dummy takes a value of 1 if more than 20% of the firm is foreign owned
Government dummy	Dummy takes a value of 1 if more than 20% of the firm is government owned
Age	Difference between 2002 and the year that the firm started operations in the country
Stock market listed dummy	Dummy variable=1 if the firm is publicly listed
External audit dummy	Dummy variable=1 if the firm's annual financial statement is reviewed by an external auditor
Small Firms 'Dummy'	Dummy takes a value of 1 if a firm has less than 20 employees

Source: Productivity and Investment Climate Surveys

The original data used to construct indices described above come from different metrics. In order to ensure compatibility between various variables used, we index all indicators to vary from 0 to 1 and rescale them so that a higher quality of regulation or infrastructure corresponds to higher values of the index.

6.3.2 Methodology

This section extends on the methodology that is introduced in section 3.2.3. As previously mentioned, to calculate the impact of institutional variables on productivity we use two approaches: the Levinsohn and Petrin procedure (2003) and Escribano and Gausch (2005) methodology. For both specifications we assume the standard neo-classical Cobb Douglas production function:

$$Y = A_{it} K_{it}^{\beta(k)} L_{it}^{\beta(l)} \qquad (6.1)$$

where β_l, β_k represent the Cobb-Douglas coefficient of labour L_{it} and capital K_{it}, of firm i at time t. A_{it} is what is what can be termed Total Factor Productivity (TFP). This is because it raises L_{it} and K_{it} marginal products and it is also unobservable. Taking logs of equation 6.1 gives:

$$y = \alpha + \log \beta_k \, k_{it} + \log \beta_l \, l_{it} + u_t \qquad (6.2)$$

where u_t is independently and normally distributed. However, it is now widely shown that the choice that firms make with regards to inputs actually depend on their technology and productivity. Technology and productivity are unobservable to the researcher. Companies that experience a positive/negative productivity shock may respond to the shock

positively/negatively and use higher/lower levels of intermediate inputs. If we will not control for this problem, the parameter estimates might be biased. The specification of the production function that allows for endogeneity of inputs is as follows:

$$y = \alpha + \beta_1 l_{it} + \beta_k k_{it} + \omega_{it} + u_{it} \quad (6.3)$$

where ω_{it} is an unobservable productivity shock that affects the firm's input choice, and u is a unobserved productivity shock that might not influence the decisions that firms make.

6.3.2.1 Levinsohn and Petrin Method

For the Levinsohn and Petrin (2003) procedure, measuring TFP requires an empirical specification of the production function which also includes the usage of intermediate inputs as an explanatory variable. We therefore assume a Cobb Douglas production function which also includes materials used in production:

$$Y = A_{it} K_{it}^{\beta(k)} L_{it}^{\beta(l)} M_{it}^{\beta(m)} \quad (6.4)$$

where β_l, β_k, β_m represent the Cobb-Douglas coefficient of labour L_{it} , capital K_{it} and material $M_{(it)}$ respectively, of firm i at time t. Taking logs of (6.4) and denoting logged variables with lower case letters yields:

$$y = \alpha + \log \beta_k k_{it} + \log \beta_l l_{it} + \log \beta_m m_{it} + e_t \quad (6.5)$$

where e_t is the error term that is normally and independently distributed. As mentioned above, it is now widely recognised that firms' choice of inputs will depend on their technology and productivity, which in turn is unobservable. For example, more productive plants are likely to invest more due to higher productivity. The logic behind the relationship between productivity and inputs can be observed in the case that a firm is experiencing a positive productivity shock. If we assume constant factor prices and that a firm is profit maximising a positive productivity shock should raise the marginal product of capital and labour. As a result, the company is likely to increase output and therefore use more inputs to drive down the marginal product. Therefore, the suitable approximation of the production function should also account for the productivity shocks that are unobservable to the researcher but impact on companies' choice of

inputs. The specification of the production function that allows for endogeneity of inputs within the Levinsohn and Petrin procedure is as follows:

$$y = \alpha + \beta_1 l_{it} + \beta_k k_{it} + \log \beta_m m_{it} + \omega_{it} + e_{it} \quad (6.6)$$

where ω is an unobservable productivity shock that affects the firm's input choice. Overall, OLS is unable to provide unbiased estimates of the production function because of the correlation of the productivity shocks, $\omega_{it} + u_{it}$, with at least some of the inputs. Companies that experience a positive productivity shock are likely to start using more inputs. If the estimation procedures will not control for this problem then TFP measures can be biased.

The Levinsohn and Petrin (2003) methodology designed to control the input endogeneity is in turn based on the work of Olley and Pakes (1996). This approach uses intermediate inputs usage as a proxy for unobservable productivity shocks.

In the light of equation (6.6) Levinsohn and Petrin (2003) show that "intermediate inputs usage can be monotonically increasing function of (K) and productivity component that is correlated with the firms' idiosyncratic choice of input (ω). That is intermediate inputs usage function depends on the unobserved efficiency variable and the capital stock." Thus, given specification (6.6) the demand for intermediate inputs takes the following form:

$$m_{it} = m(\omega_{it}, k_{it}) \quad (6.7)$$

It seems reasonable to assume that the above function is monotonic in ω.[31] That is, according to Levinsohn and Petrin (2003), "given the stock of capital in time *t*, the higher the productivity or efficiency level, the higher the usage of materials, since the firm will produce more than another firm that has the same stock of capital and labour but lower productivity." We can invert the above equation and write ω_{it} as a function of the observed variables, materials, labour and stock of capital:

$$\omega_{it} = h_t (m_{it}, k_{it}) \quad (6.8)$$

[31] Levinsohn and Petrin (2003) detail the necessary conditions for the monotonicity of this function.

Substituting this equation into the production function (6.6) yields:

$$y = \alpha + \beta_1 l_{it} + \beta_k k_{it} + \log \beta_m m_{it} + h_t(m_{it}, k_{it}) + \varepsilon_{it} \quad (6.9)$$

Without knowing whether $h_t(m_{it}, k_{it})$ is as linear terms in M_{it} and K_{it} one cannot estimate the coefficient β_k. In order to proceed, Levinsohn and Petrin define the function ϕ as:

$$\phi_t (m_{it}, k_{it}) = \beta_2 k_{it} + h_t (m_{it}, k_{it}) \quad (6.10)$$

which is a non-parametric function. The first stage of the procedure provides unbiased estimates of β_l and involves estimating the following equation:

$$y = \alpha + \log \beta_1 l_{it} + \phi_t (m_{it}, k_{it}) + \varepsilon_{it} \quad (6.11)$$

Levinsohn and Petrin show that it is possible to obtain unbiased estimates of β_k with the following equation:

$$y_{it} - \hat{\beta} \cdot l_{it} = \gamma \cdot k_{it} + g(\varphi_{t-1} - \gamma \cdot k_{t-1}) + \mu_{it} + \varepsilon_{it} \quad (6.12)$$

The above equation is the second step of the Levinson and Petrin procedure. Again, the thinking behind the approach is the hypothesis that the present time capital stock is defined before the surprise in the current period's productivity. Once we have consistent estimates of the parameters of the production function, we can then consistently estimate the firm-level total factor productivity as:

$$TFP_{it} = y_{it} - \hat{\beta}_k k_{it} - \hat{\beta}_l l_{it} - \hat{\beta}_m m_{it} \quad (6.13)$$

6.3.2.2 Escribano and Gausch Fixed Effects Methodology

A second approach that is often used to control for the endogeneity of the production function is fixed effects estimation. In fact, fixed effects estimators were introduced to empirical economics in the production function context by Hoch (1962) and Mundlak (1961).

Fixed effects approaches make explicit use of panel data features. The key assumption in the context of the fixed effects models is that unobserved productivity ω_{it} is constant over time, i.e:

$$y_{it} = \alpha + \beta_1 l_{it} + \beta_k k_{it} + \beta_m m_{it} + \omega_i + u_{it} \quad (6.14)$$

This allows one to consistently estimate production function parameters using least squares dummy variables estimation techniques. The assumption that ω_i is constant over time is clearly a strong assumption, however given that our dataset is only for a two-year period, it may well be appropriate.

To address the endogeneity problem of the inputs we follow the approach proposed by Escribano and Gausch (2005). The authors' proxy the usually unobserved firm-specific fixed effects (which are the main cause of the endogeneity of the inputs) by a long list of firm-specific observed fixed effects coming from the investment climate information. In particular, the *extended Cobb-Douglas production function* estimated becomes:

$$y_{it} = \alpha + \beta_1 l_{it} + \beta_k k_{it} + \beta_m m_{it} + \beta'_{IC} I_{it} + \beta'_C C_{it}\, \omega_j + \beta'_D D_i + \beta'_{Dt} D_t + u_{it} \quad (6.15)$$

where I_{it} is a vector of institutional quality variables , C_{it} is a vector of firm-specific control variables (details on these variables provided in Table 6.1), D_i is a firm-specific dummy variable and D_t is a time (yearly) dummy variable.

Escribano and Gausch's augmented production function allows for directly incorporating institutional variables in the Cobb Douglas production function. This permits us to estimate the changes in productivity by adding explanatory variables related to institutional environment.

In order to disentangle the impact of institutional environment on productivity with the Levinsohn and Petrin (2003) methodology, we employ a two-step procedure. This procedure involves obtaining TFP estimates and then regressing the obtained productivity estimates on a range of possible explanatory variables, including institutional quality indices. We thus estimate the following equation:

$$TFP_{it} = \delta' X_{it} + e_{it} \quad (6.16)$$

where X is a vector of observable firm and location characteristics that impact on TFP, among which is institutional environment.

Once unbiased estimates of firms' productivity are established using the procedure provided above we can regress the TFP estimates on a set of explanatory variables to determine the impact of these variables on productivity. The regression equation is as follows:

$$TFP = \alpha + \beta' x_{it} + u_{it} \quad (6.17)$$

where $\beta' x_{it}$ is a vector of explanatory variables that are assumed to determine firms' productivity.

Finally, it is important to note that the estimation of production function with both approaches described above requires a range of assumptions. First, the analysis assumes that all firms in the database face world market prices for capital equipment and raw materials. In other words, the value of capital and material inputs and the value of outputs are comparable between countries. Admittedly these assumptions might seem strong but in the current economic climate the competition is very strong, hence these assumptions might be an adequate reflection of reality. Secondly, it is a well-known fact that wages vary significantly between countries and regions, therefore we quantify the input of labour in the production function in physical rather than value units. Hence, labour is measured by the number of workers in a firm. Thirdly, in order to make a cross-country comparison of the impact of the institutional variable we need to assume that technology in use across countries is identical. This too is a strong assumption, but it is relaxed to some extent by the use of country and industry-level fixed effects in all regressions as well as disaggregating the analysis at an industry level.

In order to assess the related impact of institutional environment on trade performance we estimate a probit model that determines the probability of exporting. The probit model is explained in detail in section 3.2.5.5. The actual equation that is estimated in this chapter is as follows:

$$y^{Exp}_{it} = \alpha + \delta_P P_{it} + \delta'_{INS} I_{it} + \delta'_C C_{it} + \beta'_D D_i + \beta'_{Dt} D_t + u_{it} \quad (6.18)$$

where y^{Exp}_{it} is a binary variable (0,1) taking a value of one if a firm exports more than 20 per cent of its production and 0 otherwise. $\delta_P P_{it}$ is estimated firm level TFP and $\delta'_{INS} I_{it}$ and $\delta' C_{it}$ are vectors of institutional quality and other firm characteristics, respectively.

6.3.2.3 Other Econometric Issues

Another econometric problem that we have to face in this analysis is the fact that some or all of our indicators of institutional could be endogenous to firm performance. We attempt to control for this in two ways. Firstly, we use as many possible objective measures of institutional quality, such as time and money spent on bureaucratic and legal procedures, as possible. These measures have an advantage over perception-based indicators in that they do not suffer from a bias resulting from the fact that more efficient, innovative firms might be more constrained by institutional or regulatory quality and thus will also report higher constraints. Secondly, if we do not know all the factors behind efficiency difference between firms' productivity and the institutional or regulatory constraints, then using these firm-level indicators in the productivity estimations can be biased, as the error term will be correlated with at least some of the repressors. We thus use country - industry averages of the plant-level regulatory variables instead of the survey replies, which is an often used solution research undertaken at firm level.

Carlin and Seabright (2007) highlight that taking regional averages creates another type of endogeneity related to reverse causality at a country or regional level, i.e. better performing countries or regions have higher quality institutional or regulatory environment. Thus, the statistical relationship between reported regulatory constraints and improved firms' performance can run in both directions: better regulatory quality at a country or regional level can result in a higher firm productivity and better economic performance, or for other reasons, can have an impact on improved legal environment. In order to control for this bias we use, as before, a set of instrumental variables obtained from World Bank's Doing Business Database.

6.4 Results

In Table 6.4 we show the results of the Escribano and Gausch (2004) methodology for estimating production function[32]. These estimates include a full set of country and industry dummies so as to allow the coefficients of production function to vary between regions and sectors. These regressions also include detailed firm-level characteristics such as firm's age, ownership structure and exports. In column 1 of Table 6.5 we show regression results without the

[32] All regressions are estimated with White's robust standard errors structure and include yearly dummies.

institutional environment variables. The production functions – capital and labour - are well determined and are significant at 99 per cent level. The hypothesis for constant returns to scale is supported as the outcomes of a test show that production function coefficients equal to 1 i.e. $\beta_k + \beta_l + \beta_m = 1$ show that Prob > F =0.00. Also, the regression results show that, on average and *ceteris paribus*, firms that export or that are listed on the stock market display higher productivity. The dummy variable for Government-owned enterprises is insignificant indicating that these types of enterprises have productivity levels that are similar to private companies.

In the following two columns (2-3) we add institutional environment indexes to the baseline model. The results highlight that institutional quality, as proxied by contract enforcement and financial development, is a robust and positive determinant of firms' productivity in a cross-country perspective. These results suggest that firms in countries with better financial institutions and higher quality enforcement of contracts are more productive overall.

In column 4 we have included an interaction variable that is a product of a measure of contract enforcement regulation quality and a measure of contract-dependent industries *ContEnf*ContDep*.[33] Also, this variable is positive and statistically significant indicating not only that institutions impact on firms' productivity overall, but also that these productivity differences are larger in sectors that are more dependent on contract enforcement for growth. In other words, firms in countries with "high quality" contractual environments are more productive in sectors that depend on this type of institution for growth than firms with similar characteristics in countries with "poor" contractual environments.

In column 5 we include in the baseline regression an interaction variable between financial development and an industry-level measure of dependence on external finance for growth - *FinDev*FinDep*. The impact of this interaction variable is similar to the one described above because this variable is also positive and statistically significant. Therefore, a similar conclusion to the one above can be reached. Firms in countries with developed financial markets are more productive in sectors that depend on credit for growth than firms with similar characteristics in countries with "poor" financial development. Finally, in column 6 we have included both of the interaction variables together and yielded similar results.

[33] The definition of an indicator of contract enforcement is provided in section 6.2.1.

We have also tested for reverse causation, where improvements in firms' productivity and overall development levels could influence institutional quality. We use the number of procedures in a court case involving bridging a contract as an instrument for contract enforcement regulation. Column 7 of Table 6.4 shows that this instrumental variable is positive and statistically significant confirming that the contracting environment is an important determinant of firms' productivity levels and that causality runs from "good" institutional quality to improved productivity, rather than the reverse.

Column 8 in Table 6.4 shows the results of regression where we attempt to instrument for financial development. Following the approach in previous chapters, this chapter also instruments for financial development using data from the DBIs. In particular, we use the "Getting Credit" Index that benchmarks procedures required for obtaining credit for over 180 countries in the world.[34] The intuition behind this instrument is similar to the one for contracting institutions: procedures for getting credit are a measure of excessive bureaucracy that slow down judiciary procedures or business processes, but are not the result of better export performance or countries' overall income levels. Column 8 shows that instrumenting for financial development with data from the DBIs yields positive and statistically significant results, indicating that the development of financial institutions will increase firms' productivity rather than the reverse.

[34] Details for the "Getting Credit" database are provided in Section 3.4.

Table 6.4: Parametric Productivity Estimates - Escribano and Gausch Methodology

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7 - IV)	(8– IV)
Capital	.521*** (.009)							
Labour	.498*** (.009)							
Raw Materials	.273 (.432)							
				Determinants of Productivity Regressions				
Exporter dummy	.092*** (.015)	.473*** (.154)	.445*** (.135)	.447*** (.153)	.442*** (.174)	.492*** (.163)	.429*** (.132)	.456*** (.152)
Foreign owned (>20%) dummy	.239*** (.022)	.641*** (.244)	.637*** (.225)	.635*** (.226)	.662*** (.223)	.637*** (.225)	.639*** (.218)	.640*** (.219)
Government (>20%) dummy	.003 (.006)	.431 (.525)	.536 (.545)	.436 (.544)	.435 (.534)	.436 (.535)	-.049 (.545)	-.049 (.547)
Age	.055* (0.28)	.561 (.726)	.545 (.734)	.575 (.723)	.544 (.744)	.555 (.736)	.585 (.756)	.586 (.726)
Stock market listed dummy	.153*** (.034)	.058 (.345)	.067 (.374)	.067 (.334)	.051 (.402)	.056 (.364)	.049 (.370)	.043 (.299)
External audit dummy	.061 (.236)	.750 (.919)	.766 (.920)	.763 (.920)	750 (.945)	.766 (.920)	.722 (.902)	.704 (.903)
Small Firms 'Dummy'	-.051*** (.021)	-.11*** (.033)	-.151*** (.034)	-.161*** (.036)	-.17*** (.035)	-.15*** (.033)	-.15*** (.031)	-.12*** (.039)
Contract Enforcement		.473*** (.014)					.047*** (.011)	
Financial Institutions			.357*** (.020)					.097*** (.002)
ContEnf*ContDep				.150*** (.003)		.154*** (.004)		
FinDev*FinDep					.097*** (.012)	.096*** (.011)		
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yearly dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	16609	16498	14087	14087	14087	14087	16599	16599
R^2	0.7072	0.8453	0.8700	0.8826	0.9054	0.9055	0.8137	0.8063
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The second methodology we employ follows the Levinson and Petrin (2003) procedure described in Sections 3.2.4 and the Appendix. The results of estimating a production function using this methodology, which gives consistent estimates of the function's parameters, are presented in the top part of Table 6.5. As before, the parameters are well determined and are statistically significant at a one per cent level. The bottom part of this Table gives estimates of equation (6.4) where we regress productivity estimates of the Levinson and Petrin (2003) procedure on a similar set of firm characteristics, as in the case of the Escribano and Gausch methodology.

The results show that firms that engage in exporting are more productive than those that produce exclusively for the local market. As before, government enterprises seem to display productivity levels that are similar to privately owned companies. Also, the regression results show that, on average and *ceteris paribus*, firms that are listed on the stock market display higher productivity. Dummy variables for Government-owned enterprises and companies conducting external audits are insignificant, indicating that these type of enterprises display productivity levels that are in line with other companies. The dummy variable for foreign ownership is statistically significant, indicating that this type of ownership structure impacts on firms' productivity. The sign of the 'dummy' coefficient shows that firms that are foreign owned are more productive than locally-owned firms.

In columns 2-3 we present the regression results, which further highlight that institutional quality – as proxied by contract enforcement and financial development - is a statistically significant positive determinant of firm-level productivity. Both of our measures of institutional quality are positive and statistically significant, indicating that overall institutional quality and contract contributes to increasing firms' productivity. In columns 4-5 we turn to the core question of the Thesis – do institutions enhance firms' productivity in sectors that have an inherent dependency on institutions? Our interaction measures ContEnf*ContDep and FinDev*FinDep, which are designed to investigate the differential effects of contract enforcement institutions and financial development are, as before, positive and statistically significant, indicating that firms' productivity differentials in countries with "poor" and "good" quality institutions are larger in sectors that depend on institutions. In column 6 we include both of the interaction variables together. The result does not seem to alter our conclusion regarding the impact of institutions.

Finally, in columns 7 and 8 we include our instrumental variables, which are the same as described in the Escribano and Gausch methodology. The instrumental variable for both contract enforcement quality and financial development are also statistically significant and positive for firms' productivity, indicating that our sample was not biased by the problem of reverse causality.

Table 6.5: Levinsohn and Petrin Parametric Productivity Estimates and Determinants of Productivity Regressions

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7 - IV)	(8 – IV)
Capital	.378*** (.003)							
Labour	.719*** (0.13)							
				Determinants of Productivity Regressions				
Exporter Dummy		.312*** (.025)	.405*** (.020)	.388*** (.020)	.421*** (.023)	.405*** (.020)	.095*** (.037)	.091*** (.035)
Foreign owned (>20%) dummy		.634*** (.032)	.716*** (.031)	.663*** (.030)	.743*** (.023)	.716*** (.031)	.761*** (.043)	.707*** (.038)
Government (>20%) dummy		.013 (.012)	.015 (.012)	.014 (.012)	.016 (.012)	.015 (.012)	.003 (.004)	.005 (.003)
Age		.282*** (.046)	.293*** (.032)	.275*** .033	.292*** (.031)	.293*** (.032)	.832*** (.033)	.875*** (.040)
Stock market listed dummy		.514*** (.054)	.598*** (.040)	.606*** (.042)	.559*** (.042)	.598*** (.040)	.613*** (.042)	.607*** (.041)
External audit dummy		.425 (.026)	.393 (.022)	.430 (.022)	.364 (.031)	.393 (.022)	.419 (.324)	.416 (.222)
Contract Enforcement		.052** (.022)					.051*** (.009)	
Financial Development			.076** (.034)					0.101* (.058)
ContEnf*Cont Dep				.083** (.030)		.087** (.038)		
FinDev*FinDep					0.97*** (0.06)	1.12.*** (0.08)		
Country dummies	No	Yes	Yes	Yes	Yes		No	No
Industry dummies	No	Yes	Yes	Yes	Yes		Yes	Yes
Time Dummies	No	Yes	Yes	Yes	Yes		Yes	Yes
No. of Observations	14254	13680	11747	11317	11317		11747	11747
R^2		0.7915	0.7867	0.8097	0.8108		0.8083	0.8072
Prob > F	0.00	0.00	0.00	0.00	0.00		0.00	0.00

In order to verify the robustness of our results an important additional test is undertaken – the productivity regressions are calculated separately for each industry. This analysis is included in Appendix 5 in Table A3. The Table shows the coefficients for the impact of financial development and contract enforcement quality within a productivity analysis. The results broadly confirm our previously obtained results – institutional quality is important for firms' productivity but this impact is not identical across industries. The impact of institutions is more important for institutions that are more dependent on contracts and external finance for their growth. In Table A3 we can discern this relationship by noting that with regards to, contract enforcement institutions, the estimated coefficient for industries not particularly dependant on contracts such as: Textiles, Garments, Leather, or Food Manufacture, is either low (around 0.15) or statistically insignificant. This contrast sharply with more contract dependant industries such as Machinery, Electronics and Chemicals where the regression results indicate that the magnitude of the coefficient is between 0.3 to 0.5 and in all cases statistically significant at 1% level.

We find a similar pattern of results regarding the magnitude of the coefficient on financial development. In industries not particularly dependent on finance for their growth, such as Garments, Leather and Food Manufacture the coefficient ranges between 0.068 and 0.12 and is only statistically significant for Food and Agro Industries. In stark contrast, among industries which are according to Table 3.5 highly dependent on external finance (such as Machinery, Electronics and Chemicals) the coefficient is statically significant in all cases. The estimated coefficient ranges from 0.265 and 0.565. This provides further evidence for the validity of the key hypothesis of the Thesis – countries with "good" institutions specialize in industries that are dependent on these institutions for their growth.

6.5 Conclusion

While there is an emerging consensus that institutional environment determines income levels, productivity, and also the patterns of trade, the precise mechanisms for that relationship have yet to be fully understood. This chapter attempts to unravel the role that institutional environment – as proxied by various institutional indicators – plays in determining the productivity differences. We analyse a comparable cross-country firm-level survey and find that institutional environment is a robust determinant of cross-country productivity differences.

Using a novel set of instrumental variables we show that the chain of causality runs from improved institutional environment to better firms' productivity, rather than the reverse. Furthermore, we find that institutional environment is more important for productivity in high value-added industries such as electronics or machinery, hence the patterns of trade and specialisation. This finding may also shed light on why developing countries, where on average institutional environment is less favourable, tend to specialise in light manufacturing sectors such as garments and textiles, whereas developed countries concentrate production in highly complex sectors such as machinery and electronics.

In other words, these results highlight that differences in institutional quality between locations may explain the world's patterns of specialisation and comparative advantage. A well-known fact about international patterns of production and trade is that developed countries tend to specialise in production and exports of more complex goods with higher value-added. As developed countries tend to also have, on average, stronger institutional quality, our results indicate they will also have the highest productivity in these most sophisticated sectors and hence will specialise in the production of such goods.

Since this Chapter showed that firms' productivity is higher in countries with good institutions and especially so for institutionally dependent industries it is possible to infer that the impact of institutions on trade is through the impact of institutions on firms' productivity. This chapter finds that institutions affect production structures by determining firms' productivity in different sectors. This finding gives additional empirical support to the existence of the "production effect" of institutions described in Section 1.4.2.

Chapter 7: Institutional Environment and Exports Patterns: A case study of textiles and garment industry in Lesotho.

7.1 Introduction

An econometric inquiry in previous chapters established that some institutional characteristics indeed have an impact on shaping the international patterns of comparative advantage and hence trade among countries. The aim of this chapter is to test the underling theory through a detailed case study of an African Least Developed Economy (LDC), Lesotho.

The case study approach intends to add an important methodological dimension to the Thesis, recognizing that a combination of statistical analysis and more descriptive methods holds greater promise for scientific advancement. This analysis allows for more detailed narrative, including a deeper examination of underlying historical factors and institutional settings, and can underscore linkages and determinants beyond what a general econometric enquiry ascertains. The case-study exercise is also instrumental in reconciling econometric results with observation and analysis. The aim is to understand the industrial dynamics of Lesotho, draw conclusions and articulate policy implications founded on the recognition of institutional influence on trade outcomes.

In the quantitative part of the Thesis we sought to isolate the impact of institutions on the patterns of international trade while keeping other factors constant. This has been achieved through the inclusion of country and industry fixed-effects. Because case study methodology does not allow for a similar measure of control over other factors, we need to take a more explicit and descriptive approach to analysing such issues and their impacts. This method offers both advantages and disadvantages, as by taking on the risk of losing some of the quantitative precision of empirical methods we are able to investigate more detailed causalities and interactions. It is also argued that the case study is most useful for generating hypotheses (Flyvbjerg, 2011) and indeed the approach in this chapter has generated empirically testable assumption about the impact of institutions on trade for further investigation.

The Lesotho case study is conducted through a detailed review of the country's economy and in particular its manufacturing sector, its institutional settings and a survey of manufacturing firms. Lesotho has been chosen as a case study mainly because it is unique within the least developed

economies of Sub-Saharan Africa in that it has been able to build a large export-oriented industry that is one of the main drivers of economic growth. This achievement sets Lesotho apart from other LDCs in the continent, since despite its "improved economic performance in the recent years, Sub-Saharan Africa's (SSA) trade performance continues to disappoint" (Gupta and Yang, 2006).[35]

The focus of this chapter is particularly on Lesotho's textile and garment industry. This is for two main reasons: (1) the garment industry constitutes around 90 per cent of Lesotho's manufactured exports; and (2) the garment industry is generally considered to be the first step in countries' industrialization process (Amsden, 1989).

Understanding the role that institutional environment played in the development of the manufacturing sector in Lesotho, and of its textile and garment industry in particular, can hold important lessons for industrialization policy for the rest of the continent. This is especially important given the fact that the Commission for Africa launched by Tony Blair argued that "African poverty and stagnation is the greatest tragedy of our time." (Commission for Africa, 2005) Furthermore, Lesotho belongs to a group of states that are loosely termed the "bottom billion" – countries that appear to lag behind other developing countries in leveraging the market to achieve sustainable economic growth.[36]

This chapter seeks to answer three interrelated questions: (1) what is the role of institutional factors in the development of the manufacturing sector in Lesotho? (2) If the role of institutions proves to be important, what type of institutional environment was instrumental for this achievement? and (3) How did Lesotho's institutional environment interact with other factors affecting investments to provide a conducive environment for the emergence of export-oriented industries?

This chapter is structured as follows: Section 7.2 overviews the geographical, historical and political context of Lesotho. Section 7.3 gives a brief introduction to Lesotho's economy with special attention to the manufacturing sector. Section 7.4 analyses its trade patterns and trade

[35] In Sub-Sharan Africa in the past three decades trade has grown at about three-fourths of the global rate, and the rate of diversification has been well below that achieved by other developing countries. Primary commodities and fuels account for the largest share of exports, with the share of manufactured goods remaining at about 30% (Gupta & Yang, 2006).

[36] The term was coined by professor Paul Collier, who argued the roughly a billion people live in countries that have as of yet failed to achieve sustained economic growth.

policy, 7.5 surveys the institutional environment and 7.6 surveys some other factors that may contributed to Lesotho's industrial development. Section 7.7 overviews the Survey of Manufacturing Firms and presents the results of the survey. Section 7.8 is the key section of the analysis, building on the results from the manufacturing survey and the descriptions of Lesotho's economy and institutions to assess the impact of institutions on the country's trade and comparative advantage. Section 5.9 summarizes policy implication and conclusions.

7.2 The Lesotho Context

7.2.1 Geography and Society of Lesotho

Lesotho is a small, landlocked economy with a land area of about 30, 000 square kilometres – roughly the size of Belgium. It is one of only three countries in the world to be fully inside another country – South Africa. It is located in the Maluti/Drakensberg mountain range. More than 60 per cent of its land area is 2000 meters above sea level. The lowlands with the most fertile land consist of a narrow strip roughly 50 km wide along the western border. The lowlands comprise of only 17 per cent the country's total area but the vast majority of Lesotho's population live there. The total population of Lesotho is around 1.8 million people (CIA Factbook). Because of Lesotho's rugged terrain only about 10 per cent of its land is cultivable.

Although Lesotho is not considered a resource abundant economy it does hold a significant amount of diamonds and has large freshwater reserves. The abundant water supplies are harnessed by the Lesotho Highland Water Project and exported to South Africa.

Lesotho has the third highest HIV/AIDS prevalence rates in the world. Population and health surveys show that almost 24 per cent of adult population is HIV positive and that the rate in urban areas is higher than in rural areas. The impact of HIV/AIDS on the society and economy of Lesotho is severe. High HIV/AIDS prevalence reduces productive capacity and income of those being affected as well as that of household members who have to take for those who become ill. HIV also depletes household assets by increasing medical and burial costs. According to the World Bank (2005a) "slower labour force growth and a lower savings rate, which reduces capital formation, could lower output growth by an average of 0.4 per cent per year between 2005 and 2014." Due to excess mortality primarily caused by the HIV/AIDS crisis life expectancy at birth has been declining and is currently estimated to be 47 years.

7.2.2 Historical and Political Context

The emergence of Lesotho as a nation can be traced back to 1818 when King Moshoeshoe formed alliances with neighbouring clans and chiefdoms of Southern Sotho people. At that time the Basotho were forced to defend from incursions from the Boers from the Orange Free State and the Zulus. In order to repel the adversaries in 1868, Basutoland as it was then called, became a British Protectorate. In 1966 Lesotho gained independence. Since then a period of political turmoil prevailed for three decades with rivalry between the ruling Basotho National Party (BNP) with its long-time leader Leabua Jonathan and the opposition Basotho Congress Party (BCP). In that period, annulled elections, abortive coup d'état resulting in the arrest, killing, imprisonment, or exile of many people have been common.

In 1985 Jonathan's government cancelled parliamentary election and was eventually overthrown in the following year by a military coup led by General Justin Metsing Lekhanya. The general ceded all executive and legislative powers to the King with a military council advising the monarch. The end of the Jonathan's regime also meant a significant change in Lesotho's policies towards Apartheid South Africa. Jonathan's government provided safe heaven to a number of African National Congress (ANC) supporters which eventually led to South Africa imposing an economic blockade of Lesotho. After the coup most of ANC supporter were forced to flee Lesotho and immediately the blockade was lifted (Cho and Bratton, 2006).

The end of the Apartheid regime increased pressure for democratization in Lesotho and eventually led to free and democratic election in 1993. BCP won the 1993 elections. In 1996 one of the Members of the BCP - Pakalitha Mosisili broke away from the party and created the Lesotho Congress for Democracy (LCD). In the 1998 parliamentary elections the LDC won 79 out of 80 constituency seats with only 60.5 per cent of the vote. The first-past-the-post electoral system has been the source of political tension ever since. Nevertheless, all subsequent elections have been deemed free and fair by both international and local observers and have left LDC and Prime Minister Pakalitha Mosisili in power (Cho and Bratton, 2006).

The past decade has been a period of relative political stability. For most of this time Lesotho was ranked "Free" on the Freedom House's assessment of political rights. The rating has however declined from 2 to 3 and Lesotho is now considered "Partly Free" according to Freedom House due to unresolved disputes over legislative seats from the 2007 and 2008 elections. It is important to note that Lesotho has been one of the most democratic LDCs in

Africa with only Ghana and Togo achieving a status of Free in the Freedom House for the most part of the past decade.

7.3 The Economy of Lesotho

Lesotho is one of the poorest countries in the world. According to the World Development Indicators, the country's real per capita GDP measured in Purchasing Power Parities was US$ 1,360 in 2008, placing Lesotho among the world's 30 lowest income countries. Lesotho ranks 156th out of 182 countries on UNDP's Human Development Index.

Despite the fact that Lesotho is an LDC with relatively few natural resources, it has achieved a fairly high real annual average GDP growth rate of 3.73 per cent between 1980 and 2008.

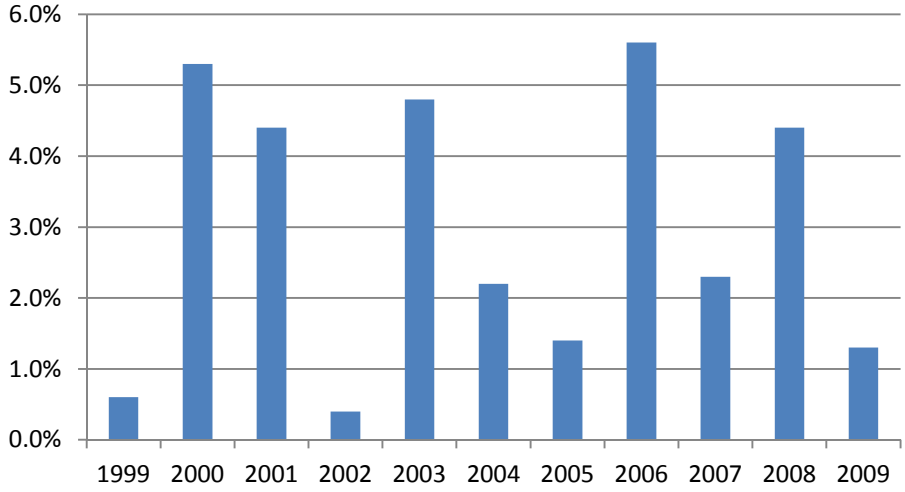
Lesotho's economic growth has, however, been quite volatile and was influenced by major external shocks that have led to major structural changes occurring in the economy. According to World Bank (2006a) "historically, and until the early 1990s, close to half of its GNI originated in remittances from Basotho miners employed in the South Africa and almost half of the Basotho male labour force worked in these mines. But the 1990s witnessed a sharp decline in mining opportunities so in 2007 only 18 per cent of Lesotho's GNI is generated in RSA". While declining remittances significantly reduced growth in GNI, several favourable external shocks associated with large scale investments financed by foreign capital inflows accelerated growth in GDP. These factors were: (1) an increase in external investments which financed the Lesotho Highlands Water Project (LHWP) aimed primarily at exporting water to South Africa; (2) FDI from East Asia and South Africa to a rapidly growing garments export sector; and (3) a resumption of diamond mining operations which was also led by foreign-owned companies (World Bank, 2006b).

Starting from 2000 the economy of Lesotho has witnessed a phenomenal growth of the garment sector. The industry has been the main driver of growth until 2005. In that period Lesotho became one of the largest exporters of garments to the US market exporting products worth US$ 450 million in 2004. Diamond mining became the 'leading' growth sector from 2004 onwards, with the opening of two mines. This enabled the mining and quarrying sector to grow by 55 per cent in the past 4 years. The growth of these two export oriented industries has

resulted in an increase in an average GDP growth rates, in the period 2003-07, to 4.4 per cent per annum (Ministry of Finance, 2009)

In the past decade there was a considerable volatility in annual growth rates (Figure 7.1), caused largely by: (1) political unrest in 1998, (2) a sharp decline in agricultural output in 2002, (3) the removal of textile quotas on China to the US market with the ending of the Multi-Fibre Agreement in 2005, and (4) surges in exports of garments, and diamonds.

Figure 7.1 GDP Annual Growth Rates (1999-2009)



Source: Bureau of Statistics Statistical (Data obtained for Lesotho National Accounts 2010)

7.3.1 The Export Oriented Manufacturing Sector in Lesotho

In 2008 the manufacturing sector in Lesotho comprised of 17.1 per cent of GDP (Table 7.1). The sector is dominated by the textiles and clothing sub-sector which has grown tremendously in the last decade and comprises to over 60 per cent of all manufacturing activity.

Table 7.1: The Manufacturing Sector in Lesotho (% share)

Sub-Sector	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Food products and beverages	28%	22%	17%	15%	14%	16%	15%	16%	17%	19%
Textiles, clothing and footwear	59%	67%	73%	77%	76%	73%	73%	70%	66%	63%
Other manufacturing	13%	12%	10%	8%	9%	11%	12%	14%	17%	19%

Source: Lesotho National Account 2010

Table 7.2: Employment in Manufacturing in Lesotho (2003-2009)

Year	Textile and Clothing	Leather and Footwear	Food and Beverages	Other Manufacturing	Total
2003	31,262	1,419	1,200	1,553	35,434

2004	31,156	2,148	1,094	1,476	35,874
2005	43,728	486	900	1,668	46,782
2006	29,178	540	1,094	1,728	32,540
2007	36,602	2,057	1,054	1,953	41,666
2008	38,449	1,863	1,160	2,470	43,942
2009	35,749	1,853	1,139	2,894	41,635

Source: Lesotho Bureau of Statistics

As shown in Table 7.2 employment in manufacturing has increased by over 15 per cent since 2003 and in 2009 amounts to over 41,000 employees. The Textile and Clothing sector with 35,750 employees is the largest private sector employer in Lesotho.

7.3.1.1 The Textile, Clothing, Footwear and Leather Sector

Textiles, clothing, footwear and leather production accounted for approximately 13 per cent of GDP in 2008. Of this broad sector, which is aggregated for statistical purposes, the clothing manufacturing sector accounted for the largest share. The sector's share of Lesotho's GDP is equal to the contribution by mining and agricultural sectors put together.

The garment industry is exports driven with around 90 per cent of production being exported to the US. The US market was the most important export destination for Lesotho clothing industry already in the 90's. However, since the establishment, in 2000, of the African Growth and Opportunity Act (AGOA) which is trade preference scheme provided to African economies by the US government, exports have grown tremendously. The average growth rate of exports to the US in the 5 year period 2000-04 was an astonishing 33.5 per cent. In this period exports to US rose from $140 million to $445 million (Table 7.3).

Table 7.3: Lesotho's Exports of Textiles and Apparel to the United States 2001-2009 (in US Dollar, '000 and square feet '000)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Export in US Dollars (Millions)	214.9	320.7	392.7	455.8	390.7	387.0	383.5	339.7	278.3
% change	53.2%	49.2%	22.4%	16.1%	-14.3%	-0.9%	-0.9%	-11.1%	-18.1%
Export in square meters (Mill)	50.9	84.4	103.9	111.2	95.3	95.2	95.1	86.7	73.4
% change	48.2%	65.7%	23.1%	7.0%	-14.3%	-0.1%	0.0%	-8.9%	-15.3%

Source: Lesotho Bureau of Statistics

At the end 2004, according to the Multi-Fibre Arrangements (MFA), the last remaining quotas imposed on Asian exporters of textiles and clothing have elapsed. Since then, garment exports in Lesotho have been under pressure as result of decreasing preference margins. The fall in

exports to the US amounted to 38 per cent in the period from 2005 to 2009. This was the result of the expiry of the MFA but also the emergence of the global economic recession.

In relation to country size Lesotho is some of world's biggest clothing exporters. Lesotho's per capita exports of clothing, in 2007, amounted to $205 which places Lesotho as the 18th country in the world with the highest volume of clothing exports per capita (Table 7.4). In fact if one excludes Macao and Hong Kong, which predominantly re-export clothing originally produced in China, Lesotho would be placed as the 16th country in the world with the highest per capita exports of clothing.

Table 7.4: World's Largest Exporters of Textiles and Clothing per capita (2009)

Country	Textile Exports ($US million)	Population	Textile exports per capita
1. Macao, China	2 546	526 178	4839,4
2. Hong Kong, China,	7 492	6 977 700	1073,8
3. Mauritius	963	1 268 835	759,6
4. Tunisia	4 159	10 326 600	402,8
5. Honduras	2 892	7 241 503	399,5
6. Portugal	3 543	10 624 688	333,5
7. Denmark	1 747	5 497 525	317,9
8. Italy	18 094	59 854 860	302,3
9. Belgium	3 173	10 703 957	296,5
10. El Salvador	1 637	6 133 910	266,9
11. Bulgaria	2 000	7 623 395	262,4
12. Cambodia	3 770	14 699 885	256,5
13. Netherlands	3 736	16 443 269	227,2
14. Turkey	15 949	73 914 260	215,8
15. Romania	4 446	21 512 646	206,7
16. Estonia	275	1 340 638	205,6
17. Lesotho	413	2 016 823	205,2
18. Malta	79	411 452	192,2
40. China	126 857	1 325 639 982	95,7
43.Viet Nam	7 955	86 210 781	92,3
47. Bangladesh	11 318	160 000 128	70,7
83. India	12 165	1 139 964 932	10,7

Source: Own Calculations based on data from US OTEXA and World Development Indicators

Lesotho is also a leader in textile and garments exports in the SSA region. Despite being a country of only 2 million, and as such being one of the smallest (by population) in the continent, it is SSA's third largest exporter of clothing after Mauritius and Madagascar and has the second largest exports per capita after Mauritius (Table 7.5). The clothing industry is a mature one with

almost 30 years of history and has been able to withhold the impact of the crisis better than many other African countries.

Table 7.5: The Textile and Garments Industry in Sub-Saharan Africa (2009)

Country	Exports	Population	Textile Exports per Capita	Manufacturing Exports per Capita
Mauritius	958	1,3	755,1	**1072,9**
Lesotho	370	2,0	205,2	**217,3**
Swaziland	134	1,2	114,5	**395,2**
Madagascar	690	19,1	36,1	**40,9**
Botswana	30	1,9	15,6	**113,3**
Cape Verde	7	0,5	13,7	**38,0**
Kenya	270	38,5	7,01	**33,6**
South Africa	287	48,7	5,89	**766,2**
Malawi	31	14,3	2,14	**6,98**
Zimbabwe	14	12,5	1,08	**46,8**
Mauritania	3	3,2	0,92	**6,70**
Togo	4	6,5	0,55	**132,6**
Eritrea	2	5,0	0,39	**2,91**
Sierra Leone	2	5,6	0,29	**10,4**
Ethiopia	13	80,7	0,16	**2,41**
Tanzania	6	42,5	0,13	**7,00**
Cameroon	2	18,9	0,13	**7,45**
Ghana	2	23,4	0,08	**8,44**

Source: Own Calculations based on data from US OTEXA and World Development Indicators

7.3.1.2. Garment Industry Production Process

The production process of the Garment factories in Lesotho is important for understanding the impact that institutions have on Lesotho's export therefore this subsection analyses this process.

The textile industry in Lesotho has particularly strong ownership linkages with foreign parent companies. Nearly all of Lesotho textile manufacturers are classified in the so called Cut, Make and Trim (CMT) production. All of the clothing factories are foreign owned and the vast majority of them are a part of a large multinational company. Hence, manufacturers in Lesotho only deal with manufacturing of actual garments and the designing, sampling, selling, raw material purchasing and financing of the operations are supplied by head offices which are located mostly in Taiwan, China and South Africa.

The head office wins order which usually come from US, Canada or Europe ensuring quality, price and delivery and assigns a local Lesotho manufacturer. It is the head office that deals with providing Lesotho factories with designs, specifications, inputs, technical assistance and supports its logistics.

7.3.1.3. Other Manufacturing

A large part of the "Other Manufacturing" sector is export oriented. In the past decade the sub-sector has been growing at a higher rate than the rest of the economy and higher than the textile and apparel sector. This indicates that the economy of Lesotho is successfully diversifying its production and exports albeit starting at a low base. Table 7.2 shows that this sector grew at an average rate of 11 per cent between 2003 and 2009. Its share of the manufacturing sector rose from 13 per cent to 19 per cent and its share of GDP from 1.6 per cent to 2.5 per cent.

This sub-sector comprises of several medium-sized enterprises in a wide range of industries such as electrical components, electronic components, energy saving light bulb manufacturing and plastics.

In early 2008, Philips – one of world largest electronics companies – made its first foreign direct investment in manufacturing sector in an LDC in Africa by investing in an energy-saving light bulb factory in Lesotho. As the result the sector grew by 25 per cent that year and by 10 per cent in 2009. The opening of Philips factory is likely to attract more investors in the sector as two other companies in the industry have already expressed interest to commence production in Lesotho.

7.4 Lesotho Trade Policy and Trade Patterns

7.4.1 Lesotho Trade Policy and Trade Relations

Lesotho's participation in several Preferential Trade Agreements is a crucial determinant of its export success as well as is the main source of government revenue. Lesotho is a part of the Southern African Customs Union (SACU). Other members of the Union are Botswana, Namibia, South Africa and Swaziland. The Customs Union has a well-established Common External Tariff (CET) and enjoys free movement of goods within the region. Lesotho is also, along with Namibia,

Swaziland and South Africa a part of SACU's Common Monetary Area. Lesotho's currency the Loti is pegged 1:1 to the South African Rand.

Lesotho is also a part of the US Government's African Growth and Opportunity Act (AGOA). The Act was passed by the US Senate in 2000 and provides for tariff-free duty-free access to the US market for the majority of SSA exports. For Lesotho the key provision of AGOA was the so called single-stage transformation rules of origin which allowed garment manufactures to obtain fabric from the most competitive supplier in the world then manufacture garments using these inputs and then sell finished products duty-free to the US. According to the World Bank (2006b; p, 5):

> *AGOA derogation provides Lesotho, and other least developed sub-Saharan African (SSA) producers, an advantage that no other supplier to the U.S. market can claim: ready adaptability to Asian sourcing networks for fabrics and materials, and tariff benefits ranging from 15.5 per cent for cotton trousers to 32.0 per cent for manmade fibre knit shirts and blouses*.

Finally, Lesotho is also a Member of the Southern African Development Community (SADC). In 2009, SADC has become a Free Trade Area which gives Lesotho a preferential market access to Member States of SADC.

7.4.2 Trade performance and Trade Patterns in Lesotho

Lesotho witnesses a relatively rapid and sustained growth in exports in the past decade. In fact, between 1999 and 2008 exports grew at a nominal rate of 9.3 per cent per annum whereas there has been relatively slower growth in imports at 7 per cent per annum. Imports are highly concentrated with around 75 per cent of them sourced from South Africa, and 21.4 per cent sourced from Asia (BoS, 2008). As mentioned before, exports are largely concentrated in one market – the US. The US constitutes more than 70 per cent of total export with the remainder going to South Africa.[37]

[37] Excluding exports of diamonds which are primarily destined for Belgium.

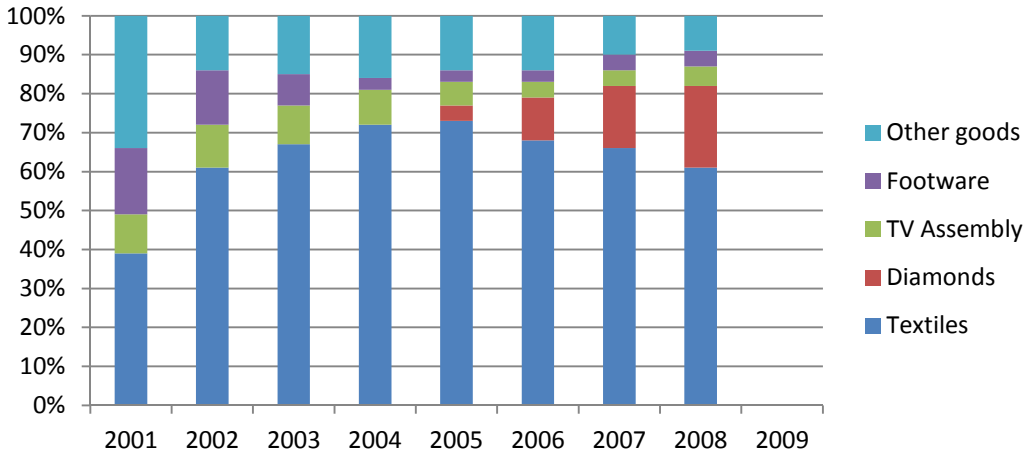
Table 7.6 Lesotho's Trade Performance (millions $US)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Exports	169	243	438	549	514	535	508	668	742	901
Imports	670	716	836	982	960	951	1000	1210	1262	1614

Source: Lesotho National Accounts 2009

Figure 7.2 illustrates the concentration of exports in the clothing sector. Despite the fact that in recent years Lesotho's dependence on exports of garments has decreased somewhat these exports still comprise of over 60 per cent of Lesotho's total exports. Since 2005 the share of diamonds in Lesotho's total exports has substantially increased and in 2008 reached over 20 per cent.

Figure 7.2 Lesotho's Major Export Shares



Source: Bureau of Statistical Yearbook 2008, Statistical Report No.12:2009.

7.5 Institutional Environment in Lesotho

This section analyses institutional environment in Lesotho paying particular attention to assessing the sub-components of institutional quality examined in the Thesis. The majority of institutional quality indicators rank Lesotho in the third quartile of the distribution. In 2010, Lesotho was ranked 130th out of 183 countries in the overall indicator of Doing Business. Its position has dropped significantly in the past years. In 2004 it was ranked 104th in the world. However, among SSA countries, which are often its direct competitors, Lesotho ranks 14th out of 46 countries. In 2004, Lesotho was ranked number 8 among African economies. This indicates that Lesotho's institutional environment, despite being rather unfavourable in comparison to the world's average, is quite competitive when compared to other countries in the continent.

Since the focus of the study is to analyse the impact of institutional environment on trade patterns we are particularly interested in the reasons why export-oriented companies established operations in Lesotho. It is therefore important to have an understanding of institutional environment at the time the investment took place. Table 7.7 shows Lesotho's ranking in the four sub-components of institutional quality analysed in the Thesis. The earliest possible data is available for 2004 from the Doing Business indicators and for 2008 for our preferred measure of property rights.

Table 7.7 shows that Lesotho is ranked in the third quartile of the distribution regarding institutional indicator for contract enforcement and "Getting Credit". This shows that Lesotho does not have a particularly high level of financial development nor particularly efficient laws and procedures that enforce contracts. Lesotho ranks better on indicators of property rights and "Employing Workers" where it is placed in the second quintile of the distribution of countries.

Table 7.7: Lesotho's Institutional Indicators in Comparison with the World.

Country	Enforcing Contracts	Economy	Getting Credit
Luxembourg	1	Malaysia	1
Iceland	2	United Kingdom	2
Hong Kong	3	South Africa	2
Norway	4	Poland	15
China	18	Ukraine	30
Vietnam	32	Swaziland	43
Rwanda	40	Costa Rica	61
South Africa	85	Thailand	71
Zambia	87	Mauritius	87
Lesotho	**105**	**Lesotho**	**113**
Swaziland	130	Mozambique	127
Bangladesh	180	Angola	135

Source: Doing Business Indicators

Table 7.7a: Lesotho's Institutional Indicators in Comparison with the World (continued)

Country Name	Property Rights	Economy	Employing Workers
New Zealand	1	United States	1
Switzerland	3	Australia	1
United Kingdom	15	Denmark	9
Barbados	19	Georgia	9
Botswana	25	New Zealand	15
Slovenia	37	Rwanda	30
UAE	49	United Kingdom	35
Malawi	68	Mauritius	36
Lesotho	**71**	Belgium	48
Albania	92	Jordan	51
Rwanda	92	Thailand	52
Kyrgyz Rep,	111	**Lesotho**	**67**

Source: Doing Business Indicators and IPRI (2004)

Table 7.8 compares Lesotho's institutional environment with its African competitors. In 2004, according to the DBIs, Lesotho had some of the most efficient institutions in SSA. In that year Lesotho was ranked 3rd on the continent for the easy of employing and firing workers and 9th on the efficiency of enforcing contracts. The 2008 International Property Rights Index shows that Lesotho was ranked 7th among SSA countries on a measure of protection of property rights. All these indicate that Lesotho had at around the same time as the emergence of Lesotho's textile and garments industry a fairly conducive institutional environment. An exception to this pattern is the "Getting Credit" indicator which show Lesotho was, in 2004, ranked 15th in Africa on this measure of institutional environment (see Table 7.9)

Table 7.8: Lesotho's Institutional Environment in Comparison to its African Competitors

Country	Property Rights	Country	Employing Workers	Country	Contract Enforcement
Botswana	1	Rwanda	1	Tanzania	1
Cape Verde	2	Swaziland	2	Mauritania	2
Mauritius	3	**Lesotho**	**3**	Ethiopia	3
Ghana	4	Botswana	4	Ghana	4
Seychelles	4	Kenya	5	Zimbabwe	5
South Africa	4	Guinea	6	Guinea	6
Malawi	6	Gambia	7	Kenya	7
Gabon	7	Burundi	8	Zambia	8
Lesotho	**7**	Malawi	9	**Lesotho**	**9**
Madagascar	7	Ethiopia	10	South Africa	10

Source: Doing Business Indicators (2004)

Table 7.9: Lesotho's "Getting Credit" Indicator in Comparison to its African Competitors

Economy	Getting Credit
South Africa	1
Kenya	2
Namibia	3
Zambia	4
Botswana	5
Swaziland	6
Rwanda	7
Mauritius	8
Nigeria	9
Tanzania	10
Malawi	11
Angola	12
Ghana	13
Uganda	14
Lesotho	**15**

Source: Doing Business Indicators

Tables 7.10 and 7.11 provide additional evidence that Lesotho's institutional quality is indeed competitive within a sub-sample of countries on the African continent. These Tables are compiled from the World Governance Indicators (WGI) contracted by Kaufmann, Kraay and Mastruzzi (2010).[38] The WGI rate Lesotho's government effectiveness, rule of law, regulatory quality and control of corruption. Also with regards to these indicators Lesotho seems to perform quite favourable in comparison to other SSA countries. Lesotho, in 2004 was ranked 9th on government effectiveness and rule of law and 13th on control of corruption. On all these indicators Lesotho was ranked in the first quartile of distribution of African economies. It is only on regulatory quality were Lesotho is in the second quartile of distribution and is ranked 19th in SSA.

[38] The Governance Indicators (WGI) reports aggregate and individual governance indicators for 213 economies over the period 1996–2009, for six dimensions of governance: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption. According to the WGI website "The aggregate indicators combine the views of a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. The individual data sources underlying the aggregate indicators are drawn from a diverse variety of survey institutes, think tanks, non-governmental organizations, and international organizations."

Table 7.10: Lesotho's Rank on World Governance Indicators (2004): Government Effectiveness and Rule of Law

Economy	Govern. Effectiv.	Economy	Rule of Law
South Africa	1	Mauritius	1
Botswana	2	Cape Verde	2
Mauritius	3	Seychelles	3
Cape Verde	4	Botswana	4
Namibia	5	Namibia	5
Seychelles	6	Ghana	6
Ghana	7	Senegal	7
Senegal	8	South Africa	8
Lesotho	**9**	**Lesotho**	**9**
Mauretania	10	Gambia	10

Source: World Governance Indicators

Table 7.11: Lesotho's Rank on World Governance Indicators (2004): Regulatory Quality and Control of Corruption

Economy	Regulatory Quality	Economy	Control of Corruption
Botswana	1	Botswana	1
Mauritius	2	Seychelles	2
South Africa	3	Mauritius	3
Namibia	4	Namibia	4
Uganda	5	South Africa	5
Cape Verde	6	Cape Verde	6
Ghana	7	Sao Tome	7
Mali	8	Burkina Faso	8
Senegal	9	Madagascar	9
Burkina Faso	10	Senegal	10
Gabon	11	Ghana	11
Mozambique	12	Malawi	12
Zambia	13	**Lesotho**	**13**
Malawi	14		
Tanzania	15		
Benin	16		
Gambia	17		
Kenya	18		
Lesotho	**19**		
Mauretania	20		

Source: World Governance Indicators

7.6 Other factors influencing investment decisions in Lesotho

The previous section has highlighted that in Lesotho's institutional environment is quite favourable in comparison to other countries in SSA and this may be an important determinant of a decision to invest in Lesotho by both local and foreign investors. However, investment decisions are usually not based solely on the quality of country's institutions therefore in this section additional factors that may impact on such decision are highlighted. In particular, this section provides a description of Lesotho's infrastructure quality and the wage rates assuming that these may be additional factors that might have impacted on the development of the export-led manufacturing industry in Lesotho.

7.6.1 Transport and Infrastructure

Competitiveness of the garment and other industries is increasing dependent on the speed that goods can be delivered to the customer. In the apparel and fashion industry, with quickly changing consumer tastes, transport infrastructure quality is therefore particularly important. Despite being landlocked Lesotho's access to international market is rather favourable. Lesotho is quite unique among landlocked countries in Africa as even though it capital is located 720 from the nearest port – Durban (RSA) - it is not a particularly difficult route. The port of Durban is one of the cheapest for exporting and importing in Africa. According to the 'Doing Business' Surveys (World Bank, 2010) the cost of 'Port and Terminal Handling' with regards to exporting in South African Ports is US$284. This compares quite favourable with other major African ports. For example, the cost of 'Ports and terminal handling' in Lagos is $416. Table 7.12 shows the cost of handling fees in African and Asian Ports.

Table 7.12 Ports and Terminal Handling Costs in Southern Africa and other Selected Economies

Country	Ports and Terminal Handling Costs
South Africa	284
Kenya	370
Nigeria	416
Madagascar	276
China	80
Bangladesh	420
Jamaica	350

Source: Doing Business Report 2009

The main export route i.e. the 720-kilometer distance from Maseru to Durban's port compares rather favourably with the 2,050 kilometres land transit facing exporters from Chad. Furthermore, Lesotho's exports transit only the territory of a single country on their way to the nearest port. The road infrastructure is also quite favourable as, in order to export Lesotho can use, for the most part South African road network which is the best on the continent (Table 7.13). Road quality in Lesotho itself is also of good quality as it is ranked 12th overall on the African Road Transport Quality index.

Table 7.13 Road Transport Quality Index in Africa

Rank	Country	Rank	Country
1	South Africa	8	Swaziland
2	Botswana	9	Ghana
3	Zimbabwe	10	Namibia
4	The Gambia	11	Lesotho
5	Sudan	12	Zambia
6	Senegal	13	Benin
7	Nigeria	14	Eritrea

Source: Logistics Performance Index

By being able to piggy bag on South Africa's transport infrastructure and through the development of relatively good quality domestic facilities Lesotho has been able to provide adequate access to market for the development of manufacturing sector. In addition, other types of infrastructure such as power and communication do not constitute a significant problem for industry in Lesotho (World Bank, 2007).

7.6.2 Wage and Productivity Nexus of manufacturing industry in Lesotho

Labour costs constitute around a half of production costs in many of labour intensive industries. The apparel industry is not exception (Nordas, 2004). Therefore, relative labour costs are an important issue taken into account when making an investment decision. The minimum wage in Lesotho is set at a comparably high level in comparison to the Asian competitors. In 2004, at the time of development of the textile industry Lesotho's minimum wage was US$ 101 in comparison to $13 in Vietnam, US$ 14 in Bangladesh and $45 in Cambodia. In SSA minimum wage was higher. In Kenya in 2004 it amounted to US$ 81 and US$ 135 in Swaziland.

From this point of view a crucial determinant of an investment decision is labour productivity. Table 7.14 compares value-added per worker in all industries and in the garment industry, in particular, in Lesotho and its African and Asian competitors. Although labour costs are relatively

low, labour productivity (value-added per worker) is also low. Labour productivity is lower in both Mozambique and Tanzania than in Lesotho, but it is about 50 per cent higher in Kenya and is over twice as high in Senegal. Labour productivity is also higher in the fast growing Asian economies of China and India—median labour productivity is almost twice as high in China as in Lesotho and is fifty per cent higher in India (World Bank, 2007).

In the garment industry, results are qualitatively similar—labour productivity in Lesotho is similar to, or higher than, Mozambique or Tanzania but is lower than in Kenya, Senegal, China and India. In all countries except India, labour productivity is lower in the garment sector than it is overall.

Table 7.14: Value Added Per worker in Lesotho and its competitors (in US$)

Country	VA per worker (all)	Country	Value Added per worker (garments)
India	3900	India	4500
China	4700	China	2800
Senegal	5500	Senegal	2900
Kenya	3200	Kenya	2500
Tanzania	2100	Tanzania	1200
Mozambique	1200	Mozambique	800
Lesotho	2500	Lesotho	1700

Source: World Bank (2007)

Based on the above analysis of wage rates and labour value added it is possible to conclude that Lesotho can compete successfully with regard to wage rates among countries in the continent but its productivity is well below that of its Asian competitor. Wages therefore may have been one of the factors that drew investors to Lesotho.

7.7 The Lesotho Manufacturing Survey

7.7.1 The 2010 Lesotho Manufacturing Survey Methodology

The Lesotho Manufacturing Survey was conducted in July and August of 2010. The objectives of the survey were to obtain feedback from Lesotho based companies, both foreign and domestic, on the importance of institutional environment and other factors in locating and operating in Lesotho.

The target population for the survey were firms in the manufacturing sector that export a substantial part of their production. Given Lesotho's small economic size the vast majority of manufacturing companies export a large share of their output abroad. The contact details for enterprises were obtained from the Lesotho National Development Corporation (LNDC).[39] Our sampling methodology was to contact all manufacturing firms in the LNDC database. Out of 51 companies in the list we were able to secure 30 interviews. The interviews were mostly conducted over the phone but in some instances a visit to the company was arranged. The survey has targeted managers in the companies to be interviewed.

We follow the World Bank's methodology and survey firms with over 5 full-time employees. We define a full time employee as a person working for 8 or more hours 5 days a week. The survey was conducted in two major urban centres of Lesotho – the capital Maseru and Nyenye Industrial centre where a large number of firms in the manufacturing sector are located.

The interviews were usually undertaken in a fairly open-ended manner. At any moment during the interview the interviewee could add any important information that he/she thought was important but was not specifically a part of the questionnaire.

7.7.2 The Manufacturing Survey Results

This section outlines the results of the manufacturing survey. For each question a table immediately below shows the results as well as a description of the question results is provided. The Appendix to the Thesis provides the full questionnaire.

Question 1: What is your profile of production?

Food	Textiles	Garments	Chemicals	Plastic and Rubber
1	1	22	0	2

Non Metallic Mineral Products	Fabricated Metal	Machinery and Equipment	Electronics	Other Manufacturing
0	0	0	3	1

Question 1 of the survey asks company managers the sector of economic activity of their company. As mentioned above the manufacturing sector in Lesotho comprises mainly of firms that belong to the garment sector. This is clearly reflected in the manufacturing survey as the vast majority (73 per cent) of all firms surveyed produced garments. The second biggest sector in Lesotho is electronics and in particular television assembly. 3 firms from that sector were part

[39] I would like to thank the LNDC for kindy sharing the contact details for companies in Lesotho.

of the survey. Two firms are in the plastics and rubber industries and other manufacturing. One of the firms surveyed is in the textiles industry and, in particular, produces material for jeans manufacture. Finally, also one company surveyed was in the food manufacturing industry.

Question 2: What is the size of your company?

<20	21-99	100-999	1000<	Total
1	4	19	5	30

In Lesotho the export oriented manufacturing comprises exclusively of foreign firms. Throughout the world, as well as in Lesotho, companies with a substantial FDI component tend to be larger than home grown enterprises. The majority of firms surveyed are therefore mid-size enterprises. 19 out of 30 firms surveyed have between 100 and 999 employees. 5 companies surveyed can be considered large as they have over 1000 employees. Very few companies belong to the 'small firms' category with less than 100 employees as only 4 companies of that sort were surveyed.

The results to question 2 by industry are as follows:

Industry	<20	21-99	100-999	1000<
Garments	0	2	16	4
Textiles			1	
Plastics and Rubber	1	1		
Food			1	
Electronics			1	1
Other		1		

Question 3: Is your establishment a part of a larger company?

Yes	No
23	7

An overwhelming amount of firms surveyed are a part of a larger international company (76%). This is related to the fact that the manufacturing sector in Lesotho is largely based on foreign firms that are often a part a larger multinational company.

Question 4: What is the country of origin of your firm's largest shareholder?

Lesotho	South Africa	Taiwan	Other Asia	Europe	Other
3	8	9	8	1	0

For only three firms surveyed the largest stakeholder was a national of Lesotho. The majority of the Lesotho's apparel industry belongs to large companies from Taiwan. Eight companies were owned by South Africans which is a fairly low number given the proximity and economic weight of Lesotho's only neighbour. The remaining 8 companies surveyed belong to other Asian nationals of which Chinese and Indian were the majority. Finally, one company originated from the European Union.

The results to question 4 by industry are as follows:

Industry	Lesotho	South Africa	Taiwan	Other Asia	Europe	Other
Garments		5	9	8		
Textiles						
Plastics & Rubber	1	1				
Food	1					
Electronics		2			1	
Other	1					

Question 5: What per cent of your production is exported?

0%	1%-24%	25-49%	50-74%	75%-100%
Discarded	0	2	2	26

The survey showed that manufacturing firms are almost exclusively geared towards the export markets. This is not surprising given a small size of the internal market and the nature of (foreign) investment which focuses explicitly on exporting. 26 out of 30 firms surveyed, that is 86 per cent of the total, have indicated that they export between 75 and 100 per cent of their production abroad. Four companies were exporting between 25 per cent and 75 per cent of their production and no company was focusing predominantly on the home market.

PART II: Lesotho's Institutional Environment

Question 6: "I am confident that the judicial system will enforce my rights". To what degree do you agree with this statement?

Disagree			Agree		
Fully disagree	Disagree in most cases	Tend to disagree	Fully agree	Agree in most cases	Tend to agree
0	2	5	3	14	5
	Total: 7			**Total: 23**	

Overall the survey results have highlighted that firms have a high degree of trust in the legal system in Lesotho. Only 7 companies have indicated that they either 'tend to disagree' or 'disagree in most cases' to the following statement: 'I am confident that the judicial system will enforce my rights.' In comparison 23 companies have agreed with this statement. The result of this question contrasts somewhat with those presented immediately below which show that firms are reluctant to engage a court in case they have a contractual dispute.

The results to question 6 by industry are as follows:

	Disagree			Agree		
Industry	Fully disagree	Disagree in most cases	Tend to disagree	Fully agree	Agree in most cases	Tend to agree
Garments		2	3	3	11	2
Textiles					1	
Plastics & Rubber			1		1	
Food					1	
Electronics			1			2
Other						1

Question 7: How would you rate Lesotho's business climate vis-à-vis its African competitors?

Negative	Mildly Negative	Similar	Mildly Positive	Positive	Very Positive
1	7	10	6	6	0

8 out of 30 respondents have rated Lesotho's business climate to be less favourable than its African competitors with only one company manager indicating that the business climate is outright negative. The majority of firms however view Lesotho's business climate as favourable in comparison to other countries in the continent. In fact 12 firms in the survey have indicated that the business climate is either mildly positive, positive or very positive in Lesotho.

The results to question 7 by industry are as follows:

Industry	Negative	Mildly Negative	Similar	Mildly Positive	Positive	Very Positive
Garments		4	7	6	5	
Textiles	1					
Plastics & Rubber		1	1			
Food					1	
Electronics		1	2			
Other		1				

Question 8: Did your company ever decide to go to court following a dispute with a supplier?

Yes	No	Don't Know
3	21	6

An important result of the survey is that firms in Lesotho do not resort to court action if they face a dispute with a supplier. Only 3 companies surveyed have ever gone to court if they had disagreement with suppliers. 21 companies have never used a commercial court in Lesotho in such a case. 6 companies interview were not able to give a definite answer to this question. This clearly reiterates Fafchamp's (2004) research results. In a survey of Ghanaian firms Fafchamp finds that fewer than 10 per cent of firms are willing to go to a court in the case of a dispute with a supplier or a client.

The results to question 8 by industry are as follows:

Industry	Yes	No	Don't Know
Garments	3	12	6
Textiles		1	
Plastics & Rubber		3	
Food		1	
Electronics		3	
Other		1	

Question 9: What is the main source of the companies' intermediate inputs?

Country/Region	Main source of intermediates supply
Lesotho	1
SACU (excluding LS)	5
South East Asia	21
Other Africa	0
Other Asia	1
Other (there than Asia and Africa)	1
Varied	0

According to the survey, companies in Lesotho source their inputs almost exclusively from abroad. In case of only one company its main source of intermediate inputs was in Lesotho. That company is in the recycle business and hence it did not engage with downstream suppliers for production of inputs.

As mentioned above the textile sector often obtains its inputs from South East Asia. This is confirmed by the manufacturing survey. More than two thirds of firms that have provided a reply to this question have indicated that their main source of inputs supply is South East Asia where world's most competitive textile manufacturers are located. For about 20 per cent of firms the main source of inputs was the Republic of South Africa.

The results to question 9 by industry are as follows:

Industry	Lesotho	SACU (excluding LS)	South East Asia	Other Asia	Other (there than Asia and Africa)
Garments		1	19	1	
Textiles		1			
Plastics & Rubber		2			
Food		1			
Electronics		0	2		1
Other	1				

Question 10: If your company forms a part of a larger multinational firm what per cent of intermediate inputs is sourced by the mother company?

0%	1%-24%	25-49%	50-74%	75%-100%
0	0	1	3	22

Companies that form a part of multinational firm indicate that they do not source intermediate inputs necessary for production. It is rather the mother company often based in South East Asia or South Africa that does that for the Lesotho subsidiary. In fact, 84 per cent of companies indicated that the headquarters of the multinational company are the source of between 75 per cent and 100 per cent of their intermediate inputs.

Question 11: Does your company engage in long-term relationships with suppliers?

Yes	No	Don't Know
21	3	6

The Survey indicates that nearly 70 per cent of companies (21 out of 30) engage in long-term relations with suppliers. Three have declared that they do not engage in such relations with suppliers whereas 6 firm managers have specified that they do not know the answer to this question.

The results to question 11 by industry are as follows:

Industry	Yes	No	Don't Know
Garments	16		5
Textiles	1	`	
Plastics & Rubber		2	1
Food	1		
Electronics	3		0
Other		1	

Question 12: Please give your perception about Lesotho's financial development?

Low	Medium	High	Very high	Don't know
8	10	3	0	9

A third of firms surveyed have indicated that Lesotho's financial development can be classified as "medium" whereas a little over a fourth of all firms that have replied to the questionnaire have indicated that this development is "low". 10 per cent of firms indicated that financial development is "high".

Question 13: Did your company ever receive a commercial loan from a bank based in Lesotho?

Yes	No	Don't Know
10	13	6

Nearly half of the firms survey have not received any loans from commercial banks in Lesotho but also a large share of companies (30%) have indicated that they have indeed obtain a loan from a domestic bank.

The results to question 13 by industry are as follows:

Industry	Yes	No	Don't Know
Garments	7	8	6
Textiles		1	
Plastics & Rubber	1	2	
Food	1		
Electronics	1		
Other	1		

Question 14: Please give your perception about the ease of hiring and firing workers in Lesotho?

Very easy	Easy	Rather Easy	Rather difficult	Difficult	Very Difficult	Don't know
0	7	5	7	7		4

The survey indicates that the perception of managers regarding hiring and firing procedures is somewhat split. Twelve respondents (i.e. 40 per cent of the total) have highlighted that this process is either "easy" or "rather easy". 46 per cent of responding companies have on the contrary indicated that hiring and termination procedures are "difficult" or "rather difficult".

The results to question 14 by industry are as follows:

Industry	Easy	Rather Easy	Rather difficult	Difficult	Don't know
Garments	5	4	7	4	2
Textiles	1				
Plastics & Rubber	1				1
Food		1			
Electronics				3	
Other					1

Question 15: What is your perception on the degree of protection of your tangible assets?

Very secure	Secure	Rather Secure	Rather insecure	Insecure	Very insecure	Don't know
0	13	6	3	2	0	4

Company managers in Lesotho seem to have a fairly high degree of confidence in the protection of private property. Nearly half of the managers (46%) feel that company assets in Lesotho are "secure". An additional 20 per cent of the managers indicate that assets in Lesotho are "rather secure". Therefore, combining together the respondents that have indicated that their assets are "secure" or "rather secure" two thirds of firms are satisfied with the protection of their assets.

The results to question 15 by industry are as follows:

Industry	Secure	Rather Secure	Rather insecure	Insecure	Very insecure	Don't know
Garments	8	4	2	2		4
Textiles	1					
Plastics & Rubber	1	1				
Food		1				
Electronics	2		1			
Other	1					

Question 16: What is your perception on the degree of protection of your intangible tangible assets?

Very secure	Secure	Rather Secure	Rather insecure	Insecure	Very insecure	Don't know
0	2	9	2	4	0	13

Investors had a problem answering this question as the term intangible assets is not common term. Therefore, nearly half of the managers indicated that they do not know the answer to this question. However, 11 out of total of 30 respondents that is 30 per cent have indicated that in their opinion intangible assets seem to be “secure” or “rather secure”.

The results to question 16 by industry are as follows:

Industry	Secure	Rather Secure	Rather insecure	Insecure	Very insecure	Don’t know
Garments	2	6	2	3		8
Textiles		1				
Plastics & Rubber						2
Food		1				
Electronics		1		1		1
Other						1

Question 17: What was, in your view, the main reason for your company to commence production in Lesotho?

Reason for Investment	No of firms	Reason for Investment	No of firms
1. Access to the local market	0	5. Political and Institutional Stability	4
2. Access to the SACU Market (SA)	4	6. Government support (DCCs)	2
3. Trade Preferences (AGOA, EPA)	4	7. Other	1
4. Competitive labour costs	2	8. Don’t know	8

The question asked about the initial reason for companies investing in Lesotho yielded an interesting pattern of results. As expected given small domestic market size and firms’ strong export focus no company has stated ‘access to the local market’ as the key reason for investing in Lesotho. Access to the South African Market, with 4 responses, has been one of the key reasons for the investments. Also 4 firms have stated trade preference schemes that Lesotho takes part in, such as AGOA or EPAs, are the most important factor in the investment. Crucially to this study 4 companies felt that Lesotho’s strong institutional environment and political stability have been instrumental in bringing the investors. Also government support has been important as 2 companies stated this factor as important. Several managers (8) did not know or were not sure of the key factor that brought the investment to Lesotho.

7.8 Institutional Environment and Lesotho's Export Patterns: Analysis

Following the presentation of manufacturing survey results and the descriptive analysis of Lesotho's institutional and economic foundation, this section seeks to assess the impact of institutional environment on shaping its export patterns. In particular, discussion below examines the ways in which each of the institutional sub-components – contract enforcement, property rights and financial and labour market institutions – affected Lesotho's export performance and thus influenced its revealed comparative advantage.

Before proceeding to the analysis of the impact of institutional environment on Lesotho's trade patterns, it is important to highlight two implications from the research hypothesis of this Thesis outlined in Chapter 1:

- First, countries that have relatively weak institutions will specialize in sectors which do not depend on institutions for their growth.
- Second, some idiosyncratic industry-level characteristics, such as inherent ability of certain sectors to integrate vertically, might be a substitute for good contract enforcement regulations when producing contract-intensive goods. Thus in broad terms, the impact of institutional comparative advantage can be diminished in industries and sectors with an inherent capacity to overcome institutional imperfections.

7.8.1 Overall Institutional Environment

Previous sections have shown that Lesotho's overall institutional environment is ranked as around 120 on the global scale of the ease of doing business. We can thus conclude that the country is not a particularly conducive place for doing business, and in particular for producing institutionally-dependent goods. Another statistic we need for this analysis is presented in Table 1.1 (Chapter 1), which shows that the apparel industry is the 16th most contract-dependent sector out of a total of 20. The same table also shows that the industry is the 18th most financially-dependent sector, 9th most dependent on intangible assets and 10th most volatile. This particular mix of industry and country characteristics fits well with the key hypothesis of the Thesis, namely that countries with relatively low-quality institutions, such as Lesotho, will specialize in sectors that are not particularly dependent on institutions for their growth.

Nevertheless since the introduction of the African Growth and Opportunity Act (AGOA) Lesotho obtained a lion's share of investments in the textile and garment sector. This industry now accounts for over 90 per cent of all manufactured exports and essentially determines Lesotho's revealed comparative advantage. Can the country's institutions at least partially explain the sector's performance? The analysis and data in this chapter indicate that institutions indeed had a considerable impact. Data presented in Section 7.5 clearly shows that among Sub-Saharan African states, Lesotho had some of the most conducive institutions for the manufacturing sector to thrive. Although institutions had not been the initial trigger for the emergence of the industry – it had rather been AGOA-related trade preferences (Salm et al., 2002) – institutions were crucial in that development. Among AGOA beneficiary countries in Sub-Saharan Africa, Lesotho has one of the strongest institutional environments (see Tables 7.8 and 7.9), which became a key factor in attracting foreign investment.

7.8.2 Contract Enforcement Environment

In this section we analyse the impact of contract enforcement mechanisms on the development of manufacturing industries, in particular textile and garments. Lesotho is ranked 116th in the world on the quality of its contract enforcement. The apparel industry is in turn the 4th least contract-dependent sector (Table 1.1). The juxtaposition of these two indicators parallels the assumptions of this Thesis, allowing to suggest that given Lesotho's relatively poor contract enforcement environment, it specializes in the garment sector which is not highly contract-dependent.

Furthermore, according to hypothesis 1a of this study, vertical integration can act as a substitute for good contract enforcement regulations. Acemoglu, Johnson and Mitton (2009) show that the apparel industry is ranked 5th highest (out of 20) in terms of propensity for vertical integration. It is possible to suggest that the organizational structure of Lesotho garment industry protects it to some extent from the damaging effect of poor contractual institutions.

Lesotho's industry is highly integrated with the global apparel industry; nearly all its companies are parts of large multinational conglomerates. Within these international structures, it is the mother company that take the risk of enforcing contracts if a supplier decides to renege. The analysis of the textiles and garment sector provided in the descriptive section and the discussion of the manufacturing survey provide solid evidence that the organizational structure of Lesotho's industry has at least partially shielded it from the impact of weak contract

enforcement. In particular, responses to questions 9 and 10 in the survey indicate that Lesotho-based firms largely source their materials from South Africa and East Asia and that it is usually the headquarters of a large multinational that deal with procurement. Salm et al. (2002) and World Bank (2006a) are among key studies that also highlight this phenomenon. The garment industry in Lesotho exclusively deals with Cut, Make and Trim (CMT) operations, whereas input sourcing and investment finance is provided by the mother companies.

Therefore, the institutional quality in the country of origin of the multinational corporation appears to have an impact on exporting patterns, in addition to the impact of the country's institutional characteristics with regard to contract enforcement. Taiwan, China and South Africa, which together account for the vast majority of foreign investors in Lesotho, have much more efficient court systems that enforce contracts faster and more successfully. On the World Bank Doing Business Indicator of contract enforcement, Taiwan ranks 90th and South Africa 84th in the world. Lesotho, in comparison, is ranked 116th.

In his thorough analysis of African firms, Fafchamps (2004) also highlights another phenomenon that can mitigate the negative impact of poor contractual institutions. He argues that in order to overcome contractual frictions, firms on the continent engage in long-term relations with suppliers of intermediate goods more often than firms in other parts of the world. The manufacturing survey also finds evidence that this is the case in Lesotho. Question 11 of the survey indicates that over 70 per cent of firms surveyed in Lesotho do engage in long-term relations with suppliers. Informal interviews with managers likewise confirmed this view. Several managers highlighted that they prefer to source intermediate inputs from a source that they have tested before. When dealing with a new supplier, managers initially source a small amount to establish a "relationship" and to test the quality and timeliness of inputs.

The literature review chapter highlighted the ways in which informal institutions, such as solidarity networks and groups based on ethnic or religious ties, lower trade transaction costs by minimizing trade-related risks and uncertainties. Relational contracting of manufacturing firms acts in a way similar to a solidarity network in that it enhances trust within a transaction and therefore decreases trade transaction costs. Lacking legal recourse, firms in Lesotho often resort instead to building long-term personalized relationships with suppliers or consumers which lowers the risk of enforcing contracts.

Furthermore this behaviour can also explain the lack of development of locally-owned manufacturing and a very limited degree of diversification of Lesotho's economy. Local businessmen simply do not have access to the secure and highly competitive sources of inputs in South Asia.

7.8.3 Financial Development

This section analyses the impact of Lesotho's financial development on its export patterns. First, it is important to note that the apparel industry is the 4th least financially dependent industry among 20 sectors in Rajan and Zingales' (1998) dataset and that, as previously noted, Lesotho's financial development is ranked 113th in the world. This pattern corroborates hypothesis 4 of the Thesis which expects countries with a relatively low level of financial development to specialize and have a comparative advantage in sectors least dependent on external finance for their growth. Lesotho's low level of financial development has not been a significant impediment for the development of the apparel industry.

Similarly, to the case of contract enforcement, the relationship between financial institutions and trade seems to be non-linear and influenced by specific industry-level characteristics. The manufacturing survey indicates that more than 50 per cent of surveyed firms have never obtained a loan from a commercial bank in Lesotho (question 13). This suggests that not only the need for external finance in the sector is low, but also that the actual uptake of financial services is low. As in the case of sourcing inputs, Lesotho-based firms deal almost exclusively with manufacturing actual garments, whereas actual financing of the operations is provided by head offices located mostly in Taiwan, China and South Africa. Informal interviews with garment industry managers confirmed that the vast majority of companies' financial needs are indeed fulfilled by the head office. This is true for the garment industry as well as other industries, such as electronics and energy-saving light bulbs.

The Doing Business Indicators clearly show that it is easier to obtain a commercial loan in countries that house the head offices of firms operating in Lesotho. For example, South Africa is ranked 2nd in the world on the "Getting Credit" indicator and Taiwan is ranked 78th. This contrasts with Lesotho rank of 113 and indicates the reason for the propensity of multinational companies to apply for credit in countries other than Lesotho. Furthermore, multinationals have the capacity for "cross-subsidization" between subsidiaries and the headquarters, which further suggests an alternative financing source. Hence as in the case of contract enforcement, sectoral

dependence on financial institutions might be diminished if firms are vertically integrated and/or part of a large multinational company, providing alternative sources of finance for firms.

By going from general to the specific, the case methodology was able to generate an additional empirically testable hypothesis regarding the impact of institutions on trade patterns. Vertical integration may be a substitute for financial development when producing goods dependent on external finance for growth. This is because for vertically integrated companies (which are often multinational), it is possible to "cross-subsidize" within the firm for the purpose of investment and working capital. As already mentioned, the hypothesis may be empirically tested as a simple extension of the econometric methodology in Chapter 4.

7.8.3 Labour Market Institutions

The apparel industry is ranked 10th, among 20 industries, on sectoral volatility. Lesotho in turn is ranked 67th on the ease of employing workers according to the DBIs. As for other institutional subcomponents, observation of the impact of labour market institutions parallels this study's research hypothesis. Since Lesotho's flexibility in employing workers is roughly average, it specializes in sectors that have average (sales) volatility.

The empirical chapters have shown somewhat mixed results regarding the impact of labour market institutions on patterns of trade in cross-country perspective. This contrasts somewhat with the analysis of the impact of labour market institutions on Lesotho's exports. In informal interviews several investors, primarily from South Africa, pointed out that Lesotho's conducive labour market institutions have been among the key factors prompting them to invest in its economy. Mangers noted that South Africa has some of the most stringent labour laws and is plagued by industrial actions and tough labour unions that put a constant upward pressure on wages. This contrasts significantly with Lesotho, where labour relations are much smoother. This phenomenon can also be noticed when analysing the Doing Business Indicators. On the measure "Employing Workers," Lesotho ranks 67th in the world whereas South Africa is 102nd, indicating that employing and firing workers is easier in Lesotho.

7.8.4 Property Rights

Intangible assets are not particularly important for the garment industry. Data provided in Table 1.1 show that among 20 sectors, the apparel industry is 10th in terms of its reliance on intangible assets. Lesotho is ranked 71st globally on the measure of property protection. Hence, a familiar

pattern again emerges. Given Lesotho's relatively average institutional quality on this indicator, the country seems to specialize in a sector that does not require strong intangible asset protection.

Informal conversations with mangers in Lesotho have shown that intellectual property and intangible assets are not particularly important for the production process in their industries, hence this topic has not been explored further. Nevertheless, it is important to note that broadly speaking company managers indicate their satisfaction with the protection of property rights in Lesotho and are not substantially worried about extrajudicial expropriation of their assets (question 15 in the survey). Managers also noted that their decision to invest in Lesotho was facilitated by a perception that their investment will be generally safe.

7.9 Conclusion

The case study of Lesotho's manufacturing sector with particular attention to the garment industry was based a detailed manufacturing survey, complemented by unstructured interviews and a review of relevant literature. The chapter has been instructive in enhancing the body of knowledge regarding the impact of institutional environment on trade patterns. Summarising the case study, the following key issues have been identified:

- First, given Lesotho's relatively poor institutional quality, it specializes in the garment sector which is not particularly dependent on institutions for growth. This is in line with the main hypothesis of the Thesis.
- Second, the garment industry as well as other smaller industries in Lesotho still require some minimum level of institutional capability to function efficiently. Lesotho provides institutions which, according to several cross-country indicators, are some of the most efficient in Sub-Saharan Africa. Thus the second key conclusion of this chapter is that institutions do not solely impact trade pattern. They interact with other factors to determine international exchange. In the case of Lesotho, its institutional environment interacted with favourable changes in trade policy to determine actual levels of production and trade. The emergence of an export-oriented manufacturing sector was initially triggered by the trade preference scheme implemented by the United States. AGOA provided Lesotho manufacturers with a sufficient margin of preference to overcome some of the institutional imperfections. Nevertheless, institutions played a

key role in Lesotho, as foreign investors chose this country due to the institutional environment which, in comparison to other African economies, was stronger.

- Third, the organizational structure of the manufacturing sector is able to compensate for some of the negative effects of Lesotho's poor institutional quality. Lesotho's manufacturing industries are highly integrated (vertically) and are almost exclusively members of larger multinational companies. Headquarters of such companies are often based in countries with better institutional quality, and are thus able to provide some of the services that would normally be dependent on the quality of domestic institutions. This applies in particular to enforcement of contracts with suppliers and provision of financial resources for firm expansion. Analysis of the textile industry shows that companies' headquarters supply inputs to their subsidiaries and provide them with required financial resources, which in turn allows these firms to bypass Lesotho's institutional imperfections.

- Fourth, the case study indicated that Lesotho's labour market institutions are important in determining its exports. Several investors highlighted that their decision to reallocate from South Africa to Lesotho was encouraged by more conducive labour laws. In particular Lesotho offers greater ease of employing workers, and its overall labour-employer relations are more peaceful. Furthermore, since the textile sector requires flexible labour laws, these factors largely validate hypothesis 3 of the Thesis, which expects countries with more flexible labour markets to specialize and have a comparative advantage in more volatile industries**.**

- Fifth, the trade policy/institutions nexus is not the only factor contributing to the development of export-led manufacturing in Lesotho. Lesotho's relatively good quality infrastructure which allowed for quick access to the US market and labour productivity that was somewhat higher than in other African countries were also contributing factors in this development.

The results of the case study chapter broadly confirm the results of our empirical chapters. The particular mix of institutional characteristics in Lesotho, coupled with the limited dependence of the garment industry on institutions, served as important determinants of the country's export patterns. It is also crucial to underscore that the institutional environment does not determine trade patterns in isolation. Other factors, which have been controlled for in the empirical analysis by using country and industry fixed effects, need to be analysed explicitly in the case study methodology. In this case study we thus focused

explicitly on these factors. This methodology allowed us to uncover some important interaction effects between institutions and other determinants of investment decisions, such as trade policy, allowing this chapter to contribute to the current body of knowledge on the impact of institutions on trade.

Chapter 8: Policy Implications and Conclusions

> *The rate at which countries grow is substantially determined by three things: their ability to integrate with the global economy through trade and investment; their capacity to maintain sustainable government finances and sound money; and their ability to put in place an institutional environment in which contracts can be enforced and property rights can be established. I would challenge anyone to identify a country that has done all three of these things and has not grown at a substantial rate.*
>
> *Larry Summers (2003; p. 3)*

8.1 Introduction

Empirical and qualitative results of this Thesis underscore the importance of certain institutional features for the creation of export-oriented manufacturing sector with high value-added. These results, however, so far provide little guidance as to the specific policies for countries to undertake in reforming their institutions. The aim of this chapter is therefore to not only overview the findings of the preceding analysis, but also to articulate specific policy implications that stem from them.

This chapter endeavours to contribute to the existing body of knowledge on institutional change by basing policy recommendations on the key finding of this Thesis – namely, evidence that improving institutional environment fosters better trade outcomes. To date, despite the general consensus on the importance of institutions for trade and development, the understanding of factors contributing to institutional change remains incomplete and requires further academic examination. With this in mind, the concluding chapter of this study highlights a range of possible novel approaches.

Below, section 8.2 summarizes the study's results and 8.3 overviews the current state of knowledge on recommended approaches to institutional reform (covered in sub-section 8.3.1). Discussion then proceeds to analyse policies for improving contract enforcement regulations (8.3.2), financial sector structure (8.3.3). Policy implications for Lesotho are reviewed in sub-section 8.3.4. Lastly, section 8.4 of the Thesis summarizes its final conclusions.

8.2 Summary of Results

Overall, the findings of this Thesis lend strong support to the argument that one of the routes through which institutions affect income levels is their impact on trade and comparative advantage patterns. The results also show that this effect is observed with regard to growth of industry value-added, and enterprise productivity. Crucially, the Thesis has shown that the chain of causality between the institutional environment and countries' comparative advantage might be as follows:

- Institutions affect firms' productivity, and this impact depends on the sector of economic activity.
- Next, changes in relative productivity between firms in different industrial sectors lead to differences in sectoral growth rates.
- Subsequently, differences in industry-level growth rates spur changes in countries' export patterns and hence affect (revealed) comparative advantage.

We find overwhelming empirical and descriptive evidence for the existence of such a "production effect" of institutions.[40] In Chapter 6 we provide quantitative evidence that institutions affect firms' productivity, that this effect is statistically large and significant and that there exists firm-level heterogeneity of this impact which depends on the industry in which a firm operates in. Additionally, in Chapter 5 we have shown that institutions determine sectoral growth rates and that these growth rates are related to countries' institutional indicators. Finally, in Chapter 4 we have demonstrated that institutional environment not only impact on firms' productivity and sectoral growth rates but also determines actual trade patterns.

The Thesis tested the effects of four institutional features, namely contract enforcement framework, financial system, property rights and the labour market. It found significant heterogeneity in the impact of these institutions on trade, each influencing trade patterns in a different way. This analysis was conducted by testing four main hypotheses:

- First, that strong contract enforcement regulation creates comparative advantage in sectors dependent on contracts with suppliers and customers for production.

[40] A full definision of the 'Production Effect' is provided in Section 1.4.2.

- Second, that high degree of financial development induces institutional comparative advantage in sectors more dependent on external finance for growth and trade.
- Third, that secure property rights are more conducive for economic growth and exports in sectors that require more intangible assets for production.
- Fourth, that more volatile sectors grow faster in countries with more flexible labour markets.

The results of this Thesis affirmed the first two propositions. Analysis indeed showed that sectors dependent on contracts not only export more in countries with better contract enforcement regulations but also display higher exports, faster value-added growth and superior productivity. Similarly, countries with high degree of financial development export more in sectors that rely heavily on external finance than in others.

Furthermore, analysis demonstrates that specialization in industries reliant on external finance and contracts for growth implies specialization in higher value-added sectors which are predominantly exported by countries with higher GDP per capita. Hence, a preliminary analysis of correlations hints that specialization in such goods may lead toward higher income levels and development.

Results regarding the impact of property rights and labour market institutions were less robust. Property rights do seem to exhibit an effect on trade volumes and value-added, but this relationship often borders statistical significance. The econometric analysis exclusively investigated the impact of property right security on investment in intangible assets. By doing so, it may have overlooked other avenues of impact linking property rights, trade and growth.

Overall, this Thesis provides little evidence that, in our sample, countries with more flexible labour markets specialize in more volatile sectors. This result is also obtained in the analysis of trade and industry growth and productivity. As above, this result should not imply that labour market institutions exert no influence on trade and incomes, as there may be other potential avenues of impact.

The results hold after several robustness checks are performed, displaying no significant differences in outcomes when excluding one country and one sector at a time. The results also appear unbiased by reverse causality. The Thesis used a novel set of instrumental variables to

indicate that the causality runs from institutions to trade and to growth, rather than the reverse. Furthermore, econometric models were estimated at an industry level; hence, to claim endogenity, one would need to assume that increases in trade or firm productivity affect institutional environment but that this effect is confined to specific sectors rather than the environment overall.

The case study of Lesotho manufactured industries broadly confirms the results of the empirical section. Since Lesotho has relatively poor institutional quality the main industry that has developed – the textiles and garment – in not particularly dependent on institutions for growth. The case study also exposed the fact that institutional environment does not affect trade in isolation of other factors. In Lesotho institutional environment interacted with favourable changes in trade policy to determine actual production and trade patterns. Finally, the case study chapter has also provided additional evidence for the assumption that vertical integration may substitute for strong institutions of contract enforcement and financial development.

8.3 Policy Implications

From a policy perspective, the results of this study imply that institutional and regulatory reform, especially in the areas of contract enforcement and financial sector regulation, is likely enhance the capacity of poor countries to progress to specialization in higher-valued products and reap the benefits of international integration. However, the econometric models estimated in this Thesis are highly stylized, and hence the results should not be viewed as an exact evaluation for policy purposes. Furthermore, it is increasingly recognized that policy choices may have very different effects on different economies depending on, for example, the timing and efficiency of implementation of the reforms. As noted by the Commission for Growth and Development (2008): “it is hard to know how the economy will respond to a policy, and the right answer in the present moment may not apply in the future”.

The quantitative results from this Thesis clearly suggest that improving enforcement of contracts and strengthening financial institutions has the capacity for improving counties’ trade outcomes. On the contrary, these results find limited evidence that strengthening countries’ intellectual property protection and increasing the flexibility of the labour market will improve trade. The case-study analysis highlights however that, in the specific case of Lesotho, the institutional structure of its labour market was conducive for the development of export-led

industrial sector and has been an important factor in the development of manufacturing capabilities. From the perspective of this study it is therefore crucial to overview the stock of knowledge on how to improve contracting and financial institutions and provide some policy advice for Lesotho regarding its labour market policies. This review is provided in the following 3 sub-sections.

The Thesis underscored the critical role of some national institutions for international trade. Yet there has been much less agreement as to what types of policies are appropriate to achieve development-inducing institutional change. It is therefore useful not only to highlight which institutions are conducive for better trade outcomes but also to provide some indication on specific policy options available to government on how to improve these institutions. The reminder of this section therefore summarizes the current stock of knowledge on this topic, followed by an analysis of the best practice in economic policy aimed at improving contracting and financial institutions.

8.3.1 Institutions, Institutional Change and Gains from Trade

Recent thinking on the topic of institutional reform converges to the agreement that it is a slow and highly case-specific process, as institutions are a product of each society's unique set of experiences. The emerging consensus in the academic and policy worlds is that it is particularly difficult to identify a set of institutions to promote economic growth and development irrespective of initial conditions in a given environment. Some of the key components of this understanding see institutional structures as path-dependent and not amenable to easy transfer between different environments. The observation, in a summary by Shirley (2008; p. 29), is that:

> *Path dependency and the stickiness of beliefs and norms explain why underdevelopment cannot be overcome by simply importing institutions that were successful in other countries. There are numerous examples of failure. Latin American countries copied the U.S. constitution, transitional countries emulated U.S. or European bankruptcy laws and commercial codes, former French colonies in Africa adopted the French educational and bureaucratic systems -- all with very different and generally disappointing results.*

Rather that copy such systems from region to region, it is sensible for countries to determine their own set of well-suited incentives, based on each economy's specific characteristics, in order to ensure that these incentives have the best capacity to achieve desired institutional outcomes. As emphasized by Djankov et al. (2004), "our understanding of reform strategies

remains in its infancy, especially in light of the growing understanding that different institutions might be appropriate in different circumstances."

For most countries the pace of institutional reform is sluggish, a possible indication that incumbent governments and other political players benefit from the systems already in place. To advance reforms, it is therefore crucial to resolve political constraints impairing them, either by securing the support of the powers controlling the existent structure or by replacing them – both lengthy and difficult tasks. In this way, the key challenge of institutional reform stems from its close connection with political reform or, in the words of Acemoglu and Robinson (2010), from "the political nature of an institutional equilibrium which makes it very difficult to reform economic institutions." Country-specific institutions depend on the type of political environment and the allocation of political power in the society. And thus far, our understanding of the dynamics steering societies towards governing arrangements that improve institutional environments is quite limited.

To give an example, countries with weak institutions are prone to clientelism which, according to Robinson and Verdier (2003), is "a political exchange between a politician, a 'patron' who gives patronage in exchange for the vote or support of a client." Within the notion of clientelism, politicians working towards policy reforms or provision of public goods provide services to their clients with the goal of getting re-elected, rather than pursuing the benefits to the society as a whole. By gaining backing from their "clients," politicians are able to assure re-election even if they perform poorly (Shirley, 2001).

Studies have shown that in many transition economies, the trajectory and relative effectiveness of institutional reform were largely determined by such political factors (for example, Shleifer and Treisman, 2000). The acknowledgment of this fact is in itself the starting point for appropriate policy response to institutional shortfalls. Identifying political opponents of change and building broad-based coalitions committed to institutional improvement are potential mechanisms of long-lasting reform.

Another recent point of convergence is that when it comes to choosing from a myriad of potential reform priorities, less is often more. An important observation regarding appropriate design of institutional reform is made by Hausmann, Rodrik and Velasco (2006; p. 3):

> *Presented with a laundry list of needed reforms, policymakers have either tried to fix all of the problems at once or started with reforms that were not crucial to their country's growth potential. And, more often than not, reforms have gotten in each other's way, with reform in one area creating unanticipated distortions in another area.*

The literature on institutional change suggests that one of the ways to prioritize crucial reform steps is by establishing efficient communication channels between government policy-makers and key players in the economy affected by reforms. In this way, UNCTAD (2006) underscores the importance of "exchanging information on the government's vision of development strategies" through strategic collaboration between the government and the private sector as well as with the policy and academic institutions. Such exchanges allow for the sharing of "entrepreneurs' views on business opportunities and investment constraints, particularly those related to the production of new products and the use of new modes of production." This first-hand feedback gives the government information on critical technology needs and investment requirements, helping to implement and coordinate policy measures.

Similarly, UNCTAD (2006) emphasizes that active participation of the citizenry can support institutional change. Engaging and consulting the public in setting of policy priorities has the potential to significantly facilitate the search for institutions best suited to the society's specific circumstances. Furthermore, participatory processes are likely to identify the most efficient and legitimate development goals and can raise the society's involvement in and ownership of the government policy. "Eliciting and aggregating local knowledge," notes UNCTAD, "provides better ideas of how to build effective organizations and institutions, particularly administrative norms, legal rules and other governance mechanisms, rather than technocratically imposing institutional blueprints."

Likewise important to note, there are many more types of institutions and avenues of impact than those discussed in this study. This Thesis argued that the quality and individual components of a given institutional environment enhance countries' capacity to progress to more advanced goods with higher value-added. However, as underlined by Rodrik (2004), there are many methods through which property rights can be secured; a formal regulatory system is only one of such ways. Other avenues through which "good" institutions can be attained, and which merit attention in policy planning, are for example informal norms, business networks and government guarantees. Rodrik further emphasizes that "effective institutional outcomes do not map into unique institutional designs. And since there is no unique mapping from function to form, it is futile to look for non-contingent empirical regularities that link specific

legal rules to economic outcomes." In the end, it all comes down to each country's unique set on initial conditions.

Before proceeding to analyse the implication of this Thesis for enhancing exports and development, the following four sections survey specific policy recommendations (corresponding to the four institution types discussed in this study) that have been successful in improving governance under some circumstances. It is important to caution against assuming that specific reforms described below work under all conditions, and that implementation of the most desirable reforms invariably spurs desired outcomes. A careful context-specific analysis is thus necessary before implementing these policy recommendations.

8.3.2 Contract Enforcement Regulation and the Courts

The World Bank's World Development Report 2002 surveys policy recommendations for improving contract enforcement environment. The survey indicates that efficiency of contract enforcement can be achieved in two ways: by improving regulations and the legal system (courts and laws), and by facilitating the flow of information regarding the reputations of existing and potential business partners. As the World Bank (2004) explains, "reputation is central to ensuring contract performance in all societies. In deciding whether to contract with a new partner, firms are guided by what they know about the potential partner's history of complying with contractual obligations. A firm is more likely to contract with those who have a good reputation."

An institutional environment that makes information on contracting parties' reputation easily accessible may therefore improve contract enforcement. Improvement can be attained by facilitating information flow as well as by creating and supporting various organizations that enable it. In this way, contract enforcement can be facilitated by credit bureaus that collect and publicize data on firms' credit history. Such reputation-based mechanisms, however, have several shortcomings, including the fact that they are far less helpful for newly launched enterprises (no record of creditworthiness), and that they depend on the firms' collective willingness to boycott those with a bad reputation. And overall, as economies become larger and more complex, compiling and channelling information on trustworthiness becomes more difficult, which increases the importance of a court-based conflict resolution system.

With respect to court effectiveness, the key finding of the World Bank's World Development Report 2005 is that simplification of procedural elements is associated with greater efficiency of the courts and of the regulatory system in general. Lowering costs and delays and reducing procedural complexity can make the court system more conducive to contract enforcement. It is often noted that court procedures in many poorer economies are cumbersome, time-consuming and expensive. Because developing countries tend to have lower administrative capacity, this undue complexity may have a higher impact on their economies as well as facilitate corruption in the absence of transparency.

The World Bank (2002) also emphasizes open information flows as they relate to greater accountability of the judicial system and of the court staff in particular – a key factor in raising overall court efficiency. A key element of accountability is transparency, for example by making available information that enables to monitor judicial performance and affects the reputations of the judges. In some countries accountability has been improved by providing more information on judicial outcomes. Additionally, the civil society and the media can assume a crucial role as the judicial system's external monitors, which can make it more accountable to the general public.

Furthermore, the World Bank's World Development Report (2002) argues that formal courts should not represent the only method for dispute resolution, and that the population's access to legal services can be expanded through "alternative dispute resolution systems – based on social norms or on simplified legal procedures." Where such mechanisms develop, "partially delegating the 'nuts and bolts' of procedural reform to the judicial branch can speed the process of innovation and experimentation."

Another possible avenue to improve contract enforcement is to remove obstacles to private settlement of disputes. In this regard, in the World Bank (2005) recommendation, "fostering private resolution through arbitration, mediation, or conciliation will also improve the contracting environment. Not only are these methods often less expensive than a lawsuit, they can produce more accurate decisions as well."

In cases where contract enforcement has an international dimension, an alternative way to ensure compliance is for respective governments to join relevant international bodies that aid enforcement. At the moment, however, there is no international organization specifically

targeting trade disputes. Since 1958, the UN Convention on the Recognition and Enforcement of Foreign Arbitral Awards has acted as a supranational enforcement mechanism for private parties but its mandate is fairly limited. Countries that are signatories of the convention must apply for court rulings made outside of their jurisdiction without requiring their own judicial systems to deal with the issue. Furthermore, private parties can agree to submit their disputes for arbitration in a third country and can seek enforcement in the home jurisdiction. According to the convention, a neutral country can also be used for court proceedings by investors who are concerned about the quality and speed of judgment in the country of investment. In addition to these provisions, the United Nations Commission on International Trade Law (UNCITRAL) has developed a "modal law" of international commercial arbitration which has been adopted by over 35 countries.

8.3.3 Institutions for Financial Development

"Financial markets, when functioning well, connect firms to lenders and investors willing to fund their investments and share some of the risks" (World Bank, 2005). However, the design of policies and institutions that enable such well-functioning markets is not straightforward, as was vividly illustrated by the difficulties in strengthening financial regulation after the 2008-2009 crisis. Key challenges faced by developed countries often lie in adjusting financial regulation to curtail excessive risk-taking in the banking sector while not overly restricting credit provision essential for a healthy economy. Developing countries face a different set of challenges. Prominent among them are information problems, often worsened by insufficient protection of property rights.

The objective of modern regulatory policy, in the World Bank (2002) assertion, "is largely prudential regulation to promote an efficient, safe and stable financial system," as well as "to promote systemic stability" more broadly. In turn, pursuing general macroeconomic stability is an important component of a policy set aimed at banking sector development. For example, controlling inflation allows to set low interest rates which facilitates lending by the financial sector. Other important macroeconomic indicators are stable exchange rates and sustainable debt levels, among others.

Several policy interventions that have recently proven to distort markets and constrain financial development are excessive state ownership of banks, subsidized credit, and barriers to competition such as restrictions on foreign banks and non-bank financial institutions. In regard to the latter, fostering competition within the financial services industry can include, inter alia,

building a regulatory framework that enables the emergence of non-bank financial institutions and microfinance organizations and removing restrictions on foreign direct investment in the sector.

Another important component of prudential regulation aimed at developing a strong financial system is restraining excessive lending and risk-taking by banks. Governments can limit excessive and risky lending by requiring banks to diversify and to maintain a minimum ratio of capital to loans.

As in the case of contract enforcement, financial institutions can be reinforced by creating credit bureaus and other instruments to address the problem of information shortage. Finally, it is important to add that interest rates appear to be lower in countries with low crime and corruption; therefore, working towards peaceful and corruption-free societies may also enhance financial sector development.

8.3.4 Policy Implications for Lesotho

As Chapter 7 discusses, the institutional environment in Lesotho is rather unfavourable for both foreign and domestic investors. Although Lesotho performs fairly well in comparison to other African states in terms of institutional quality, most global indicators place Lesotho in the bottom quintile of all countries. This section examines the future implications of these findings with focus on the following two questions: (1) Which institutional reforms are key for enhancing Lesotho's capacity to develop and export manufacturing products with high value-added; and (2) What set of governance reforms are politically feasible and have the best potential to lift constraints on the development of its manufacturing sector?

Contract enforcement

Lesotho currently lacks a credit bureau that would collect and publicize information on creditworthiness of citizens and foreigners. As discussed above, this institution would play a critical role in facilitating the flow information on firms' reputations, which can strengthen contract security not only among enterprises but also between firms and the financial sector. This creation of the bureau has however been forestalled by an apparent governmental dispute on its nature, with the government arguing that sensitive information on creditworthiness should not be handled by a private entity. This problem can be avoided by following the approach of several other countries (Bangladesh, Bolivia, Bulgaria, Nigeria, Romania and

Vietnam) who have established government-owned reporting agencies, building on data collected by central banks. The Government of Lesotho should undertake a similar initiative to support the free flow of information on creditworthiness.

Lesotho has only recently established commercial courts aimed specifically at dealing with business disputes. Entrepreneurial activity in Lesotho is likely to be further supported by improving the capacity of these courts to address commercial cases more swiftly and efficiently as well as by reinforcing the courts' credibility.

Financial system

In the past decade, Lesotho has taken the advice of international institutions and significantly liberalized its financial system. Nearly all banking operations are now undertaken by foreign-owned banks, all of them originating from South Africa and many with the prior history of involvement in the privatization of the sector in the early 1990's. Foreign-owned banks have brought significant expertise into the financial system and have significantly contributed to the country's financial development.

A crucial mechanism for improving financial development lies in the strengthening and simplifying of financial regulation, which is currently weak and cumbersome. Several regulatory requirements that have been singled out by the private sector as constraining the ease of doing business need to be simplified. These legislative changes include simplifying regulations on the issuance of trade credit by domestic banks, permitting banks to reclaim automobiles in the event of a default, etc. Such changes can often be undertaken relatively simply as they do not require parliamentary approval and can be implemented through an amendment to the current legislation by the Minister of Finance.

In the longer term, reforms should include finalizing regulations that would deter the creation of Ponzi (pyramid) schemes which until recently have been very common, affecting tens of thousands of people who often lost their life savings. In the long term, it is also crucial to implement a land reform clarifying land titles which in the rural areas are currently communal. This in turn would significantly enhance people's ability to use land as collateral for loans.

The government should also resist the temptation of introducing additional distortions in financial markets. Currently the government in conjunction with the banking sector is preparing

a partial credit guarantee scheme. In its current form, this scheme is likely to distort credit market structure. The scheme makes no provisions for small firms that face credit constraints but that would otherwise be able to borrow, and is therefore unlikely to enhance their access to credit. A better approach (in accordance with World Bank recommendations) would be to strengthen property rights and financial regulation.

Labour markets

The Doing Business Indicators show that the Lesotho's labour market is fairly flexible and conducive for reallocation of labour across and within industries. Yet the results of Lesotho manufacturing survey and informal interviews with managers indicate that the country's labour market laws, and particularly the unionization of labour, at present suggest the opposite conclusion. In fact, companies in Lesotho often resort to short-term employment contracts to overcome the difficulties of discharging workers in cases of non-performance. Arguably, an appropriate policy response for achieving de-facto labour market flexibility is engaging the labour unions in a dialog. This dialog would aim at achieving better cooperation and understanding with the unions for a more elastic labour market. Prudent policies for the longer term include improvements in the educational system to better reflect the needs of the industry and well-targeted provisions for the unemployed.

The preceding sections cautioned against undertaking reform by transplanting institutions from developed countries and highlighted the importance of adopting institutions to specific environments. Lesotho, however, presents a somewhat unique case in this regard. Given its close connection to South Africa, a certain degree of regulatory harmonization may facilitate investor relations. This convergence would be beneficial in the areas of financial regulation, property rights, business regulations and customs.

8.4 Conclusion

This Thesis analysed mechanisms through which institutions affect international patterns of trade and comparative advantage. Its aim was to enhance the existing body of knowledge by delving beyond the surface-level acknowledgement of the fact that institutions "matter" and exploring specific channels of causality through which institutional characteristics affect industrial exchange. The Thesis aimed to adopt a holistic approach by taking stock of the current

body of knowledge on the topic and assessing each theory's relevance within a unified empirical framework as well as through a qualitative case study.

This work's analysis has found that institutions indeed have a significant impact on trade, comparative advantage, economic growth (at the industry level) and enterprise productivity, although it discovered marked variation in this impact based on the institution type. This study offers the following contributions to the general understanding of linkages between institutions, trade and growth:

- First, it overviewed and assessed the existing body of theoretical literature addressing the impact of institutions on trade.
- Second, it offered a unified empirical framework to test these theories and assess their relative pertinence. Some of the employed empirical analysis, such as the sector-specific assessment of the impact of institutions on firm productivity and international trade growth, is novel in the literature.
- Third, by shifting the focus of the analysis from cross-country regressions to the industry and country level, this study was able to examine the research question in greater detail and avoid some of the pitfalls of cross-country studies.
- Fourth, it employed novel tests for reverse causality and concluded that causality runs from institutions to trade, rather than the reverse.
- Fifth, recognizing the context-specific nature of institutions, the Thesis also examined the nexus of institutions, trade and economic growth using a case study approach and was able to provide policy recommendations tailored to the needs of Lesotho, the case study's country of focus.

The key finding of this Thesis is that firms in countries with poor institutions tend to specialize in sectors that do not require state capabilities such as the provision of robust rule of law, efficient courts and growth-inducing financial and labour market regulation. This finding is supported by a number of theoretical models (Nunn, 2007; Costinot, 2009).

The Thesis argued that the key function of the institutional structure is to provide incentives and mechanisms that facilitate the incorporation of increasingly more advanced technology into production and trade processes. The assumption was that the quality of institutions should

matter for the kinds of products firms decide to manufacture. When such institutions are effective, firms recognize that detailed contracts involving multiple suppliers of highly differentiated (complex) products are properly enforced and that stealing is deterred. When this is the case, companies are able to outsource using multiple input suppliers and can manufacture high value-added complex products relatively cheaply. On the other hand, when these institutions are weak, firms fear that input suppliers can easily breach contracts and that buyers and predators can easily steal their shipments. As a result, they tend to vertically integrate their production processes and specialize in simpler products.

Regarding institutional reform, an important point is made by Akyüz, Chang and Kozul-Wright (1998) who contend that all countries have both types of institutional features: those that are conducive for growth and those that inhibit growth. The key challenge lies in discovering whether and how pro-development elements can best be promoted.

It is therefore likely that countries are not predetermined for ”good” or ”bad” institutions, and that institutional reform should be pursued. This Chapter has argued that prior to undertaking institutional reforms, policymakers should carefully consider the potential political ramifications of change as well as try to identify and co-opt political groups that could jeopardise the reforms. The reform process should only be initiated if sufficient political support can be obtained.

The Thesis has also argued that countries should apply context-specific reforms that target specific binding constraints on institutional change and economic development. Importantly, policymakers should keep in mind that reforms which are “second-best” in terms of economic efficiency are often still appropriate to pursue, because they may be more politically feasible to implement.

Finally, it is important to mention avenues that should be explored in further research. Overall, the results of this Thesis have shown that labour market institutions and to a lesser extend property right exert a limited impact on trade patterns. However, this result may signify a shortfall of measurement rather than the lack of the actual relationship. The analysis of property rights has rested on their assumed importance for the development of intangible assets, but it is likely that property rights have a much wider effect on the economy. It would therefore be worthwhile to explore alternative routes through which property rights influence comparative

advantage. One such avenue could be, for example, the impact of property rights on firms' capacity to use tangible assets as collateral for loans.

Regarding labour market institutions, this Thesis investigated whether more volatile sectors grew faster and exported more in countries that had more flexible labour markets. It found little evidence for this relationship. As the preceding analysis highlights, more volatile sectors do not display higher value-added, greater productivity or faster productivity growth; countries with strong institutions might therefore choose not to specialize in these sectors. It is advised that further research explores alternative routes in which labour market institutions affect trade.

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Appendices

Appendix 1: Difference-in-Difference Methodology by Meyer (1994)

The basic methodology applied in this study is the difference-in-differences approach. The difference-in-differences methodology is often used in studies where a researcher designs a treatment and control groups. In this situation the researcher compares the performance of the treatment group pre- and post-treatment relative to the performance of the control group pre- and post-treatment. This is done in order to investigate whether the "treatment" has induced a different outcome in the control group.

To develop the empirical strategy we firstly look at a typical difference-in-difference approach as presented in Meyer (1994). Then we discuss how the methodology is modified and applied to cases of impact on the institutional environment of our chosen dependent variables.

Meyer (1994) makes the following set of assumptions: (1) economic agents have some treatment applied at a point in time, and (2) outcome for these economic agents can be observed both before and after treatment application. He then shows that it is possible to estimate the effect of a treatment with the following equation:

$$y_{it} = \alpha + \beta d_t + e_{it} \qquad (3.9)$$

where, according to Meyer (1994), "y_{it} is the outcome for agent i (i=1,….,,N) at time t (t=0 or 1), d_t is a dichotomous variable equal to one if t=1 and zero if t=0, and e is an error term e_{it} (whose variance varies by t). β identifies the causal effect of treatment under the identifying assumption that $E[e_{it}/d_t]$=0, i.e. that without treatment all agents would be comparable over time (such that without treatment β=0)."

The key feature of the difference-in-differences methodology is that it is also able to take into account other factors that impact on the dependent variable. The approach achieves that by not only examining the outcomes of the treatment group but also analysing the outcomes for a control group that does not receive the treatment, assuming that the control group is also affected by the same factors. Meyer (1994) suggests that the following equation can capture this effect:

$$н^{o}_{we} = \alpha + \alpha_1 в_e + \alpha^1 в^{o} + \beta в^{o}_{e} + y^{o}_{we} \qquad (3.10)$$

where j is an index of the two groups. The index indicates that j=1 is the treatment group and j=0 is the control group; d^j_t is a dual choice variable equal to one if j=1 and zero if j=0; and d^j_t is a dual choice variable equal to one if both j=1 and t=1, and zero otherwise. As usual, β is the main coefficient that indicates the magnitude and direction of the effect of treatment. It can be obtained in two ways: (1) simply by estimating the equation (3.10), or (2) by estimating the 'difference in differences' equal to the difference in average outcomes for the treatment group subtracted from the change in the average outcomes for the control group. In Meyer's analysis, "the parameter α_1 measures how the two groups are affected over time by any non-treatment forces, while the parameter α^1 depicts any time-invariant difference in results between the

treatment and control groups. Similar to (3.8), the key identifying assumption in Eq. (3.9) is that $E[e^j_{it} / d^j_t]=0$, i.e. that b=0 in the absence of treatment. This assumption is most plausible when the untreated comparison group is very similar to the treatment group".

The approach in this Thesis is in essence similar to the one described above. The key difference is that this analysis does not explicitly have a treatment and control group but analyses differences within countries and sectors in a similar fashion. The study compares how country differences in institutional endowments affect industries within these countries. The first 'level 'of difference is at country level and the second 'level' is at an industry – hence difference-in-differences.

Appendix 2: The Levinsohn and Petrin (1999) Procedure

For the Levinsohn and Petrin (1999) procedure requires an empirical specification of the production function. First, we assume a standard neo-classical Cobb Douglas production function:

$$Y = A_{it} K_{it}^{\beta(k)} L_{it}^{\beta(l)} M_{it}^{\beta(m)} \quad \text{(A.1)}$$

Where β_l, β_k, β_m represent the Cobb-Douglas coefficient of labour L_{it} , capital K_{it} and material $M_{(it)}$ respectively, of firm i at time t. A_{it} is what is called the total factor productivity (TFP) because it increases all factors' marginal product simultaneously and it is unobservable to the researcher. Taking logs of (1) and denoting logged variables with lower case letters yields:

$$y = \alpha + \log \beta_k \, k_{it} + \log \beta_l \, l_{it} + \log \beta_m \, m_{it} + e_t \quad \text{(A.2)}$$

where e_t is normally and independently distributed. However, it is now widely recognized that firms' choice of inputs will depend on their technology and productivity, which in turn is unobservable. For example, more productive plants are more likely to invest more due to higher productivity. The specification of the production function that allows for endogeniuty of inputs is as follows:

$$y = \alpha + \beta_1 \, l_{it} + \beta_k \, k_{it} + \log \beta_m \, m_{it} + \omega_{it} + e_{i\,t} \quad \text{(A.3)}$$

where ω is an unobservable productivity shock that affects the firm's input choice; and is a purely temporal (unobserved) productivity shock that does not influence firm decisions. In general, the coefficients of this production function cannot be estimated consistently with OLS because of the correlation of the productivity shocks, $\omega_{it} + u_{it}$, with at least some of the inputs. Firms that receive a positive productivity shock could respond by using higher levels of inputs. If this is not controlled for, the parameter estimates - and thus the TFP measures - are biased. The Levinsohn and Petrin semi-parametric approach uses intermediate inputs usage as a proxy for unobservable productivity shocks. Labour and intermediate inputs are considered to be freely variable, while capital is a state variable that is assumed to adjust slowly to productivity shocks. Given specification (A.3) it can be shown that intermediate inputs usage can be monotonically increasing function of (K) and productivity component that is correlated with the firms' idiosyncratic choice of input (ω). That is intermediate inputs usage function depends on the unobserved efficiency variable and the capital stock. Thus given specification (A.3) the demand for intermediate inputs takes the following form:

$m_{it} = m(\omega_{it}, k_{it})$ (A.4)

It seems reasonable to assume that the above function is monotonic in ω.[41] That is, given the stock of capital in time *t*, the higher the productivity or efficiency level, the higher the usage of materials, since the firm will produce more than another firm that has the same stock of capital and labour but lower productivity. Thus, we can invert the above equation and write ω_{it} as a function of the observed variables, materials, labour and stock of capital:

$\omega_{it} = h_t(m_{it}, k_{it})$ (A.5)

Substituting this equation into the production function (A.3) yields:

$y = \alpha + \beta_1 l_{it} + \beta_k k_{it} + \log \beta_m m_{it} + h_t(m_{it}, k_{it}) + \varepsilon_{it}$ (A.6)

Not knowing the functional form of $h_t(m_{it}, k_{it})$ - in particular not knowing if it also has linear terms in M_{it} and K_{it} - one cannot sort out the coefficient β_k. Rather for the purpose of labelling the function ϕ is defined as:

$\phi_t(m_{it}, k_{it}) = \beta_2 k_{it} + h_t(m_{it}, k_{it})$ (A.7)

and therefore it is a non-parametric function. The first stage of the procedure thus involves estimating:

$y = \alpha + \log \beta_1 l_{it} + \phi_t(m_{it}, k_{it}) + \varepsilon_{it}$ (A.8)

As in Olley and Pakes (1996) and Pavcnik (2002), the function ϕ_t is approximated by polynomial series on the observed variables – capital and material stock and estimating (A.6) gives unbiased estimates of β_1.

The second stage of the estimation obtains unbiased estimates of β_k. Here Levinsohn and Petrin (2003) (as well as Olley and Pakes, 1996) assume that the unobserved productivity level variable ω_{it} follows a 1st order Markov process. This assumption allows us to rewrite the expected value of ω_{it} as a function of an unexpected shock with zero mean and of its value at time *t*-1.

$\omega_{it} = \omega_{it-1} + \zeta_{it} \rightarrow E(\omega_{it}/\omega_{it-1}) + \zeta_{it} \rightarrow E(\omega_{it}/\omega_{it-1}) = g(\omega_{it-1})$ (A.9)

Under this assumption, capital does not immediately respond to ζ_{it}, which is the innovation in productivity over last period's expectation (the surprise in productivity). This assumption leads directly to the following moment condition:

$E[\zeta_{it} \mid k_{it}] = 0$ (A.10)

This, in turn, allows us to assume that the unexpected part of the innovation in productivity this period is independent of this period's capital stock (which was determined by the previous period's investment)(Frazer, 2005). In the second stage procedure we therefore estimate the following expression:

$$y_{it} - \hat{\beta} \cdot l_{it} = \gamma \cdot k_{it} + E(\omega_{it} / \omega_{it-1}) + \mu_{it} + \varepsilon_{it}$$ (A.11)

[41] Levinsohn and Petrin (2003) detail the necessary conditions for the monotonicity of this function.

The g(.) function can then be expressed as a function of the past values of the observed variables by replacing ωit-1 with ϕ_{t-1}-y k_{t-1}. That is E(ω_{it}/ω_{it-1})=g(ϕ_{t-1}-y k_{t-1}) thus the estimated equation is as follows:

$$y_{it} - \hat{\beta} \cdot l_{it} = \gamma \cdot k_{it} + g(\varphi_{t-1} - \gamma \cdot k_{t-1}) + \mu_{it} + \varepsilon_{it} \quad \text{(A.12)}$$

Expression (3.22) is the second step of the Levinson and Petrin procedure and it gives unbiased estimates of β_k. The implementation of the second stage of the procedure involves regressing y-$\hat{\beta}$ on k and a fitted polynomial ϕ(k, m) - β_{k-1}. Non-linear least square methodology must be used as β_k enters the polynomial nonlinearly. Again, the intuition behind the strategy lies in the assumption that the current period's capital stock is determined before the surprise in the current period's productivity.

Once we get consistent estimates of the parameters of the production function, we can then estimate consistently the firm-level total factor productivity as:

$$TFP_{it} = y_{it} - \hat{\beta}_k k_{it} - \hat{\beta}_l l_{it} - \hat{\beta}_m m_{it} \quad \text{(A.13)}$$

where TFP stand for Total Factor productivity.

Appendix 3: The Lesotho Manufacturing Survey 2010

Section 1: Company Profile. Company Name

_____

Question 1: What is your profile of production?

1. Food
2. Textiles
3. Garments
4. Chemicals
5. Plastics and Rubber
6. Non Metallic Mineral Products
7. Fabricated Metal Products
8. Machinery and Equipment
9. Electronics
10. Other manufacturing

Question 2: What is the size of your company?

1. Small (less than 20 employees)
2. Medium (between 20 and 99 employees)
3. Large (over 100 employees)

Question 3: Is your establishment a part of a larger firm?

1. Yes
2. No, firm is on its own

Question 4: What is the country of origin of your firm's largest stakeholder?

1. Lesotho
2. South Africa
3. Taiwan
4. Other Asia. Specify _____
5. Other Africa. Specify _____
6. Other. Specify _____

Question 5: In what year did the firm begin operations?

1. _____
2. Don't know

Question 6: What percent of your production is exported?

1. 0%
2. 1-24%
3. 25-49%
4. 50-74%
5. 75-100

Section 2: Lesotho's Institutional Quality

Question 7: 'I am confident that the judicial system will enforce my contractual and property rights in a business dispute.' To what degree do you agree with this statement? Do you:

1. Fully disagree
2. Disagree in most cases
3. Tend to disagree
4. Tend to Agree
5. Agree in most cases
6. Fully agree

Question 8: Would your company decide to go to court following a dispute with a supplier?
1. Yes
2. No. If no please specify why:
_____
_____
_____

Question 9: What percent of the companies intermediate inputs are sourced from:

1. Lesotho
2. SACU
3. Other Africa
4. South East Asia
5. Other Asia
6. Other Specify_____

Question 10: If your establishment is part of a larger company what is the percent of intermediate inputs that are sourced by the headquarters?

1. 0%-24%
2. 25-49%
3. 50-74%
4. 75%-100%

Question 11: How would you rate Lesotho's business climate vis-à-vis its African competitors?

1. Negative
2. Mildly Negative
3. Similar
4. Mildly Positive
5. Positive
6. Very Positive

Question 12: Please give your perception about Lesotho's financial development?

1. Low
2. Medium
3, High
4. Very High
5. Don't Know

Question 13: Did your company ever receive a commercial loan from a bank based in Lesotho?

1. No
2. Yes
3. Don't know

Question 14: Please give your perception about the ease of hiring and firing workers in Lesotho?

1. Very Easy
2. Easy
3. Rather Easy
4. Rather Difficult
5. Difficult
6. Very Difficult
7. Don't know

Question 15: What is your perception on the degree of protection of your tangible assets?

1. Very Secure
2. Secure
3. Rather Secure
4. Rather Insecure
5. Insecure
6. Very Insecure
7. Don't know

Question 16: What is your perception on the degree of protection of your intangible assets?

1. Very Secure
2. Secure
3. Rather Secure
4. Rather Insecure
5. Insecure
6. Very Insecure
7. Don't know

Section 3: Other Issues

Question 17: What was, in your view, the main reason for your company to commence production in Lesotho?

1. Access to the local market
2. Access to the SACU Market (SA)
3. Trade Preferences (AGOA, SACU)
4. DCCs
5. Government support (subsidies, factories)
6. Other. Specify_____

Appendix 4: Results of Gravity Model by Industry

Table A1: Results of gravity model by industry (Contract Enforcement Quality)

Censored Tobit - marginal effect of Institutions disaggregated (Contract Enforcement)				
Explanatory Variable	**311 - Food Manufacturing)**	**312 – Food Manufacturing**	**313 - Beverages**	**314 – Tobacco**
Contract Enforcement	.886*** (.128)	.928*** (.109)	1.966 *** (.107)	.286*** .095
Explanatory Variable	**321 – Textiles**	**322 – Wearing Apparel**	**323 – Leather Products**	**324 - Footwear**
Contract Enforcement	-.535*** (.111)	-.746*** (.109)	-.503*** (.102)	-.824*** (.106)
Explanatory Variable	**331 – Wood Products**	**332 – Furniture, except metal**	**341 –Paper products**	**342 – Printing and Publishing**
Contract Enforcement	.965*** (.113)	.142 (.104)	.974*** (.113)	.383*** .108
Explanatory Variable	**351 –Industrial Chemicals**	**352 – Other Chemicals**	**355 – Rubber Products**	**356 – Plastic Products**
Contract Enforcement	2.04*** (.119)	.940*** (.114)	.574*** (.106)	.440*** (.105)
Explanatory Variable	**361 – Pottery, china**	**362 – Glass and Products**	**369 – Non metallic**	**371 – Iron and steel**
Contract Enforcement	-.464*** (.095)	.145 (.100)	.045 (.105)	1.78*** (.124)
Explanatory Variable	**381 – Fabricated metal products**	**382Machinery except electrical**	**383 – Machinery electrical**	**384 – Transport equipment**
Contract Enforcement	1.24*** .104	2.30*** (.113)	1.93*** (.116)	1.67*** (.117)
Explanatory Variable	**385 – Professional and Scientific**	**390 – Other manufacturing products**		
Contract Enforcement	1.66*** (.103)	.467*** (.103)		

Graph A1: Scatterplot graph showing the relation between Gravity Model Coefficients -Contract Enforcement (y-axis) and Depandance on Contracts Inicator (x-axis)

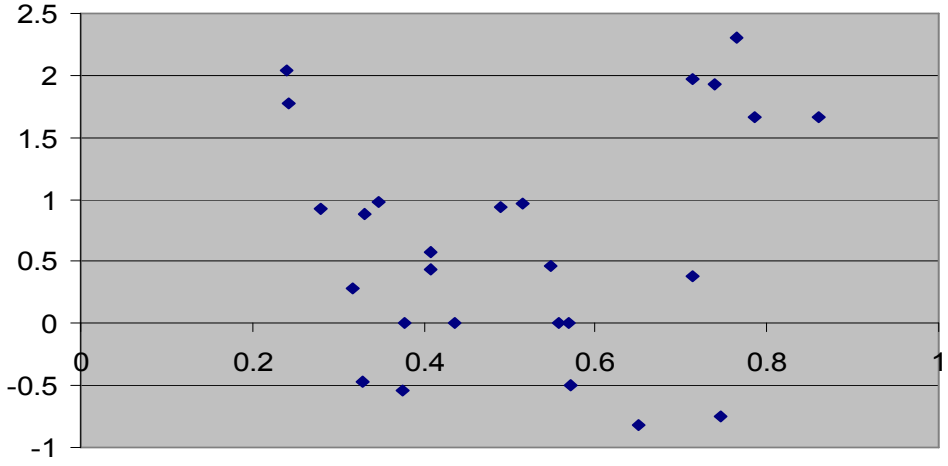
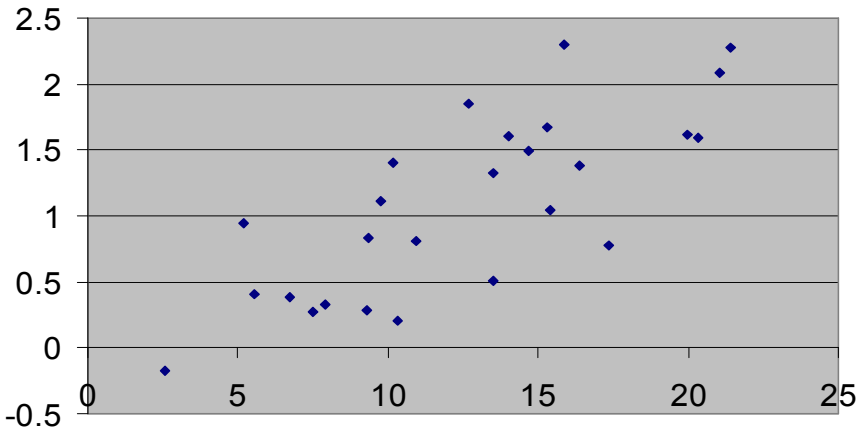


Table A2: Results of gravity model by industry (Financial Development)

Censored Tobit - marginal effect of Institutions disaggregated (Business Environement)				
Explanatory Variable	**311 - Food Manufacturing)**	**312 – Food Manufacturing**	**313 - Beverages**	**314 - Tobacco**
Financial Development	1.11*** (.115)	1.406*** (.098)	1.850*** (.097)	.323*** (.086)
Explanatory Variable	**321 – Textiles**	**322 – Wearing Apparel**	**323 – Leather Products**	**324 - Footwear**
Financial Development	-.172*** (.048)	.948*** (.098)	.384*** (.092)	.410*** (.095)
Explanatory Variable	**331 – Wood Products**	**332 – Furniture, except metal**	**341 –Paper products**	**342 – Printing and Publishing**
Financial Development	.271*** (.102)	.807*** (.094)	1.32*** (.102)	1.59*** (.097)
Explanatory Variable	**351 –Industrial Chemicals**	**352 – Other Chemicals**	**355 – Rubber Products**	**356 – Plastic Products**
Financial Development	1.38*** (.107)	1.672*** (.102)	.832*** (.095)	1.55*** (.094)
Explanatory Variable	**361 – Pottery, china**	**362 – Glass and Products**	**369 – Non metallic**	**371 – Iron and steel**
Financial Development	.285*** (.086)	.779*** (.090)	.200*** (.094)	1.04*** (.112)
Explanatory Variable	**381 – Fabricated metal products**	**382Machinery except electrical**	**383 – Machinery electrical**	**384 – Transport equipment**
Financial Development	1.498*** (.093)	2.271*** (.102)	2.298*** (.104)	1.605*** (.106)
Explanatory Variable	**385 – Professional and Scientific**	**390 – Other manufacturing products**		
Financial Development	2.084*** (.093)	1.614*** (.093)		

Graph A2: Scatterplot graph showing the relation between Gravity Model Coefficient – Financial Development (y-axis) and Dependance on Finance of industry growth indicator (x-axis)



Appendix 5: Productivity Model by Industry Results

Table A3: Productivity Model Industry Level Results: Contract Enforcment and Financial Development

Cobb-Douglas Industry Level Productivity Estimates: Levinsohn and Petrin										
Explanatory Variables	Textiles		Leather		Garments		Agro industry		Food	
Contract Enforcement	.147**		.033***		.178**		.261		0.33*	
Financial Development		.08*		0.095		.068		.183**		.121***
Country dummies	Yes		Yes		Yes		Yes		Yes	
Control Variables	Yes		Yes		Yes		Yes		Yes	
Number of Observations	3315		592		4208		439		1603	
R^2	0.9228		0.9293		0.9541		0.8575		0.9063	
Prob > F	0.00		0.00		0.00		0.00		0.00	

Cobb-Douglas Industry Level Productivity Estimates: Levinsohn and Petrin										
Explanatory Variables	Machinery		Electronics		Chemicals		Wood		Plastics	
Contract Enforcement	.565**		.38***		.265***		.086*		.089	
Financial Development		.234**		.264***		.18*		.42**		.21**
Country dummies	Yes		Yes		Yes		Yes		Yes	
Control Variables	Yes		Yes		Yes		Yes		Yes	
Number of Observations	2367		1657		2523		1373		1527	
R^2	0.9001		0.9224		0.9241		.94521		0.8958	
Prob > F	0.00		0.00		0.00		0.00		0.00	

Appendix 6: Supplementary Regressions for the Gravity Model

Gravity Models: First Step Heckman				
Explanatory Variable	(1)	(2)	(3)	(4)
GDP	1.524***	1.413***	1.11***	.633***
	(.015)	(.013)	(.013)	.011
GDP partner	.150***	.421***	.213***	.183***
	(.037)	(.026)	(.018)	.012
Total Imports Partner	1.25***	.435***	.704***	.160***
	(.048)	(.031)	(.024)	.012
Distance	-1.153***	-1.215***	-1.106***	-.835***
	.034699	(.029)	(.028)	.0258
Remoteness	.027***	.065***	.0405	.008*
	(.006)	(.005)	(.005)	.004
Tariffs	-.470***	-.433***	-.139***	.044**
	(.047)	(.042)	(.026)	.018
Border	2.82***	2.680***	2.55***	2.00***
	(.194)	(.165)	(.162)	(.144)
Colony	1.768***	1.420***	2.54***	1.642***
	(.304)	(.259)	(.254)	.223
Language	2.46***	2.07***	1.656***	.873***
	(.092)	(.078)	(.077)	.069
Island	.065***	.505	.636***	.562***
	(.088)	(.075)	(.074)	.065
Landlocked	-.880***	-.278***	.037	.357***
	(.077)	(.066)	(.065)	.057
Common Religion	.886***	.928***	1.966 ***	.286***
	(.128)	(.109)	(.107)	.095
No. of Ob	646925	646925	646925	646925
R^2 / Pseudo R^2	0.5153	0.5539	0.5645	0.5739
Prob > F	0.00	0.00	0.00	0.00

Gravity Models: First Step Heckman				
Explanatory Variable	(5)	(6)	(7)	(8)
GDP	1.698***	1.265***	1.269***	1.05***
	(.013)	(.013)	(.012)	.013
GDP partner	.516***	.396***	.569***	.144***
	(.024)	(.021)	(.021)	.022
Total Imports Partner	.663***	.808***	.386***	.618***
	(.027)	(.018)	(.019)	.022
Distance	-1.26***	-1.08***	-.906***	-.983***
	(.029)	(.029)	(.027)	.028
Remoteness	.027***	.066***	.059***	.065***
	.005	(.005)	(.004)	.005
Tariffs	-.185***	-.460***	-.514***	-.408***
	(.034)	(.044)	(.036)	.053
Border	2.29***	1.83***	2.69***	2.24***
	(.169)	(.165)	(.155)	.162
Colony	.905***	1.02***	.882***	1.87***
	(.265)	(.260)	(.242)	.261

Language	1.91***	1.65***	1.57***	1.05***
	(.080)	(.078)	(.073)	.077
Island	.294***	.493***	.329***	.049
	.077	(.075)	(.070)	.073
Landlocked	.008	-.432***	.005	-.162**
	(.067)	(.066)	(.062)	.064
Common	-.535***	-.746***	-.503***	-.824***
Religion	(.111)	(.109)	(.102)	(.106)
No. of Ob	646925	646925	646925	646925
R^2 / Pseudo R^2	0.5153	0.5539	0.5645	0.5739
Prob > F	0.00	0.00	0.00	0.00

Appendix 7: usSIC – ISIC Rev 3 and Rev 2 Concordance

SIC Code	Code Description	ISIC Rev 3 2-digit	Code Description	ISIC Rev 2 3-digit	
20	Food and kindred products	15	Manufacture of food products and beverages	311, 312, 313	Food manufacturing Beverage industries
21	Tobacco	16	Manufacture of tobacco products	314	Tobacco manufacture
22	Textile mill products	17	Manufacture of textiles	321	Manufacture of textiles
23	Apparel and other textile products	18	Manufacture of wearing apparel; dressing and dyeing of fur	322	Manufacture of wearing apparel, except footwear
24	Lumber and wood products	20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	331	Manufacture of wood and wood and cork products, except furniture
25	Furniture and furniture fixtures	36	Manufacture of furniture; manufacturing n.e.c.	332	Manufacture of furniture and fixtures, except primarily of metal
26	Paper and allied products	21	Manufacture of paper and paper products	341	Manufacture of paper and paper products
27	Printing and Publishing	22	Publishing, printing and reproduction of recorded media	342	Printing, publishing and allied industries
28	Chemicals and allied products	24	Manufacture of chemicals and chemical products	351, 352	Manufacture of industrial chemicals Manufacture of other chemical products
29	Petroleum and coal products	23	Manufacture of coke, refined petroleum products and nuclear fuel	353, 354	Petroleum refineries Manufacture of miscellaneous products of petroleum and coal

30	Rubber and miscellaneous plastics	25	Manufacture of rubber and plastics products	355, 356	Manufacture of rubber products Manufacture of plastic products not elsewhere classified
31	Leather and leather products	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	323	Manufacture of leather and products of leather, leather substitutes and fur, except footwear and wearing apparel
32	Stone, clay and glass products	26	Manufacture of other non-metallic mineral products	361, 362, 369	Manufacture of pottery, china and earthenware Manufacture of glass and glass products Manufacture of other non-metallic mineral products
33	Primary metal industries	27	Manufacture of basic metals	37	Basic Metal Industries
34	Fabricated metal products	28	Manufacture of fabricated metal products, except machinery and equipment	381	Manufacture of fabricated metal products, except machinery and equipment
35	Industrial machinery and equipment	29	Manufacture of machinery and equipment n.e.c.	382	Manufacture of machinery except electrical
36	Electrical and electronic equipment	31	Manufacture of electrical machinery and apparatus n.e.c.	383	Manufacture of electrical machinery apparatus, appliances and supplies
37	Transportation equipment	34, 35	Manufacture of other transport equipment Manufacture of motor vehicles, trailers and semi-trailers	384	Manufacture of transport equipment
38	Instruments and related products	33	Manufacture of medical, precision and optical instruments, watches and clocks	389	Manufacture of professional and scientific, and measuring and controlling equipment not elsewhere classified, and of photographic and optical goods
39	Misc. manufacturing products	36	Manufacturing n.e.c.	390	Other Manufacturing Industries