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# Forest Stakeholders, Policies and Trade in India's Forest Sector

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# FOREST STAKEHOLDERS, POLICIES AND TRADE IN INDIA'S FOREST SECTOR

A Thesis

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by
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I dedicate this thesis to my beloved parents Banani Das and Debasish Das and to my grandmother Karuna Das. I could have never completed my masters without their never ending love and prayers. Their hard work, dedication, dutifulness and adherence to rectitude have come up as blessings in my life. My love, respect and gratitude for them are hard to express in words.

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# ABSTRACT

The thesis examines a panel of trade flows during 2009-2013, exploring the influence of regulatory quality on the pattern of forest products imports by India from 143 partner countries. The study applies a pooled regression model followed by Generalized Least Squared (GLS) technique and a more robust Feasible Generalized Least Squared (FGLS) method of estimation with regulatory quality, distance between the partner country and India, total forest area of partner country, GDP and population indicators to assess the impact of partner country's regulatory quality and other trade-related factors on imports of forest products by India. The results support the notion that imports of forest products depend on regulatory quality, the distance between the trading countries, forest cover, the size of the economy and other factors considered in the model. The study also considers the impact of regional variability on forest products import by India.

Quantitatively, the results suggest that a 1 percent improvement in regulatory quality of the partner country would yield a 6.10 percent increase in imports of forest products by India. A 1 percent increase in distance between India and the trading country yields a 0.60 percent decrease in total import volume, whereas a 1 percent increase in forest area of partner country and a 1 percent increase in GDP of partner country yields an increase in forest products imports to India by 0.24 percent and 0.75 percent, respectively. Thus, it confirms that while improvement in regulatory quality of partner countries contribute to improved imports, improvements in the GDP of partner country and increase in the total forest area are equally important in facilitating the growth of forest products imports by India. This improvement implies policy emphasis on the governance, economy

and environment of the trading countries and, are important to support the furtherance of the volume of trade flows across countries.

# CHAPTER 1: INTRODUCTION

India's forests play a significant role in the economic development of the country. There is an extensive demand for forest products in India. These include a plethora of products such as furniture, firewood, timber, materials for housing and fodder. The recent surge in demand is mainly an indication of the country's rapid economic growth, industrialization and increase in population (Malik & Dhanda, 2003). About 24 percent of India's total land area is attributed to forest cover (FAOSTAT, 2013). The products produced by these resources, however, do not meet the total requirement of the country. To suffice domestic needs, importing from other countries is necessary.

During the last decade, forest products imports by India has increased by four times. The total value of forest products import by India has reached 5.4 billion US $ during 2013 from about 1.5 billion US $ during 2003. This volume of imports by India accounts for 0.29 percent of India's GDP in 2013. There are several factors associated with this surge in forest products import by India from exporting countries. Use of more energy efficient technology for transporting goods, trade liberalization, rapid economic growth and transition in the functioning of the governance are few factors that can influence the change in the volume of trade between countries. Operational issues of governance are currently being discussed to help define the reasons behind the changing patterns of trade. Researchers suggest that institutional quality or a quantitative reflection of the overall governance of a country has significant impacts on trade patterns in different sectors across the world. Regulatory quality, which is a part of institutional quality also has significant impacts on trade patterns in different sectors across the world (Freund & Bolaky, 2006).

This thesis examines regulatory quality and the effect of partner country's regulatory quality on forest products import by India.

The first chapter of the thesis primarily discusses India and India's forest products sector followed by an overview of forest products trade in the country. The second chapter deals with the literature review. The third chapter gives the problem statement and objective of the thesis. The fourth chapter describes the methodology, research model, hypothesis and data. The fifth chapter finally describes the results of the analysis and the last chapter discusses and concludes the study.

### 1.1 Overview of Forest Sector in India

India is the 12th largest global economy by nominal Gross Domestic Product (GDP) of 2.3 trillion US $ and fourth largest by Purchasing Power Parity (PPP). Per capita income in India is $3,694 (IMF, 2011) and the average annual GDP growth rate for last five years has been 7.5 percent. Industries in India contribute 29.1 percent of GDP; Services contributes to 53.7 percent and Agriculture (including forestry) contributes 17.2 percent of the GDP of India. Forests play a significant role in the socio-economic development of the country. With two-thirds of the population of the country depends on agricultural activities for their livelihood. Dense forest once covered most of India, but in almost all states of India, the forest cover has been reduced significantly. Figure-1 shows a picture of India's original forest cover and reduced forest cover during the beginning of last decade (2005). There has been a decrease of 34,700 hectares of forest cover in India during the period 2009-2011 (Forest Survey of India, 2013).

With a total forest of 78.92 million ha, India ranks 10th among the most forested nations of the world. This accounts for nearly 24.01 percent of the total geographical area

of the country. In India, forests divided into two broad categories, forest cover and tree cover. Out of 78.92 million ha (789,200 sq. km) of forests, about 69.79 million ha (697,898 sq. km) is forest cover, which accounts for 21.23 percent of the geographic area, whereas

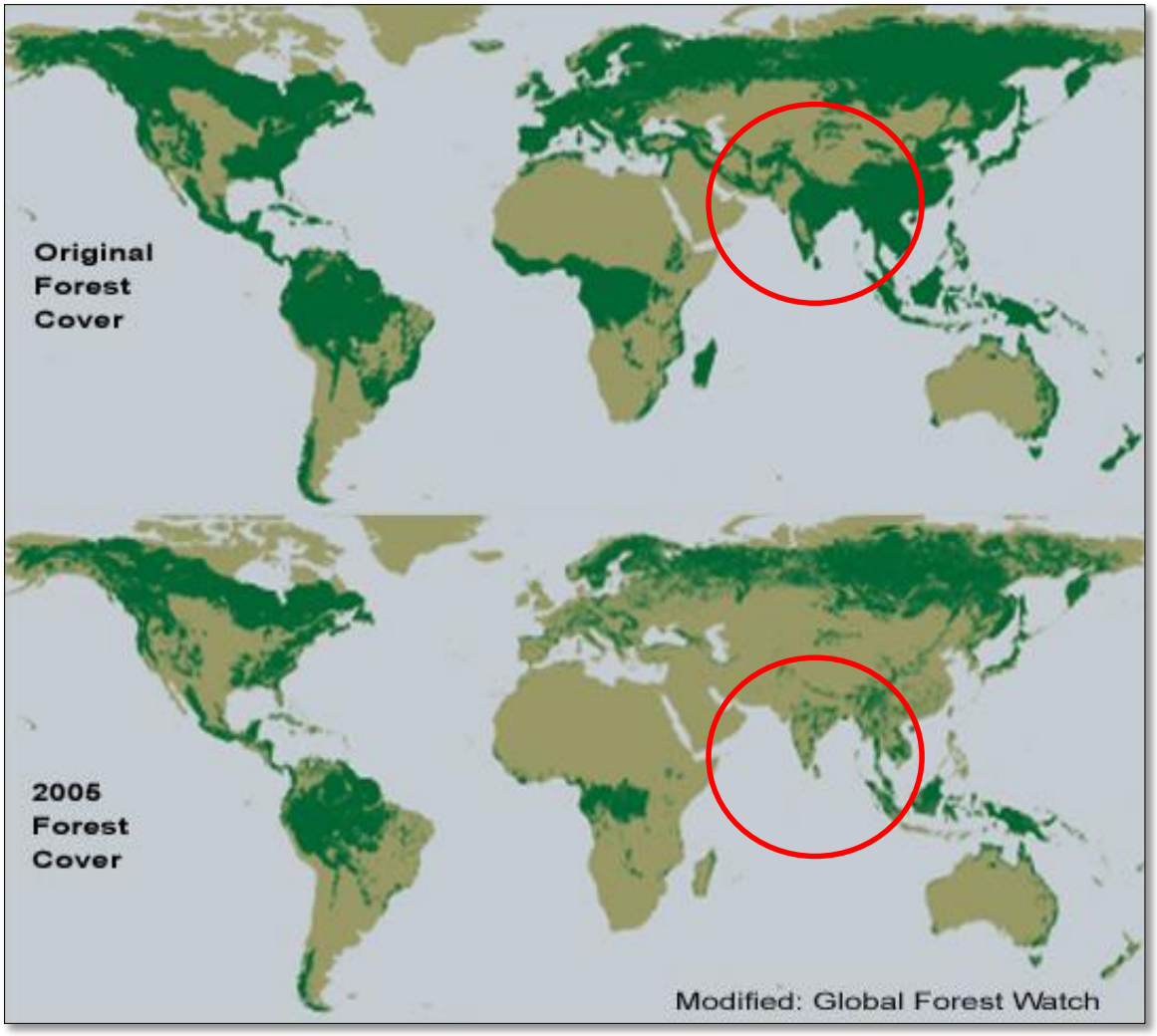



Figure 1 Decline in India's Forest Cover

tree cover is about 9.13 million ha, which accounts for 2.78 percent of the geographic area (FSI, 2013). Forests in India provide a wide range of goods and services such as timber, fuel wood, materials for building houses and fodder. Along with the above-mentioned goods, forests also provide wood products, pulpwood, sawn wood, veneer wood and paper. Forests in India provide employment to the local people and habitat for many tribal groups.

The forestry industry contributes to about 0.9% of the GDP of India (2011). There are about 173,000 villages in India that are classified as forest fringe villages (Kishwan, Pandey, & Dadhwal, 2009). Government has reduced and reformed import tariffs to allow imports to satisfy the growing demand for forest products. Figure- 2 gives a graphical representation of forest cover in India in comparison to other countries of the world during the beginning of last decade.

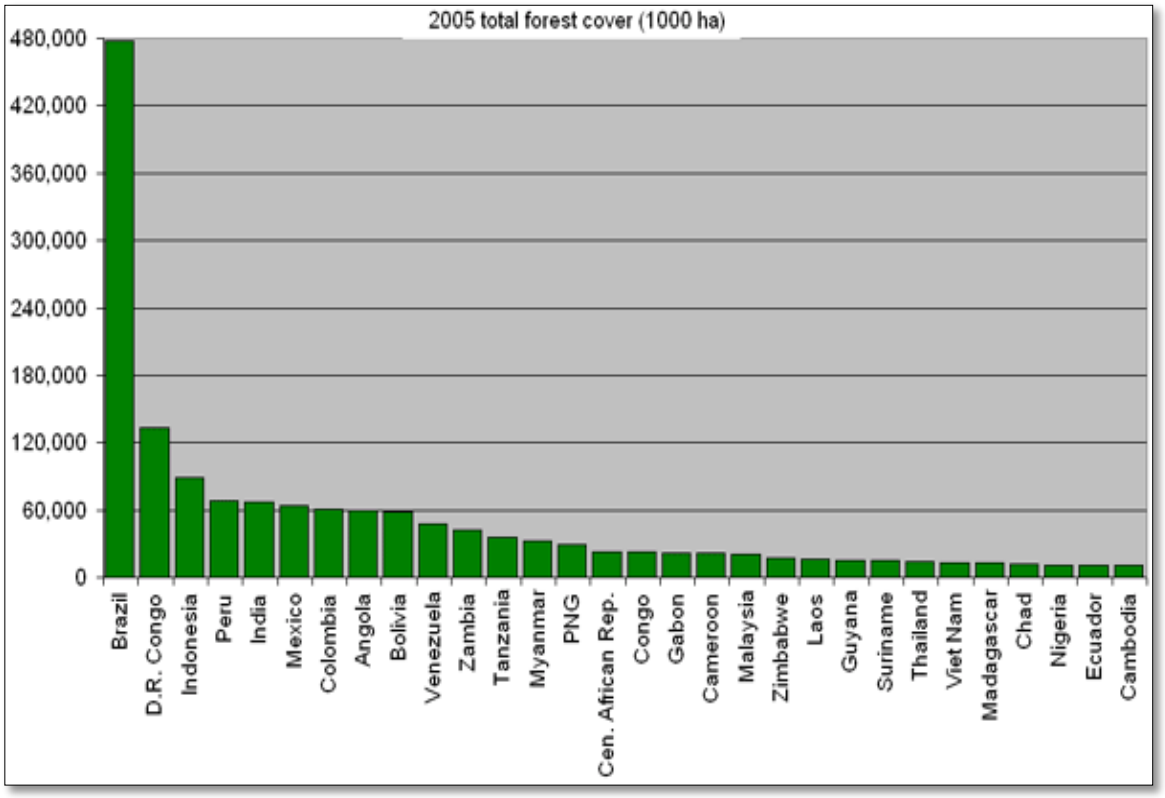



Figure 2 India-Comparison to Other Tropical Forested Countries
Source: FAO, 2005

Our primary focus of the thesis is on forest products in India so, we will consider only forest cover for further discussions. Forests cover in India is further classified into very dense forest, moderately dense forest and open forest. Table- 1 gives a brief description of the classifications made under forest cover in India.

Table 1 Classification of Forest Cover in India

| Class | Description |
|---|---|
| Very Dense Forest | All lands with tree canopy density of 70% and above. |
| Moderately Dense Forest | All lands with tree canopy density of 40% and more but less than 70%. |
| Open Forest | All lands with tree canopy density of 10% and more but less than 40%. |
| Scrub | Degraded forest lands with canopy density less than 10%. |
| Non-forest | Lands not included in any of the above classes. |

Source: (FSI, 2013)

Table- 2 shows the above mentioned class wise forest cover in India. Moderately dense forest is 31.87 million ha (318,745 sq. km) which accounts for the largest share of the area covered under forest followed by open forest which covers 29.56 million ha (295,651 sq. km) of forest area and very dense forest accounts for 8.35 million ha (83,502 sq. km) of forest areas.

Table 2 Class Wise Forest Cover in India

| **Class** | **Area (sq.km.)** | **Percentage of Geographical Area** |
|---|---|---|
| **Forest Cover** | | |
| **a) Very Dense Forest** | **83,502** | **2.54** |
| **b) Moderately Dense Forest** | **318,745** | **9.7** |
| **c) Open Forest** | **295,651** | **8.99** |
| **Total Forest Cover*** | **697,898** | **21.23** |
| **Scrub** | **41,383** | **1.26** |
| **Non Forest** | **2,547,982** | **77.51** |
| **Total Geographic Area** | **3,287,263** | **100** |
| ***Includes 4,629 sq. km under mangroves** | | |

Source: (FSI, 2013)

Figure-3 shows percentage shares of different classes of forest areas in India with respect of total forest cover. Very dense forest covers 2.54 percent, moderately dense forest covers 9.7 percent, and open forest covers 8.99 percent of the total forest area in India.

Forest area is unevenly distributed in different regions of India. The Northern and Northeastern part of India have vast areas covered by the forest, whereas the Western part of India consist of deserts. The Southwest coast and the Eastern region of India also have

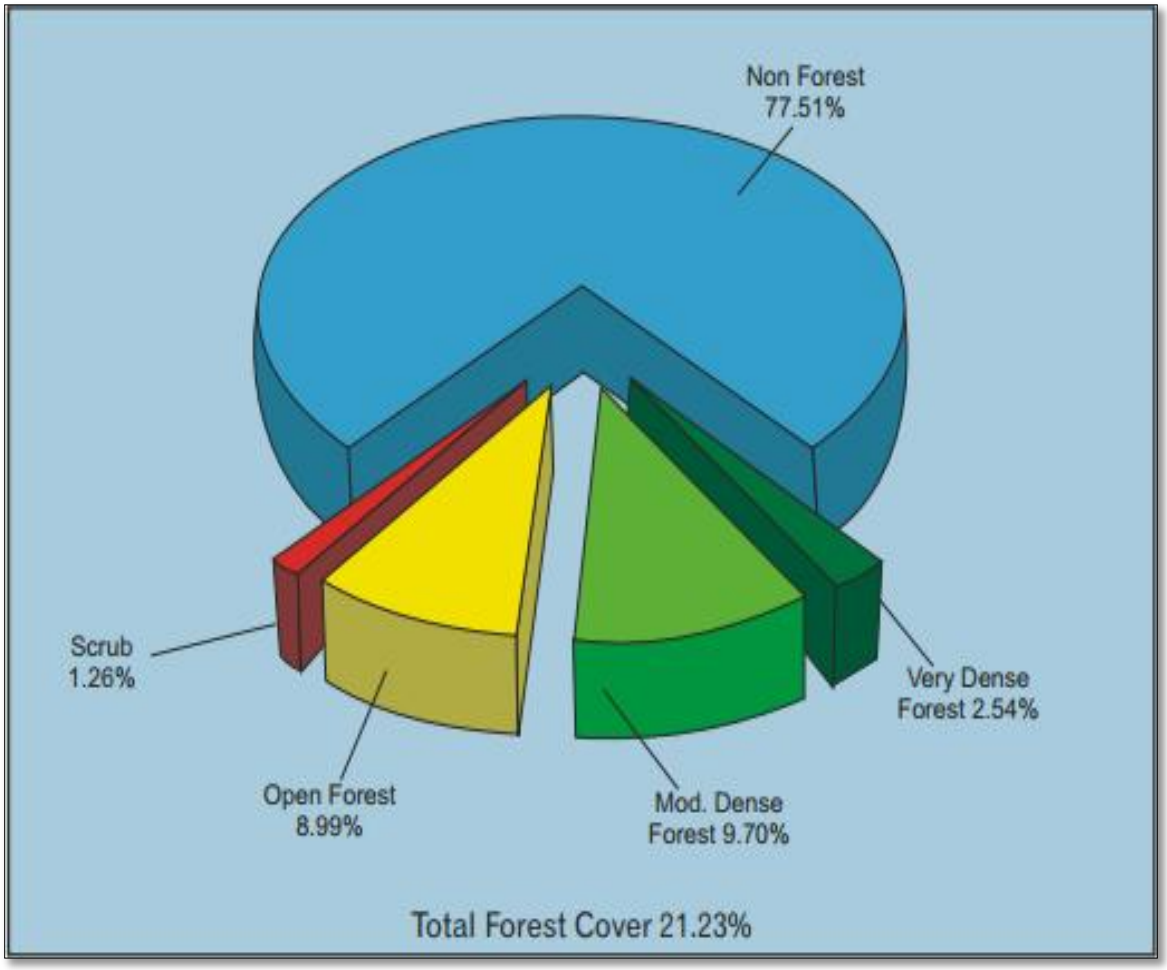



Figure 3 Percentage Share of Different Classes of Forest Cover in India
Source: (FSI, 2013)

Vast areas covered by forests. Madhya Pradesh, a state located in the central region of the country has the largest area covered by forest at 77,522 sq. km (7,752,200 ha) followed by Arunachal Pradesh, a state located in the northeastern part of India with 67,321 sq. km

(6,732,100 ha) of land covered by forest. Table -3 gives a state-wise list of the total area covered by forest and percentage share with respect to the total geographic area of that state.

Table 3 Forest Cover in States and Union Territories of India (Area in Sq. km.)

| States/UTs | Geogra-phical Area | 2013 Assessment | | | | Per cent of Geogra-phical Area | Change in Forest Cover wrt ISFR 2011 | Change Percent | Scrub |
|---|---|---|---|---|---|---|---|---|---|
| | | Very Dense Forest | Mod. Dense Forest | Open Forest Forest | Total Forest Forest | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Andhra Pradesh | 275,069 | 850 | 26,079 | 19,187 | 46,116 | 16.77 | -273 | -0.10 | 10,465 |
| Arunachal Pradesh | 83,743 | 20,828 | 31,414 | 15,079 | 67,321 | 80.39 | -89 | -0.11 | 121 |
| Assam | 78,438 | 1,444 | 11,345 | 14,882 | 27,671 | 35.28 | -2 | 0.00 | 182 |
| Bihar | 94,163 | 247 | 3,380 | 3,664 | 7,291 | 7.74 | 446 | 0.47 | 115 |
| Chhattisgarh | 135,191 | 4,153 | 34,865 | 16,603 | 55,621 | 41.14 | -53 | -0.04 | 117 |
| Delhi | 1,483 | 6.76 | 49.38 | 123.67 | 179.81 | 12.12 | 3.61 | 0.24 | 2.24 |
| Goa | 3,702 | 543 | 585 | 1091 | 2219 | 59.94 | 0 | 0.00 | 0 |
| Gujarat | 196,022 | 376 | 5,220 | 9,057 | 14,653 | 7.48 | 34 | 0.02 | 1,492 |
| Haryana | 44,212 | 27 | 453 | 1,106 | 1,586 | 3.59 | -22 | -0.05 | 150 |
| Himachal Pradesh | 55,673 | 3,224 | 6,381 | 5,078 | 14,683 | 26.37 | 4 | 0.01 | 298 |
| Jammu & Kashmir* | 222,236 | 4,140 | 8,760 | 9,638 | 22,538 | 10.14 | -1 | 0.00 | 2,105 |
| Jharkhand | 79,714 | 2,587 | 9,667 | 11,219 | 23,473 | 29.45 | 496 | 0.62 | 670 |
| Karnataka | 191,791 | 1,777 | 20,179 | 14,176 | 36,132 | 18.84 | -62 | -0.03 | 3,216 |
| Kerala | 38,863 | 1,529 | 9,401 | 6,992 | 17,922 | 46.12 | 622 | 1.60 | 29 |
| Madhya Pradesh | 308,245 | 6,632 | 34,921 | 35,969 | 77,522 | 25.15 | -178# | -0.06 | 6,389 |
| Maharashtra | 307,713 | 8,720 | 20,770 | 21,142 | 50,632 | 16.45 | -14 | 0.00 | 4,157 |
| Manipur | 22,327 | 728 | 6,094 | 10,168 | 16,990 | 76.10 | -100 | -0.45 | 1 |
| Meghalaya | 22,429 | 449 | 9,689 | 7,150 | 17,288 | 77.08 | 13 | 0.06 | 372 |
| Mizoram | 21,081 | 138 | 5,900 | 13,016 | 19,054 | 90.38 | -63 | -0.30 | 0 |
| Nagaland | 16,579 | 1,298 | 4,736 | 7,010 | 13,044 | 78.68 | -274 | -1.65 | 2 |
| Odisha | 155,707 | 7,042 | 21,298 | 22,007 | 50,347 | 32.33 | 1444 | 0.93 | 4,424 |
| Punjab | 50,362 | 0 | 736 | 1,036 | 1,772 | 3.52 | 8 | 0.02 | 37 |
| Rajasthan | 342,239 | 72 | 4,424 | 11,590 | 16,086 | 4.70 | -1 | 0.00 | 4,211 |
| Sikkim | 7,096 | 500 | 2,161 | 697 | 3,358 | 47.32 | -1 | -0.01 | 311 |
| Tamil Nadu | 130,058 | 2,948 | 10,199 | 10,697 | 23,844 | 18.33 | 219 | 0.17 | 1,212 |
| Tripura | 10,486 | 109 | 4,641 | 3,116 | 7,866 | 75.01 | -111 | -1.06 | 66 |
| Uttar Pradesh | 240,928 | 1,623 | 4,550 | 8,176 | 14,349 | 5.96 | 11 | 0.00 | 806 |
| Uttarakhand | 53,483 | 4,785 | 14,111 | 5,612 | 24,508 | 45.82 | 12 | 0.02 | 262 |
| West Bengal | 88,752 | 2,971 | 4,146 | 9,688 | 16,805 | 18.93 | 3810# | 4.29 | 111 |
| A&N Islands | 8,249 | 3,754 | 2,413 | 544 | 6,711 | 81.36 | -13 | -0.16 | 57 |
| Chandigarh | 114 | 1.36 | 9.66 | 6.24 | 17.26 | 15.14 | 0.26 | 0.23 | 0.56 |
| Dadra & Nagar Haveli | 491 | 0 | 114 | 99 | 213 | 43.38 | 2 | 0.41 | 1 |
| Daman & Diu | 12 | 0 | 1.87 | 7.4 | 9.27 | 8.28 | 3.27 | 2.92 | 0.96 |
| Lakshadweep | 32 | 0 | 17.18 | 9.88 | 27.06 | 84.56 | 0.06 | 0.19 | 0 |
| Puducherry | 480 | 0 | 35.23 | 14.83 | 50.06 | 10.43 | 0.06 | 0.01 | 0 |
| **Grand Total** | **3,287,263** | **83,502** | **318,745** | **295,651** | **697,898** | **21.23** | **5871** | **0.18** | **41,383** |

** Includes Jammu & Kashmir area outside LOC that is under illegal occupation of Pakistan and China.*

# The negative change in forest cover of Madhya Pradesh as compared to previous assessment is mainly attributed due to inclusion of some non forest area as forest cover. Similarly in West Bengal the change in forest cover in present assessment is due to exclusion of some areas as forest cover in the previous assessment due to poor quality satellite data.

Source: (FSI, 2013)

Besides the classifications mentioned above, forests in India are also divided into three classes for administrative viability, reserved, protected and unclassed forests (Ahmed, 1997). The definitions of these forest types according to Indian Forest Act, 1927 are as follows:

Reserved Forest: "An area notified under the provisions of Indian Forest Act (IFA), 1927 having the full degree of protection. In Reserved Forests, all activities are prohibited unless specifically permitted" (Section 20 of IFA,1927).

Protected Forest: "An area notified under the provisions of the Indian Forest Act having a limited degree of protection. In Protected Forest, all activities are permitted unless prohibited" (Section 29 of IFA,1927).

Unclassed Forest: "An area recorded as the forest but not included in Reserved or Protected forest category. Ownership status of such forests varies from state to state" (Section 29 of IFA,1927).

Forest products demand in India is primarily timber, wood products, wood fuel, bamboo and paper, of which about 90 percent is wood fuel. There is a huge gap in demand and supply of forest products in India. To bridge this gap India has to import forest products (Mondal, 2015) and (Kumar, Viswanathan, & I, 2013). The demand is mostly by the stakeholders associated with forest sector in India. Industries such as paper, furniture, fuel and rayon manufacturing, consume a majority of forest products (Dhanuraj & Kumar, 2014). Other stakeholders are the non-governmental organizations (NGOs) and tribal groups that depend on the forest.

Although there are several rules and regulations in the forest sector in India in order to preserve and increase the productivity of forest products meeting demand for forest

products in various sectors remains challenging. However, this gap is increasingly met by forest products imports to India from partner countries (Dhanuraj & Kumar, 2014).

### 1.2 Overview of Forest Products Trade in India

India's forest products imports had increased by nearly four times from 1.5 billion US $ to 5.4 billion US $ during the last decade, as shown in Figure- 4 (FAOSTAT, 2013). India has only 24 percent of the total area covered by forest, and there is a large gap between the forest products demand and supply (Kumar et al., 2013). During the last decade due to a surge in the demand for wood products and the relative scarcity of timber in India, the log imports have almost doubled. Currently, India is the largest potential timber importing country after China (Flynn, 2013).

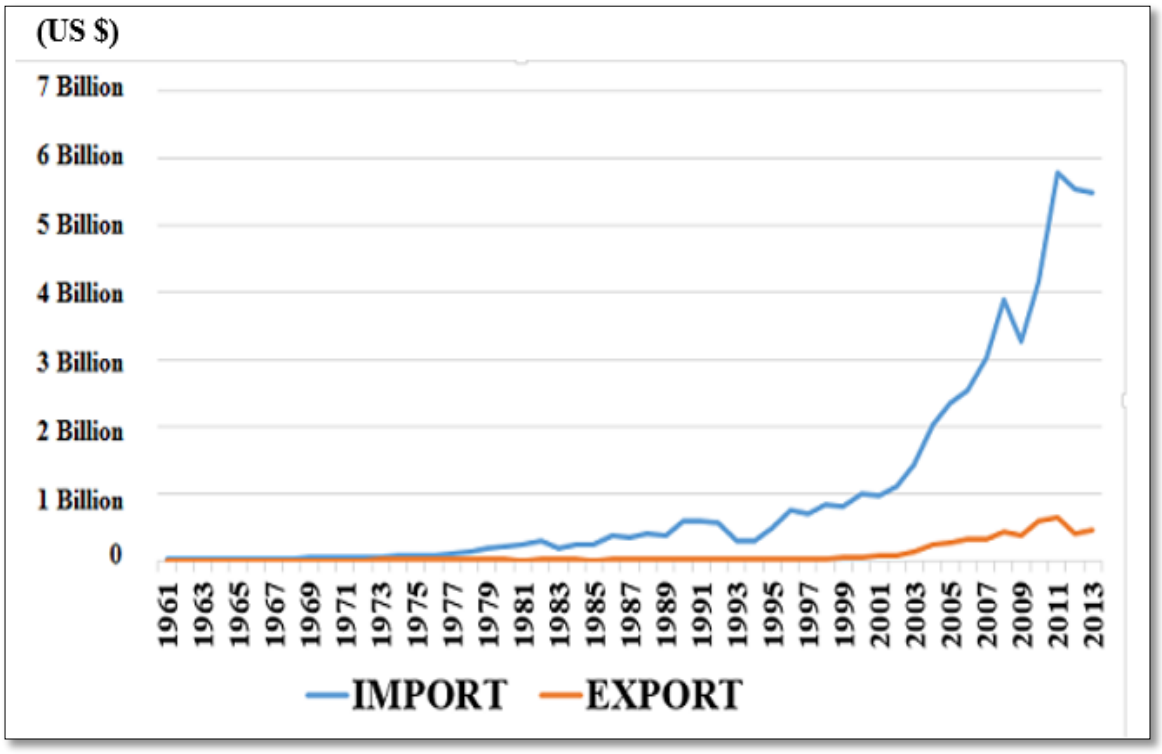



Figure 4 Trend of Forest Products Trade in India
Source: FAOSTAT, 2013

Prior to the 1980s, India's forest products trade balance was almost zero. However, during late 1980's and early 1990's, the trade balance started showing a negative trend.

Due to trade liberalization in India during 1990's and an exponential growth rate of population, the demand for forest products has also increased. Since the 1990's there has been a sharp increase in India's forest products imports. The largest share of India's forest products imports comes from the United States of America followed by China, Germany, Japan and the United Kingdom. Of the top five countries, the US has exported about 1.5 billion US $ worth of forest products to India during 1961-2013. All the top five exporters of forest products to India are representative of large economies in Figure- 5.

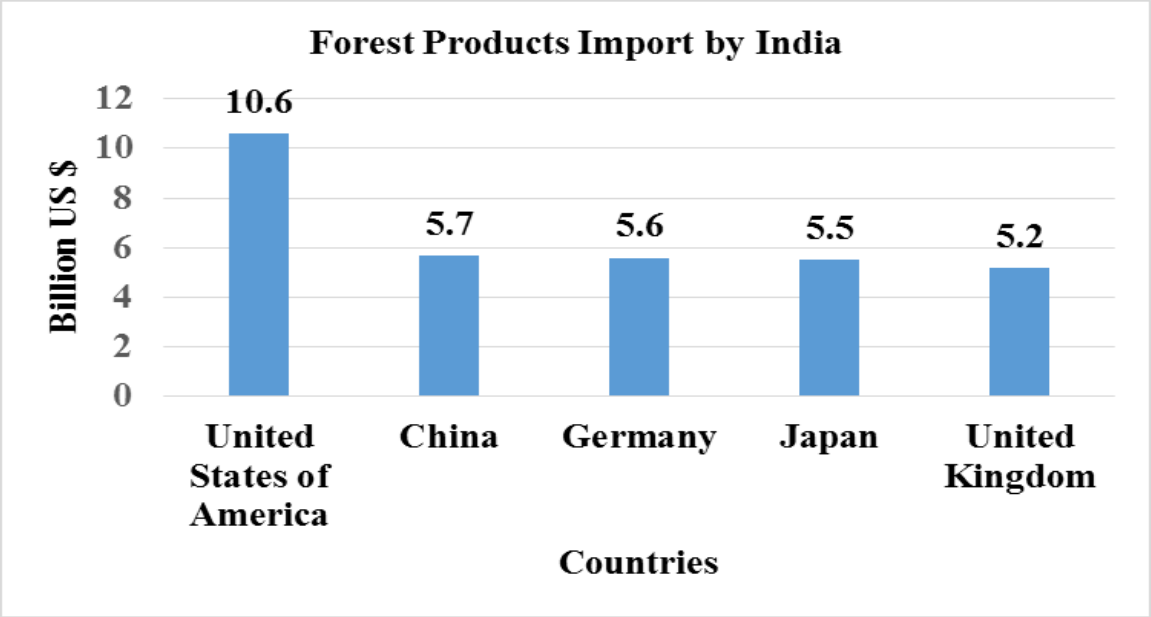



Figure 5 Top Five Countries from which India Imports Forest Products (1961-2013)
Source: FAOSTAT, 2013

As shown in Figure- 6, Europe accounts for the largest share of forest products import to India since 1961. About 46.9 percent of the total forest products imports in India comes from European countries including Germany, United Kingdom, France, Belgium, and Croatia. About 28.9 percent of imports come from other Asian countries like Japan, Malaysia, Myanmar, Nepal and Bangladesh. These neighboring countries, Nepal, Bhutan, Myanmar, Malaysia, Pakistan, and Bangladesh have a comparative advantage of forest

products trade with India over other partner countries as they mostly share borders with India. The distance between these countries and India are less compared to other trading partners which reduces transportation costs. Imports from North and South American

Countries account for 20.1 percent of total imports of forest products in India whereas African countries and Oceania account for 2.7 percent and 1.4 percent, respectively, of total forest products import by India since 1961 (FAOSTAT, 2013).

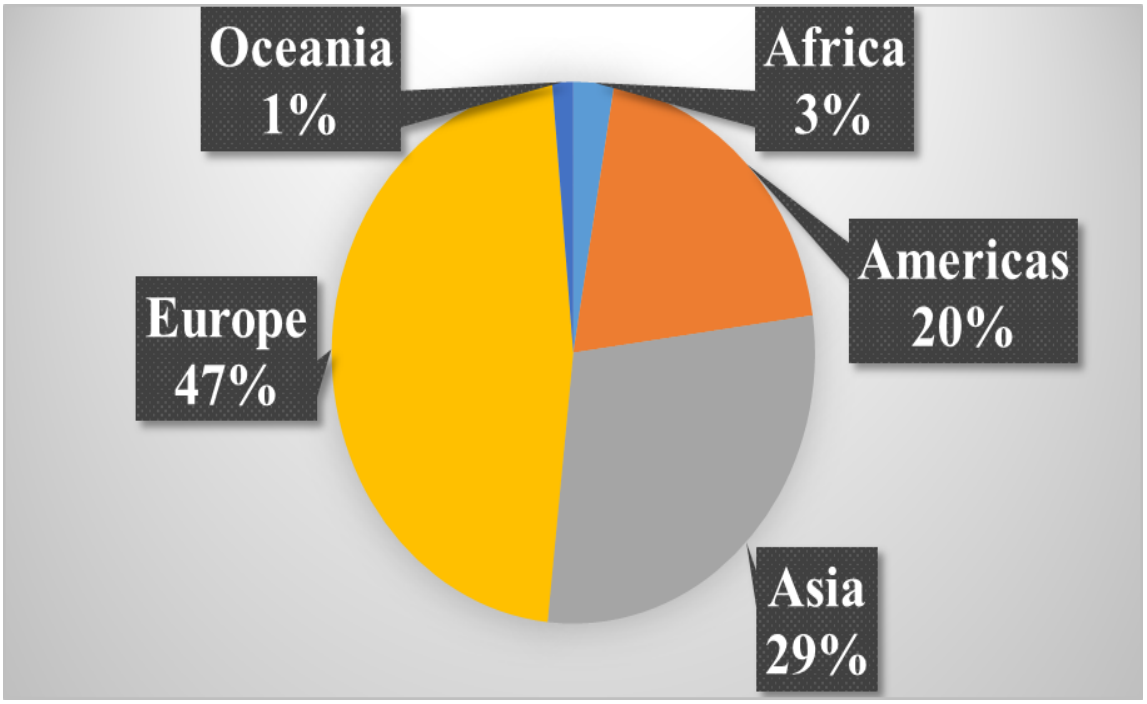



Figure 6 Area-Wise Share of India's Forest Products Import by India (1961-2013)
Source: FAOSTAT, 2015

Table- 4 gives a list of partner countries from which India imports forest products. The majority of India's forest products import comes from countries like the USA, Malaysia, Myanmar, China, and Canada. The US alone accounts for 0.6 billion US $ worth of forest products imported by India in 2013, and all the five countries mentioned above accounts for nearly 40% of India's forest products imports.

Distance between two trading countries plays a significant role in determining the volume of trade as it affects the transport cost of goods across nations (Iwanow & Kirkpatrick, 2007). India prefers to import forest products in bulk from neighboring countries such as Malaysia, Myanmar, Nepal, Bhutan, and Bangladesh (Mondal, 2015). However, as there are several other factors affecting trade other than distance, India also trades with more distant countries when necessary. During 2009-2013, about 399 million US $ worth of India's forest products imports came from the South American countries such as Cuba, Peru, Bolivia, Ecuador, and Argentina (FAOSTAT, 2013).

Table 4 Selected List of Partner Countries from Which India Imports Forest Products

| IMPORT, HIGHEST | DISTANCE, FARTHEST | DISTANCE, NEAREST | FOREST AREA, LARGEST | GDP, HIGHEST | GDP, LOWEST |
|---|---|---|---|---|---|
| USA | Chile | Nepal | Russia | USA | Syrian Arab Republic |
| Malaysia | Peru | Pakistan | Brazil | China | Korea |
| Myanmar | Bolivia | Bhutan | Canada | Japan | New Caledonia |
| China | Ecuador | Bangladesh | USA | Germany | Cuba |
| Canada | Argentina | Myanmar | China | France | Barbados |

Source: World Bank, 2015 and FAOSTAT, 2013

The size of a country's economy often has a significant effect on the respective country's trade performance. It is often not clear whether trade influences the size of economy or vice versa. However, an increase in the size of an economy inhibits a country's capacity to respond to the outside market that affects trade (Tinbergen, 1962). In addition

more trade helps in the growth of a country's economy. The size of an economy is typically represented by GDP and population.

This thesis examines forest products and the forest area of partner countries along with GDP of trade partners. The United States, China, Japan, Germany, Russia, Canada and Brazil are few of the large economies from which India import forest products. The US, France, China, Germany, and Japan are large in terms of total GDP whereas Russia, Brazil and Canada have vast areas covered by forest. There are also a few relatively small forest products exporting economies from which India import forest products such as Syrian Arab Republic, New Caledonia, Korea, Cuba and Barbados.

Table 5 Overview of Indian Economy in 2015

| **INDIA in 2015** | |
|---|---|
| **GDP** | **2.3 trillion US $** |
| **GDP Growth Rate** | **7.5 percent** |
| **Population** | **1.2 billion** |
| **Population Growth Rate** | **1.24 percent** |
| **Forest Area** | **0.69 million Sq. km** |
| **Regulatory Quality** | **-0.47** |
| **Exchange Rate** | **0.016 US $** |

Source: (WorldBank, 2015) and (FAOSTAT, 2013)

India's current GDP is about 2.3 trillion US $ (IMF, 2015) and has a population of 1.2 billion (Worldometers, 2015). The total area covered by forest in India is 0.6 million square kilometers (FAOSTAT, 2013). India being a fastest growing economy, has a huge demand and represents a potential market of forest products in the world. Table-5 gives an overview of India's current economic situation.

India imports forest products from many countries (belonging to the seven regions) across the world, such as East Asia and Pacific, Europe & Central Asia, Latin America &

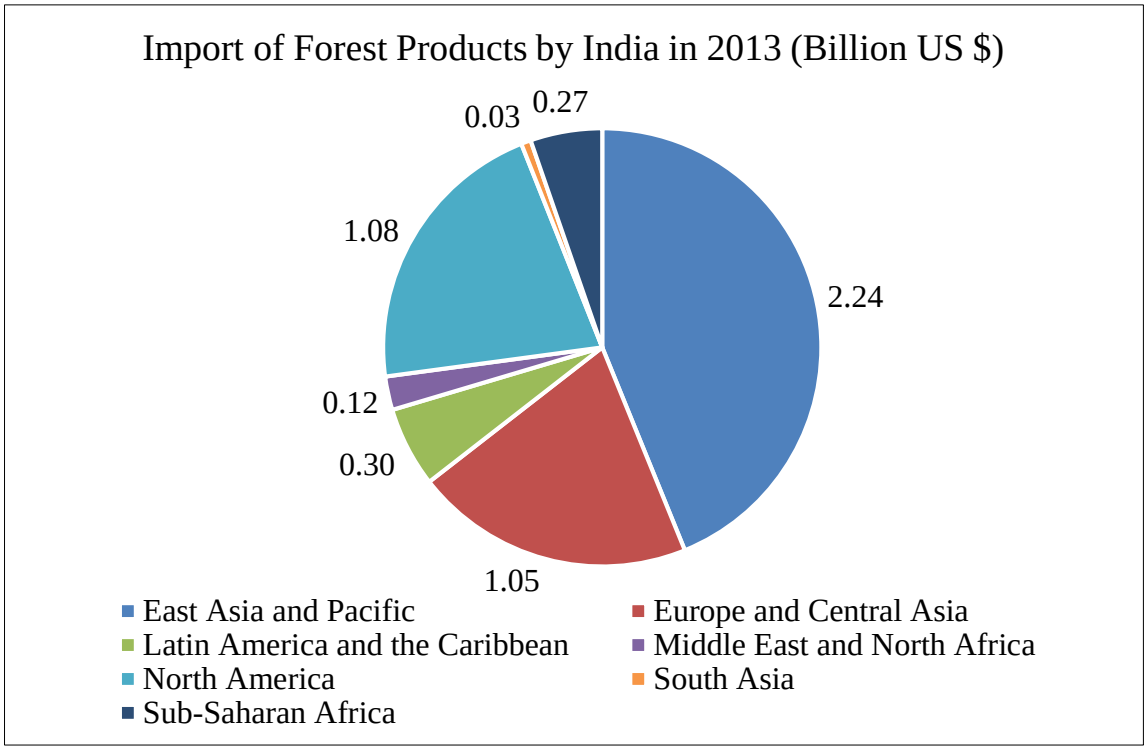



Figure 7 Region-wise Share of Import of Forest Products by India in 2013
Source: FAOSTAT, 2013

the Caribbean, Middle East & North Africa, North America, South Asia and, Sub-Saharan Africa. East Asia and Pacific, North America and, Europe & Central Asian countries accounts for a large share of forest products import by India. Fig-7 shows a region-wise share of forest products import by India during 2013. Out of 5.4 billion US $ worth of forest products import by India in 2013, about 2.24 billion worth of imports came from the East Asia and Pacific countries such as Myanmar, China, Malaysia and Thailand. About 1.08 billion US $ worth of Import came from North American countries, the US and Canada, and about 1.05 billion US $ worth of imports came from Europe and Central Asia countries such as Turkey, Germany, Sweden and Russia.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Trade Facilitation

The surge in imports of forest products in India during the last decade has occurred due to several reasons. Researchers have studied different issues that lead to a shift in patterns of trade across different countries. Trade facilitation is being discussed extensively to help address the issues of changes in volume of trade. Trade facilitation is a simplification of trade. It is the modernization and standardization of trade procedures so that it gets easier to exchange goods and services across countries. The use of advanced technology, reduction of transaction cost, implementation of proper rules and regulations associated with trade and transparency of financial institutions and relatively less rigidity of the bureaucracy of a country may lead to trade facilitation (Grainger, 2007). Transaction costs in trade can be scaled down by regulating and administering custom laws and trade policies, and correctly implementing they lower cross-border transport cost of goods and services (Staples, 2002). Thus, trade facilitation forms an important part in determining the volume of trade across countries by reducing transaction costs that indirectly reflect the status of governance of the trading partners.

In addition to the aforesaid factors, there are several other factors such as improvement of the institutional quality, scientific innovations and technological development such as e-governance can integrate the domestic market at the global level so that there is more efficient exchange in terms of volume of goods among trading partners (Kimberley, 2007).

## 2.2 Effect of Institutional Quality on Trade

From the previous discussion we suggest that an improvement in institutional quality plays a significant role in integrating the domestic market to supply chains at the global level. This development helps in simplifying trade in terms of the exchange of total volume of goods and services among trading partners (Iwanow & Kirkpatrick, 2007). Institutional quality refers to institutional reforms in a country. It consists of six different aspects that represent perceived instances of policies that determine proper functioning of the domestic market and links with the international markets. The six elements that constitute institutional quality are the rule of law, voice and accountability, government effectiveness, control of corruption, political stability and, regulatory quality (Kaufmann, Kraay, & Mastruzzi, 2007). It is quite evident that an improvement in the institutional quality would decrease the transaction cost and streamline trade across countries is indisputable. A low level of institutional quality restricts a country's ability to respond to global import/ export markets. For example, the developing and the underdeveloped countries of the South with low institutional quality have low access and exposure to import and export markets in the North. A low level of institutional quality restricts a country's economic capacity to respond to the current growing market (Francois & Manchin, 2006).

Out of the six aspects of institutional quality, we study the effect of regulatory quality on forest products imports by India. Regulatory quality mainly focusses on policy implementation and reflects the functioning of the governance that helps in integrating and simplifying trade across countries (Iwanow & Kirkpatrick, 2007).

## 2.3 Effect of Regulatory Quality on Trade

Regulatory quality enhances the volume of trade between countries and helps in economic growth. It identifies smooth functioning of a business, banking and labor market flexibility (Freund & Bolaky, 2006). (Banerjee, 1997) and (Guriev, 2004) have said that there are several factors such as corruption and poor institutions that determines the level of regulation and governance of trading countries, mentioned in (Breen & Gillanders, 2010). (Iwanow & Kirkpatrick, 2007) have studied the effect of regulatory quality on exports in the manufacturing sector and found that regulatory quality has a significant positive effect on improved export performance. They have quantified the effect of regulatory quality on the total volume of exports in the manufacturing sector. Their results that they have obtained, showed that a 10 percent increase in the value of regulatory quality among all the exporting countries increases the export of manufacturing sector by nearly 10 percent keeping other things constant. It is important and interesting to know the effect of regulatory quality on the volume of import of forest products by India from all the 143 partner countries that export forest products to India.

# CHAPTER 3: PROBLEM STATEMENT AND OBJECTIVE

## 3.1 Problem Statement

The volume of forest products imported by India has escalated dramatically over the last two decades. In order to demonstrate the factors affecting such changing trends in exports and imports across different sectors, researchers have discussed the influence of institutional quality and regulatory quality (an aspect of institutional quality that considers the functioning of governance of a country). They have mentioned that an improvement in regulatory quality of the trading countries, not only influences trade, it also improves the quality and quantity of related goods and services that are being traded (Iwanow & Kirkpatrick, 2007) and (Freund & Bolaky, 2006). This thesis studies the effect of Regulatory Quality on imports of forest products. India, being a growing market for most goods and services from different sectors, is considered as one of the most important potential among the existing market for forest products.

## 3.2 Objective

The objective of the thesis is to study the effect of regulatory quality on forest products import by India.

# CHAPTER 4: RESEARCH HYPOTHESIS AND METHODOLOGY

## 4.1 Regulatory Quality

Regulatory Quality is a part of functioning of the governance that is defined as the ability of the government to form rules and regulations and properly implement them in order to promote and permit private sector development (WGI, 2013). It has an index ranging from -2.5 (weak) to 2.5 (strong) representing governance performance.

In this thesis, Regulatory Quality is the main explanatory variable to study its effect on forest products imports in India. The value of regulatory quality in each country is obtained by combining around 31 different surveys and assessments from sources such as African Development Bank Country Policy and Institutional Assessments (ADB), Afrobarometer (AFR), Asian Development Bank Country Policy and Institutional Assessments (ASD), Business Enterprise Environment Survey (BPS) and European Bank for Reconstruction and Development Transition Report (EBR) etc., (a list of the surveying organizations are given in (Appendix 1) . While constructing the index for regulatory quality, a diverse group of representative and non-representative sources are surveyed, and their perception regarding the quality of various aspects of governance in the country is recorded. Regulatory quality includes assessment of a country's performance provided by different sources in regards to price control, administered prices, investment freedom, trade policies and the business regulatory environment. Each of the surveys receives a different weight, depending on the coverage and its effect on Governance. The relevant areas considered and questions asked by data sources (surveys and expert opinions) that form a part of Regulatory Quality Index are broadly categorized into two sections, representative sources and non-representative sources.

The representative sources consider the authority's performance on price controls, discriminatory tariffs, discriminatory taxes and unfair competitive practices as well as rigidity in government regulations and, the burden of taxation and excessive protection. Other aspects associated with the functioning and prevalence of the trade barriers and trade regulations, stringency of environment regulations, intensity of local competition, the effectiveness of antitrust policies, and the ease of starting a new business are considered in the survey. The extent to which there are financial freedom, investment freedom, availability of state subsidies on necessary goods for the start-up of a business such as petrol prices and the share of administered prices are considered in the process. Finally the ease of setting up a subsidiary for a foreign firm and the ease of starting a business governed by local law are considered under the non-representative sources while conducting the survey for quantifying the value of regulatory quality (WorldBank, 2014).

The non-representative sources consider the effectiveness of the government in assuring less rigidity of the bureaucratic rules, check on corruption and transparency at the authoritative level. Firstly, it looks into the extent to which there are problems in tax regulations, custom and trade regulations, and labor regulations for the growth of business in the country. Secondly, it considers the extent to which price control is affecting prices of products in industries, over protectionism is affecting business, and competition legislations are preventing unfair competition in the country. Thirdly, non-representative sources consider the easy access to foreign and domestic capital markets and doing other business activities. Lastly, it considers whether or not the financial institutions' transparency is widely developed in the country, the custom authorities facilitate efficient transition of goods and services, the legal entity is harming the country's performance in

competitive market, foreign investors are free to invest in the domestic market, whether the foreign bidders have sufficient access to public sector contracts, real personal taxes are non-distortionary, real corporate taxes are non-distortionary, banking regulations hinder competitiveness, and whether the labor regulations hinder business activities in the country.

Table- 6 shows a list of regulatory quality values of five large economies and five relatively smaller economies from which India import forest products. It is to be noted that India has a regulatory quality value of -0.47. (A full list of regulatory quality values can be found in appendix v.

Table 6 Partner Country Regulatory Quality Values in 2013

| COUNTRIES WITH LARGE SHARE OF IMPORT | REGULATORY QUALITY | COUNTRIES WITH RELATIVELY SMALLER SHARE OF IMPORT | REGULATORY QUALITY |
|---|---|---|---|
| USA | 1.26 | Jamaica | 0.23 |
| Malaysia | 0.62 | Barbados | 0.43 |
| Myanmar | -1.51 | Democratic Republic of the Congo | -1.28 |
| China | -0.31 | Zimbabwe | -1.8 |
| Canada | 1.71 | Slovakia | 0.91 |

Source: (WorldBank, 2014)

### 4.2 Hypothesis and Data

We estimates a model taking five-year panel data running from 2009-2013 for 143 partner countries from which India import forest products. The dataset contains around 722 observations and 11 variables. The values of all the variables are log-linearized in the model. The total value of Import (in current US $) data is taken from Food and Agricultural Organizations of the United Nations dataset. The variables such as forest area, GDP and

population are included in the model as a proxy for the market size of a country's economy from the World Governance Indicators dataset. (Anderson & Wincoop, 2003) says that trade between two countries is affected by trade cost. Moreover, the distance between the two nations is the most important determinant of the trade cost. According to their study, there is an inverse relationship of trade cost and the log distance between two partner countries. We take the distance variable from their study.

Gross Domestic Product (GDP) and population are also incorporated in the model as a representative of the size of a country's economy. The data for real GDP (calculated in current US $) and the population has been taken from the World Development Indicators dataset published by the World Bank. The larger the GDP, the higher will be the volume of forest products trade between the partner country and India. Therefore, the coefficient of the logarithm of GDP is expected to be positive. Moreover, there is a positive relationship between the population of the countries and demand of the commodities. So, the coefficient of the logarithm of population of India is expected to be positive. However, the reverse is true for the coefficient of the logarithm of the population of partner country as more goods will be consumed by the domestic population and less left to be exported. So it is expected to be negative. Similarly, the coefficient of the forest area of partner country is expected to have a positive sign as it is assumed that the larger the forest area implies in more availability of resources for trade.

### 4.3 Methodology and Model

The thesis estimates the model with panel data of 5 years from 2009-2013 for 143 partner countries from which India import forest products. The regression equation takes the following form:

$$Y_{ijt} = \beta_0 + \beta_1 \text{ REGQ\_PAR}_{jt} + \beta_2 \text{ REGQ\_IND}_t + \beta_3 \text{ GDP\_IND}_t + \beta_4 \text{ GDP\_PAR}_{jt} + \beta_5 \text{ POP\_PAR}_{jt} + \beta_6 \text{ POP\_IND}_t + \beta_7 \text{ DIST}_{ij} + \beta_8 \text{ FOR\_PAR}_{jt} + \epsilon_{ijt} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,

i and j are the trading partners, and t denotes time, which is (2009 – 2013). Here "i" is fixed that is India and "j" is each of the 143 partner countries that export forest products to India.

- $Y_{ijt}$ denotes the value of total Forest Products imports to India from country j at time t.
- $\text{REGQ\_IN}_t$ and $\text{REGQ\_PAR}_{jt}$ denote the Regulatory Quality variable of India and country j respectively at time t.
- $\text{GDP\_IND}_t$ and $\text{GDP\_PAR}_{jt}$ are the real GDPs of India and country j respectively at time t.
- $\text{POP\_IND}_t$ and $\text{POP\_PAR}_{jt}$ denote the population of India and country j respectively at time t.
- $\text{DIST}_{ij}$ is the distance between the capital city of India (New Delhi) and the capital city of country j.
- $\text{FOR\_PAR}_{jt}$ is the total forest area of country j at time t.
- $\epsilon_{ijt}$ is the error term.

The dependent variable $Y_{ijt}$ estimates the total value of forest products import by India from all the 143 partner countries during 2009-2013. The values of import are obtained from FAO STAT, 2015 dataset. $\text{REGQ\_PAR}_{jt}$ that is the regulatory quality of partner country is the main variable of the study. The variable is taken from Kaufmann et al. (2007) dataset. The values are obtained from the World Bank, 2014. Other explanatory variables such as regulatory quality of India, GDP and population (the size of the

economies) of partner countries and India, distance between the trading countries and, forest area etc., are incorporated in the model as other explanatory variables in order to minimize the omitted variable bias.

All the variables are linearized by taking logarithms on both sides of the equation and in order to ensure compatibility among all the variables in the model the regulatory quality index is rescaled by shifting its mean from "0" to "10". In this case, the value of regulatory quality ranges from 7.5 to 12.5, where 7.5 denotes weak governance and 12.5 denotes strong governance of a country. A pooled regression is used to analyze the effect of regulatory quality on forest products import by India initially. Later to make the model robust, we have incorporated the region dummy in the model and accounted for the region specific unobserved factors affecting trade.

The World Bank has classified all countries across the globe into seven groups on the basis of their respective geographical locations. They are East Asia and Pacific, Europe & Central Asia, Latin America & the Caribbean, Middle East & North Africa, North America, South Asia and, Sub-Saharan Africa. Further analysis is done by including the region dummy in the model in order to give an insight on the regional variability on forest products import by India. This checks for the region specific unobserved variables affecting forest products import by India and makes the model more robust by reducing the omitted variable bias further (Cameron & Trivedi, 2009). Taking East Asia and Pacific as the base region the following Feasible Generalized Least Squared (FGLS) regression is performed. The model now takes the following form,

$$Y_{ijt} = \beta_0 + \beta_1 \text{REGQ\_PAR}_{jt} + \beta_2 \text{REGQ\_IND}_t + \beta_3 \text{GDP\_IND}_t + \beta_4 \text{GDP\_PAR}_{jt} +$$

$$\beta_5 \text{POP\_PAR}_{jt} + \beta_6 \text{POP\_IND}_t + \beta_7 \text{DIST}_{ij} + \beta_8 \text{FOR\_PAR}_{jt} + \beta_9 \text{REGION\_2}_j +$$

$\beta_{10}$ REGION_$3_j$ + $\beta_{11}$ REGION_$4_j$ + $\beta_{12}$ REGION_$5_j$ + $\beta_{13}$ REGION_$6_j$ +

$\beta_{14}$ REGION_$7_j$ + $\epsilon_{ijt}$ …….. (2)

Where,

All the subscripts and the other variables of equation (2) are same as equation (1) before, but there are additions of region dummy variables in the later. East Asia and Pacific has been taken as the base region and an FGLS (Feasible Generalized Least Square) regression is performed.

- REGION_$2_j$ denotes "Europe and Central Asia" is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise.
- REGION_$3_j$ denotes "Latin America & the Caribbean" is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise.
- REGION_$4_j$ denotes "Middle East & North Africa" is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise.
- REGION_$5_j$ denotes "North America" is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise.
- REGION_$6_j$ denotes "South Asia" is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise.
- REGION_$7_j$ denotes "Sub-Saharan Africa" is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise.

# CHAPTER 5: RESULTS AND DATA ANALYSIS

The thesis examines the effect of partner country's Regulatory Quality on forest products imports to India. As discussed in Chapter 4, imports is the dependent variable and the Regulatory Quality is the main independent variable. A review of the summary statistic of all variables used in the model is shown in table- 7. The first column gives the mean of the variables used in the model. The second column gives the standard deviation from the average value of each variable. The third and the fourth column gives the minimum and maximum values respectively, of the variables considered in the dataset.

Table 7 Summary Statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **Import of Forest Products by India (Million US $)** | **143** | **37.69** | **100** | **.004** | **775** |
| **Regulatory Quality of Partner Country** | **142** | **0.005** | **1.02** | **-2.52** | **1.90** |
| **Regulatory Quality of India** | **5** | **-0.39** | **0.07** | **-0.47** | **-0.30** |
| **Distance between India and Partner Country (km.)** | **143** | **7,510.14** | **4,186.01** | **800** | **16,909** |
| **GDP of Partner Country (Trillion US $)** | **141** | **0.47** | **1.59** | **0.00019** | **16.8** |
| **GDP of India (Trillion US $)** | **5** | **1.73** | **0.18** | **1.37** | **1.88** |
| **Population of Partner Country (Billion)** | **143** | **0.03** | **0.11** | **0.00017** | **1.36** |
| **Population of India (Billion)** | **5** | **1.22** | **0.02** | **1.19** | **1.25** |
| **Forest Area of Partner Country (sq. km.)** | **137** | **266,254.6** | **908,859.30** | **0** | **8,092,100** |

Source: FAOSTAT, 2013

Regulatory quality being the main variable, it is important to know the distribution of partner country's regulatory quality before fitting it into a regression model. Figure- 8 shows a Kernel density graph of the values of partner country's regulatory quality during 2009-2013 from the dataset. The values of partner country's regulatory quality have a uni-modal distributional pattern.

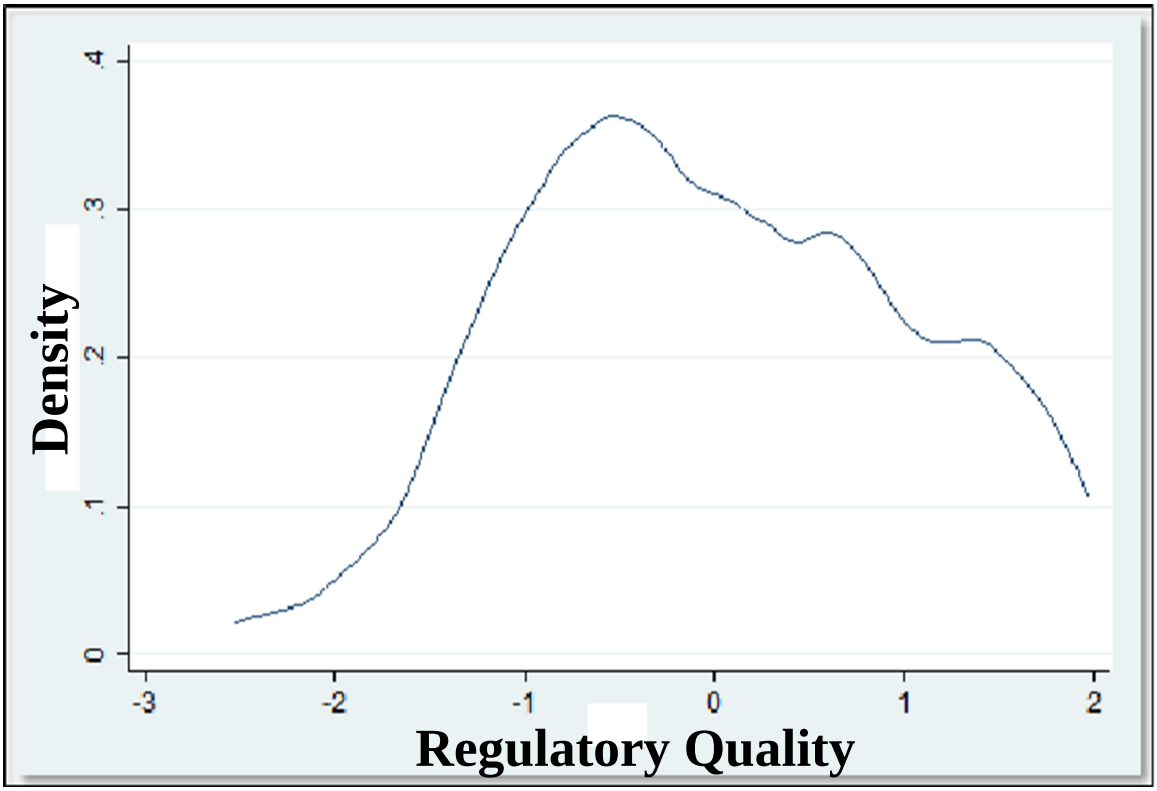



Figure 8 Distribution of Partner Country's Regulatory Quality (2009-2013)
Source: FAOSTAT, 2013

Before going into the detailed analysis of the results, we have given a closer look at the variations in regulatory quality of India and few of the important trading partners during 2009-2013. Fig-6 shows the trend in regulatory quality of India during 2009-2013. It is seen that in India, there is a declining regulatory environment over the years from -0.30 in 2009 to -0.47 in 2013.

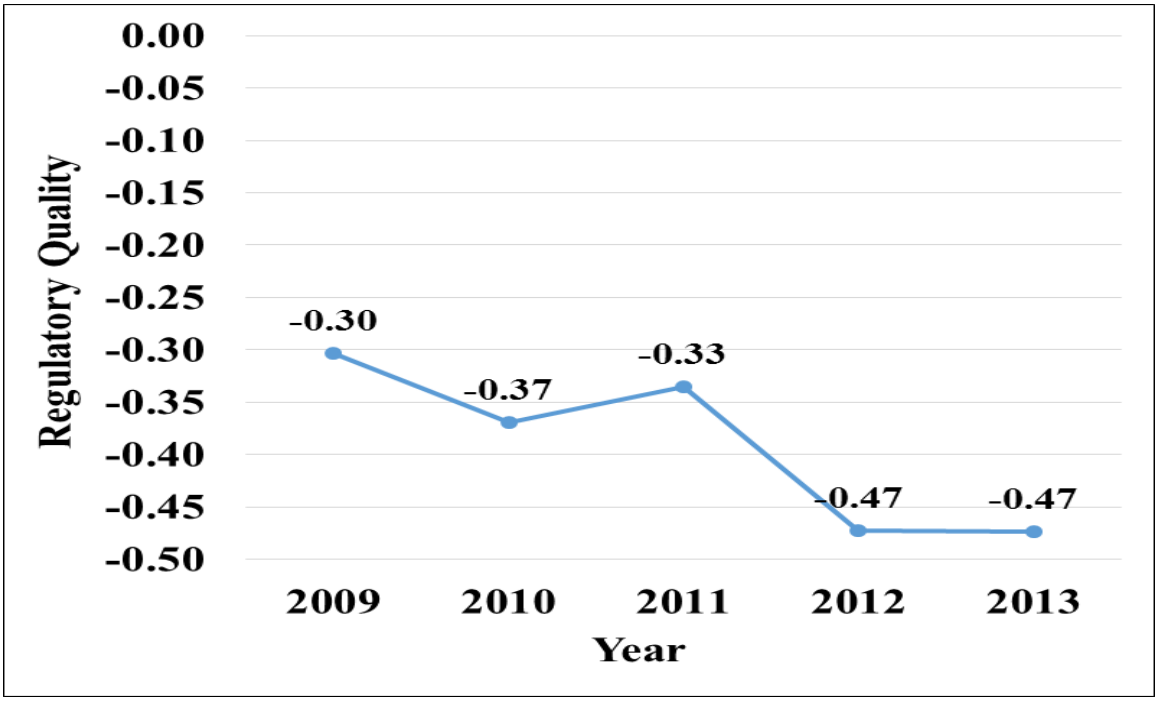
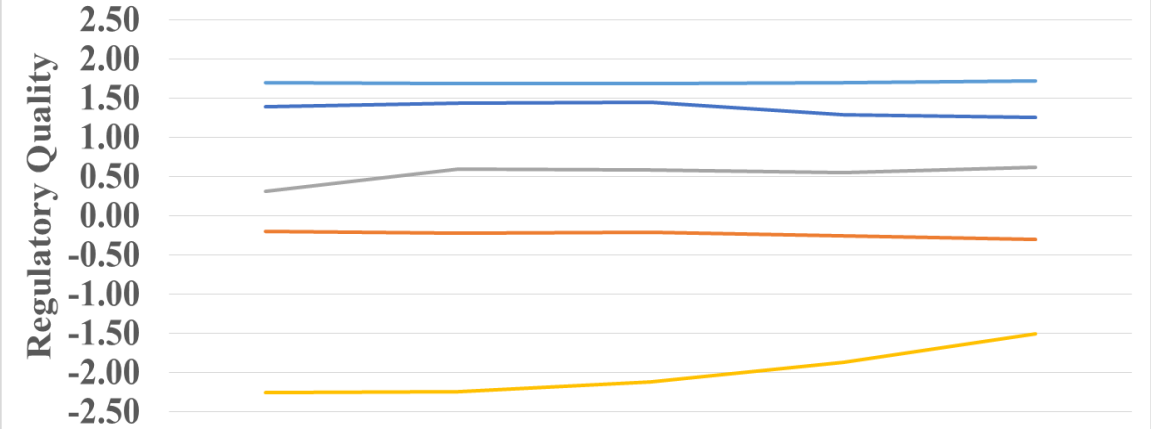



Figure 9 Trend in Regulatory Quality of India (2009-2013)
Source: FAOSTAT, 2013

USA, China, Canada, Myanmar and Malaysia are few important trading partners of India. Forest products import by India from these countries were high during 2009-2013. Figure- 10 shows, a trend in the regulatory environment in these countries during this time. To study the effect of Regulatory Quality on forest products import in India, we have done a pooled regression analysis. Pooled analysis is an analysis that uses a combination of cross-sectional and time series data (Podestà, 2000). Our data has repeated observations of years (2009-2013) of each of 143 partner countries that export forest products to India. It means that in the pooled arrays of data has combined the cross-sectional data of 143 countries for 5 years to produce a data set of (143 x 5) observations, in this case. The model considered in the study is a random effect model as the unobserved variables are strongly independent of the observed variables (Williams, 2015).




| | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|
| Canada | 1.70 | 1.69 | 1.68 | 1.69 | 1.71 |
| China | -0.20 | -0.22 | -0.21 | -0.26 | -0.31 |
| Malaysia | 0.31 | 0.59 | 0.59 | 0.55 | 0.62 |
| Myanmar | -2.25 | -2.25 | -2.13 | -1.87 | -1.51 |
| USA | 1.39 | 1.43 | 1.45 | 1.29 | 1.26 |

Figure 10 Trend of Partner Country's Regulatory Quality (2009-2013)
Source: FAOSTAT, 2013

**5.1 Robustness**

To check the robustness of the model, first we have checked the presence of heterogeneity in the model and multicollinearity among the variables. Heteroskedasticity

Table 8 Breusch-Pagan test of Heteroskedasticity

| Breusch-Pagan / Cook-Weisberg test for heteroskedasticity |
|---|
| H0 : There is no Heteroskedasticity in the model<br>H1: There is Heteroskedasticity in the model |
| chi2(7) = 31.80 |
| Prob > chi2 = 0.0000 |

occurs when the variance of the error terms differ across observations. It is mostly observed in cross-sectional data. A pooled regression analysis will not give an appropriate result in the presence of heteroskedasticity in the dataset. One of the fundamental assumptions for

Table 9 Pairwise Correlation among the Variables

| | Import | GDP of Partner Country | GDP of India | Forest Area of Partner Country | Regulatory Quality of India | Regulatory Quality of Partner Country | Population of Partner Country | Population of India | Distance |
|---|---|---|---|---|---|---|---|---|---|
| Import | 1 | | | | | | | | |
| GDP of Partner Country | 0.550 | 1 | | | | | | | |
| GDP of India | 0.09<br>0.02 | 0.05<br>0.18 | 1 | | | | | | |
| Forest Area of Partner Country | 0.26<br>0 | 0.31<br>0 | -0.002<br>0.9527 | 1 | | | | | |
| Regulatory Quality of India | -0.06<br>0.12 | -0.04<br>0.23 | -0.69<br>0 | 0.004<br>0.92 | 1 | | | | |
| Regulatory Quality of Partner Country | 0.35<br>0 | 0.49<br>0 | -0.005<br>0.89 | -0.18<br>0 | 0.008<br>0.82 | 1 | | | |
| Population of Partner Country | 0.36<br>0 | 0.68<br>0 | 0.01<br>0.77 | 0.55<br>0 | -0.01<br>0.76 | -0.10<br>0.00 | 1 | | |
| Population of India | 0.08<br>0.03 | 0.05<br>0.15 | 0.84<br>0 | 0.92 | -0.90<br>0 | 0.83 | 0.01<br>0.73 | 1 | |
| Distance | -0.06<br>0.10 | -0.12<br>0.001 | 0<br>1 | 0.24<br>0 | 0<br>1 | 0.07<br>0.04 | -0.18<br>0 | 0<br>1 | 1 |

Source: FAOSTAT, 2013

using regression analysis is that the model is homoscedastic. We have checked the presence of Heteroskedasticity by performing the Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity. Table- 8 shows that results of Breusch-Pagan test. As the p-value is less than 0.05, we reject the null hypothesis and claim that there is heterogeneity in the model. So we need to remove this heterogeneity. For this, we have run a pooled OLS

Heteroskedasticity-robust regression and later a random effect GLS Heteroskedasticity-robust regression analysis to ensure the robustness of the results.

The next step is to check the presence of multicollinearity among the independent variables in the model. Table- 9 shows the pairwise correlations among all the variables along with their respective level of significance. It is seen that none of the variables have very high correlation coefficients with the other. This implies that the model do not suffer from multicollinearity problem. The first row of each variable gives the value of correlation coefficients and the second low gives the p-value or the level of significance of the respective pairwise correlations between the variables.

### 5.2 Explanation of the Regression Results

At first a pooled Ordinary Least Squared (OLS) regression is run to study the effect of regulatory quality and other variable on forest products import by India. The estimation results of applying the pooled regression model described in detail in Chapter 4 are presented in Table- 10.

Results indicate that both partner country's regulatory quality and the size of their economies have significant effects on trade. Institutional quality, represented by regulatory quality in the model, positively affects the volume of forest products imported from India. A one percent improvement in regulatory quality of the partner country would yield a 7.17 percent increase in imports of forest products to India. The scale of regulatory quality index is subtle (- 2.5 to + 2.5), while a one percent increase seems small in absolute terms, it would have a huge impact and could only be attained by drastic changes in governance and rigidity of the existing rules and regulations. Thus, it has a large effect on the volume of forest products imported to India. Also, a one percent increase in distance between India

Table 10 Pooled Ordinary Least Squares (OLS) Regression Result

| | Import of Forest Products | Std. Err | Directionality |
|---|---|---|---|
| **Regulatory Quality of Partner Country** | **7.1*** ** | **1.7** | **Consistent With the Hypothesis** |
| **Regulatory Quality of India** | **24.9** | **29.8** | **Consistent With the Hypothesis** |
| **GDP of Partner Country** | **0.4*** ** | **0.1** | **Consistent With the Hypothesis** |
| **GDP of India** | **2.04** | **1.9** | **Consistent With the Hypothesis** |
| **Population of Partner Country** | **-0.1** | **0.1** | **Consistent With the Hypothesis** |
| **Population of India** | **11.3** | **23.1** | **Consistent With the Hypothesis** |
| **Distance** | **-0.5** ** | **0.1** | **Consistent With the Hypothesis** |
| **Total Forest Area of Partner Country** | **0.2*** ** | **0.05** | **Consistent With the Hypothesis** |
| **Constant** | **-369.9** | | |
| **N** | **456** | | |
| **R-squared** | **0.3** | | |

**$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$**

and the trading country yields a 0.53 percent decrease in total volume of imports, whereas a one percent increase in forest area of a partner country and a one percent increase in GDP

of a partner country yield an increase in forest products imported to India by 0.25 percent and 0.46 percent, respectively. All the results above are significant at the one percent level, but the variable distance is significant at a five percent level.

Table 11 Pooled Ordinary Least Squares (OLS) Heteroskedasticity Robust with Cluster, Distance

| | **Import of Forest Products** | **Std. Err** | **Directionality** |
|---|---|---|---|
| **Regulatory Quality of Partner country** | **7.1**** | **3.1** | |
| **Regulatory Quality of India** | **24.9*** | **14.2** | **Consistent With the Hypothesis** |
| **Distance** | **-0.5*** | **0.3** | **Consistent With the Hypothesis** |
| **Forest Area of Partner Country** | **0.2***** | **0.09** | |
| **GDP of India** | **2.04***** | **0.9** | |
| **GDP of Partner Country** | **0.4**** | **0.2** | |
| **Population of India** | **11.4** | **12.08** | **Consistent With the Hypothesis** |
| **Population of Partner Country** | **-0.05** | **0.2** | **Consistent With the Hypothesis** |
| **Constant** | **-369.9** | **258.7** | |
| **N** | **456** | | |
| **R-squared** | **0.3** | | |

**$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$**

While the regulatory quality of exporting countries and other variables have substantial positive impacts on forest products trade, the regulatory quality of India itself and the other factors do not have significant impacts on trade. However, coefficients associated with these variables are consistent with the hypothesis that was obtained from existing literature. An R-squared value of 0.36 tells that 36 percent of the variation in the value of forest products imported by India can be explained by the regulatory quality variable and other explanatory variables in the model. Considering the statistical significance of our results, it can be inferred that an improvement in the regulatory quality, or the functioning of the governance, of partner countries, could have a significant effect on the volume of trade between countries.

As in this model the errors are independent of the proximity of the countries and errors are heteroskedastic, to make it more robust we have done a cluster analysis and ran a pooled OLS heteroskedasticity-robust analysis rather than only pooled OLS (Cameron & Trivedi, 2009). Here we have formed the cluster by distance and ran the regression to get a better result by removing heterogeneity from the model. The new results are shown in Table- 11. In this table as the standard error is adjusted across 125 clusters in the distance the values of the standard errors of the variables have decreased signifying an improvement in the analysis of the model.

Further robustness in the model was checked in several other ways in the study. For that we first declared that the data is panel. Then we ran "Panel Ordinary Least Squares (OLS) Heteroskedasticity Robust Model" and "FGLS- Feasible Generalized Least Squares" to get a more precise result. This makes the model more robust and finally with these we can confirm that all the problems in our data can be omitted and the result is more

precise than the earlier ones. The result given by Random effect GLS heteroskedasticity robust test is shown in table- 12.

Table 12 Panel Ordinary Least Squares (OLS) Heteroskedasticity Robust Model

| | **Import of Forest Products** | **Std. Err** | **Directionality** |
|---|---|---|---|
| **Regulatory Quality of Partner country** | **8.01*** ** | **2.7** | **Consistent With the Hypothesis** |
| **Regulatory Quality of India** | **38.9*** ** | **10.1** | **Consistent With the Hypothesis** |
| **Distance** | **-0.5*** | **0.3** | **Consistent With the Hypothesis** |
| **Forest Area of Partner Country** | **0.2*** ** | **0.09** | **Consistent With the Hypothesis** |
| **GDP of India** | **1.6** ** | **0.8** | **Consistent With the Hypothesis** |
| **GDP of Partner Country** | **0.4*** ** | **0.2** | **Consistent With the Hypothesis** |
| **Population of India** | **26.3** ** | **9.6** | **Consistent With the Hypothesis** |
| **Population of Partner Country** | **-0.04** | **0.2** | **Consistent With the Hypothesis** |
| **Constant** | **-706.2** | **200.8** | |
| **N** | **456** | | |
| **Number of Groups** | **126** | | |
| **R-squared** | **0.35** | | |
| **Wald chi2(8)** | **229.2** | | |

**$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$**

As mentioned the FGLS regression results are shown in table- 13.

Table 13 Feasible Generalized Least Squares (FGLS) Regression Result

| | Import of Forest Products | Std. Err | Directionality |
|---|---|---|---|
| **Regulatory Quality of Partner country** | **8.1*** ** | **2.8** | **Consistent With the Hypothesis** |
| **Regulatory Quality of India** | **38.1*** ** | **10.06** | **Consistent With the Hypothesis** |
| **Distance** | **-0.5*** | **0.3** | **Consistent With the Hypothesis** |
| **Forest Area of Partner Country** | **0.2*** ** | **0.09** | **Consistent With the Hypothesis** |
| **GDP of India** | **1.6** ** | **0.8** | **Consistent With the Hypothesis** |
| **GDP of Partner Country** | **0.4*** ** | **0.2** | **Consistent With the Hypothesis** |
| **Population of India** | **25.6*** ** | **9.5** | **Consistent With the Hypothesis** |
| **Population of Partner Country** | **-0.04** | **0.2** | **Consistent With the Hypothesis** |
| **Constant** | **-690.06** | **197.9** | |
| **N** | **456** | | |
| **Number of Groups** | **126** | | |
| **Wald chi2(8)** | **234.5** | | |

**$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$**

As shown in Table- 6 earlier, the values of regulatory quality varies significantly across different countries. Further robustness is ensured by studying the region wise variation in the regulatory quality values. The World Bank has classified all countries into

Table 14 Pooled Ordinary Least Squares (OLS) Regression Using Regional Variability

| | Import of Forest Products | Std. Err | Directionality |
|---|---|---|---|
| **Regulatory Quality of Partner country** | **6.1*** ** | **2.2** | **Consistent With the Hypothesis** |
| **Regulatory Quality of India** | **22.9** | **27.2** | **Consistent With the Hypothesis** |
| **Distance** | **-0.6**** | **0.3** | **Consistent With the Hypothesis** |
| **Forest Area of Partner Country** | **0.2*** ** | **0.06** | **Consistent With the Hypothesis** |
| **GDP of India** | **1.9** | **1.8** | **Consistent With the Hypothesis** |
| **GDP of Partner Country** | **0.7*** ** | **0.1** | **Consistent With the Hypothesis** |
| **Population of India** | **10.08** | **19.9** | **Consistent With the Hypothesis** |
| **Population of Partner Country** | **-0.4*** ** | **0.1** | **Consistent With the Hypothesis** |
| **Europe & Central Asia** | **-2.1*** ** | **0.3** | |
| **Latin America & the Caribbean** | **-1.4*** ** | **0.5** | |
| **Middle East & North Africa** | **-1.4*** ** | **0.4** | |
| **North America** | **0.1** | **0.4** | |
| **South Asia** | **-1.2**** | **0.6** | |
| **Sub-Saharan Africa** | **-0.2** | **0.4** | |
| **Constant** | **-333.2** | **426.08** | |
| **N** | **456** | | |
| **R-squared** | **0.4** | | |

**$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$**

seven groups on the basis of their respective geographical locations. They are East Asia and Pacific, Europe & Central Asia, Latin America & the Caribbean, Middle East & North Africa, North America, South Asia and, Sub-Saharan Africa. We have performed further analysis by including the region dummy in the model in order to give an insight on the regional variability in the effect of regulatory quality on forest products import by India. This checks for the region specific unobserved variables affecting forest products import by India and makes the model more robust by reducing the omitted variable bias further. Taking East Asia and Pacific as the base region the following Pooled (OLS) regression result is obtained as shown in Table- 14.

From the regression result, it could be inferred that East Asia and Pacific, Europe & Central Asia, Latin America & the Caribbean, Middle East & North Africa and, South Asia have significant effect on forest products import by India. The impact of forest products import by India from the Europe and Central Asian countries is about 2.1 percent less than the impact by the countries belonging to the East Asia and Pacific region. Latin American and the Caribbean countries and the Middle East & North African countries have 1.47 percent lesser effect of forest products import by India compared to East Asian and Pacific regional countries, Whereas the South Asian countries have 1.24 percent lesser effect on forest products import by India compared to the East Asia and Pacific region countries. But North American countries' impact on forest products import by India though not significant, but its direction is 0.14 percent more than that of East Asia and Pacific regional countries. Similarly Sub-Saharan African countries do not have a significant impact on India's forest products import compared to the East Asian and Pacific regional countries.

By incorporating the regional dummy in the model, the estimation becomes more accurate as it reduced the omitted variable bias further by considering the effect of region

Table 15 Feasible Generalized Least Squares (FGLS) regression using Regional Variability

| | Import of Forest Products | Std. Err | Directionality |
|---|---|---|---|
| **Regulatory Quality of Partner country** | **6.79**** | **3.09** | **Consistent With the Hypothesis** |
| **Regulatory Quality of India** | **37.01***** | **10.17** | **Consistent With the Hypothesis** |
| **Distance** | **-0.42** | **0.49** | **Consistent With the Hypothesis** |
| **Forest Cover of Partner Country** | **0.23**** | **0.11** | **Consistent With the Hypothesis** |
| **GDP of India** | **1.64**** | **0.81** | **Consistent With the Hypothesis** |
| **GDP of Partner Country** | **0.68***** | **0.2** | **Consistent With the Hypothesis** |
| **Population of India** | **24.26***** | **9.54** | **Consistent With the Hypothesis** |
| **Population of Partner Country** | **-0.34*** | **0.2** | **Consistent With the Hypothesis** |
| **East Asia and Pacific** | **Base Region** | | |
| **Europe & Central Asia** | **-2.10***** | **0.63** | |
| **Latin America & the Caribbean** | **-1.96***** | **0.9** | |
| **Middle East & North Africa** | **-1.53***** | **0.7** | |
| **North America** | **0.05** | **0.8** | |
| **South Asia** | **-1.28**** | **1.2** | |
| **Sub-Saharan Africa** | **-0.83** | **0.8** | |
| **Constant** | **-654.26** | **199.6** | |
| **N** | **456** | | |
| **Wald chi2(14)** | **1335.92** | | |

**$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$**

specific unobserved variables on forest products import by India. So here we can see that a one percent change in the regulatory quality value of the partner countries, the forest product imports by India increases by about 6.10 percent which is different from the result we had obtained from the model before incorporating the regional variability dummy. Also a one percent increase in forest area of partner country increases the volume of import by 0.24 percent now and a one percent increase in GDP of partner country increases the import by 0.75 percent. Distance shows a significant negative effect as before, but now a one percent increase in distance decreases the value of forest products import of India by 0.6 percent instead of 0.5 percent as before. This change in the coefficients have occurred by increasing the explanatory variables in the model and hence ensuring the robustness of the model. Similarly, another Table- 15 shows a more robust Feasible Generalized Least Squares (FGLS) regression using region dummy.

### 5.3 Hypothesis Testing

Regression results are consistent with the hypothesis. The regulatory quality of partner countries has a significant positive effect on the volume of forest products import by India. Similarly, Gross Domestic Product (GDP) of partner countries, distance between the partner countries and India, and, forest area of partner countries have significant positive, negative, and positive effects, respectively, on the value of forest products import by India. The variables described above are significant at the 1 percent level, but distance is significant at 5 percent level. Although the coefficients of the other explanatory variables in the model, such as regulatory quality of India, GDP of India, population of India, and population of partner countries, do not have a significant effects on the volume of forest products imported by India, their directions (positive or negative) are consistent with the

hypothesis and the literature. There are 456 observations in total, and an R-squared value of 0.36 tells that 36 percent of the variation in the value of forest products imported by India can be explained by the regulatory quality variable and other explanatory variables in the model. Later while making the model more robust by taking cluster (distance) and declaring a panel data and then running FGLS regression we get the standard errors of each variables lesser than the previous analyses implying an improvement in the model. Also by incorporating the region dummy in the model the R-squared value has gone up to 0.42 from 0.36, which implies that 42 percent of the variation in the value of forest products import by India can be explained by the regulatory quality variable and other explanatory variables in the model now.

# CHAPTER 6: CONCLUSION AND DISCUSSION

## 6.1 Assessment of Influence of Regulatory Quality on Forest Products Trade

The purpose of this thesis has been to provide a quantitative assessment of the effect of regulatory quality on the import volume of forest products by India. The study suggests, using a pooled regression model and later by GLS regression and FGLS regression, that improvements in regulatory quality by partner countries could indeed play a significant role in increasing India's forest products imports. Changes in the functioning of governance in India and trade liberalization influence the demand for forest products by India. Due to large shifts in the growth rates of the economy and the population, India demands more forest products. Also, there are changes in partner countries' levels of regulatory quality over the years. Improvements in regulatory quality help reduce transaction costs and thus result in more trade between countries.

The regional effect on import of forests products by India gives an insight on the region specific contribution on forest products import by India. It supports the existing literature by characterizing the countries in terms of proximity with India, where the distant countries participate in relatively lesser volumes of trade with India than the nearer ones. Compared to East Asia and Pacific region, the Europe & Central Asia, Latin America & the Caribbean, Middle East & North Africa, South Asia and, Sub-Saharan Africa have relatively lower effects on forest products import by India. This can be attributed to the fact that East Asia and Pacific region countries are in close proximity with India geographically. As our results suggest that distance has a significant effect on trade as it affects the transaction costs to a large extend, the effects of distance on India's import by other countries belonging to the above mentioned regions are relatively less than East Asia and

Pacific regional countries. Latin America and Caribbean countries though have a significant effect on India's forest products import, but their impact is about 1.48 percent less than the impact by East Asia and Pacific region countries. Similarly Europe and Central Asia has 2.1 percent less, the Sub-Saharan African countries have 0.27 percent less and, the Middle East and North African countries have1.47 percent lesser impact than East Asia and Pacific regional countries on India's forest products import.

South Asian countries though are in close proximity with India, trades lesser forest products to India as compared to countries of the East Asia and Pacific region because the major components of forest products like lumber and wood products are abundant in the later. Three of the major partner countries Myanmar, Malaysia and China from which India imports forest products in bulk, lies in the East Asia and Pacific region. Thus our conclusion being consistent with the literature that distance between the trading countries, their regulatory environments and abundance of forest resources in the exporting countries, all play a cumulative significant role in the trade of forest products between India and rest of the world.

### 6.2 Assessment of Current Forest Products Trade in India

The volume of forest products imported by India is affected by the size of the economies of partner countries and the distance between the two countries also to governance or institutional quality of India. More distant countries trade lower volumes of goods than the neighboring countries. However, larger economies and higher levels of forest cover in the partner countries, the latter of which would be expected to produce larger volumes of forest products, are associated with more trade with India. Countries with these characteristics are thus in more advantageous competitive positions than other countries,

in terms of trade. Our results thus contributes to the existing literature on the factors affecting international trade of forest products in complementing the research by studying the impact of regulatory environment of the trading partners, Size of their economies and available forest resources and distance between them on enhancement of economic interactions.

### 6.3 Limitations of the Study

This thesis considers only India's forest products imports value. However, a descriptive study could be done on forest products, considering all the importing and exporting countries across the globe. More years could have been included to get a reflection of the trends in forest products trade over a longer time periods. More explanatory variables could be included to reduce the omitted variable bias from the model. The study considers aggregate forest products, so it fails to explain the sector-specific impacts of the factors affecting trade.

### 6.4 Future Research

This thesis studies aggregate forest products, which can be extended further by considering the disaggregated sectors, like wood products or timber. These would provide more specific knowledge about the factors affecting the trade of those sectors. Further studies considering both export and import of products in specific sectors could be done. More explanatory variables could be included in the model, to reduce the omitted variable bias, and, if sectors are considered separately, wood products- or timber industry-specific explanatory variables have to be considered.

# REFERENCES


Ahmed, M. F. (1997). In-Depth Country Study-India *Asia-Pacific Forestry Sector Outlook Study Working Paper Series*.

Anderson, J. E., & Wincoop, E. V. (2003). Gravity with Gravitas: A Solution to the Border Puzzle *The American Economic Review, 93*(1), 170-192.

Banerjee, A. V. (1997). A Theory of Misgovernance *The Quarterly Journal of Economics, 112*(4).

Breen, M., & Gillanders, R. (2010). Corruption, Institutions and Regulation. *Irish Society of New Economists conference 2010*.

Cameron, A. C., & Trivedi, P. K. (2009). *Microeconometrics Using Stata*

Dhanuraj, D., & Kumar, R. V. (2014). A Critical Assessment of Forest Legislations in India. *Centre for Public Policy Research*.

FAOSTAT. (2013). FAOSTAT.

Flynn, R. (2013). India's Forest Products Industry Outlook. from http://www.risiinfo.com/risi-store/do/product/detail/2013indias-forest-products-industry.html

Francois, J., & Manchin, M. (2006). Institutions, Infrastructure, and Trade. *Institue for International and Development Economics (IIDE) Discussion Papers*.

Freund, C., & Bolaky, B. (2006). TRADE, REGULATIONS, AND GROWTH. *Paper presented at the Trade and Growth Conference, Research Department, Hosted by the International Monetary Fund*.

FSI. (2013). India State of Forest Report 2013. *Forest Survey of India*.

Grainger, A. (2007). CUSTOMS AND TRADE FACILITATION: FROM CONCEPTS TO IMPLEMENTATION. *Worlds Custom journal, 2*(1).

Guriev, S. (2004). Red tape and corruption. *Journal of Development Economics, 73*(2), 489-504.

IMF. (2015). International Monetary Fund.

Iwanow, T., & Kirkpatrick, C. (2007). Trade Facilitation, Regulatory Quality and Export Performance. *Journal of International Development, 19*, 735-753.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2007). Governance Matters V: Aggregate and Individual Governance Indicators for 1996-2005

Kimberley, P. (2007). E-governance in trade facilitation: transparency and ICT as prerequisites for free and fair trade. 283-290.

Kishwan, J., Pandey, R., & Dadhwal, V. (2009). India's Forest and Tree Cover: Contribution as a Carbon Sink. *INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION*.

Kumar, K. S. K., Viswanathan, B., & I, Z. B. (2013). *ESTIMATION AND FORECAST OF WOOD DEMAND AND SUPPLY IN TAMILANDU*.

Malik, D. P., & Dhanda, S. (2003). *Status, Trends and Demand For Forest Products In India*. Retrieved from http://www.fao.org/docrep/ARTICLE/WFC/XII/0228-B1.HTM

Mondal, P. (2015). Forest Resources in India: Use, Over Exploitation, Causes and Effects. from http://www.yourarticlelibrary.com/environment/forest/forest-resources-in-india-use-over-exploitation-causes-and-effects/28196/

Podestà, F. (2000). RECENT DEVELOPMENTS IN QUANTITATIVE COMPARATIVE METHODOLOGY: THE CASE OF POOLED TIME SERIES CROSS-SECTION ANALYSIS. *DSS PAPERS SOC 3-02*.

Staples, B. (2002). Trade facilitation: improving the invisible infrastructure *In Development, Trade and the WTO: A Handbook, Hoekman B, Mattoo A, English P (eds). World Bank: Washington DC.*

Tinbergen. (1962). Shaping the world economy: Suggestions for an international economics policy, The Twentieth Century Fund, New York.

WGI. (2013). World Governance Indicators Report. *World Bank*.

Williams, R. (2015). Panel Data 4: Fixed Effects vs Random Effects Models. *https://www3.nd.edu/~rwilliam/stats3/Panel04-FixedVsRandom.pdf*.

WorldBank. (2014). World Bank Report. *World Bank*.

WorldBank. (2015). World Bank Data.

Worldometers. (2015). Worldometers.

# APPENDIX I

| Forest product includes the following: |
| --- |
| Round wood, fuel wood, saw logs, veneer logs, pulpwood, wood charcoal, wood chips, wood residues, wood pellets, sawn wood, veneer sheets, wood based panels, plywood, particle board, strand board, fireboard, hardboard, wood pulp, papers, carton board and paperboards etc. |

# APPENDIX II

| Code | Data Source Name |
|---|---|
| ADB | African Development Bank Country Policy and Institutional Assessments |
| AFR | Afrobarometer |
| ASD | Asian Development Bank Country Policy and Institutional Assessments |
| BPS | Business Enterprise Environment Survey |
| BTI | Bertelsmann Transformation Index |
| CCR | Freedom House Countries at the Crossroads |
| EBR | European Bank for Reconstruction and Development Transition Report |
| EIU | Economist Intelligence Unit Riskwire & Democracy Index |
| FRH | Freedom House |
| GCB | Transparency International Global Corruption Barometer Survey |
| GCS | World Economic Forum Global Competitiveness Report |
| GII | Global Integrity Index |
| GWP | Gallup World Poll |
| HER | Heritage Foundation Index of Economic Freedom |
| HUM | Cingranelli Richards Human Rights Database and Political Terror Scale |
| IFD | IFAD Rural Sector Performance Assessments |
| IJT | iJET Country Security Risk Ratings |
| IPD | Institutional Profiles Database |
| IRP | IREEP African Electoral Index |
| LBO | Latinobarometro |
| MSI | International Research and Exchanges Board Media Sustainability Index |
| OBI | International Budget Project Open Budget Index |
| PIA | World Bank Country Policy and Institutional Assessments |
| PRC | Political Economic Risk Consultancy Corruption in Asia Survey |
| PRS | Political Risk Services International Country Risk Guide |
| RSF | Reporters Without Borders Press Freedom Index |
| TPR | US State Department Trafficking in People report |
| VAB | Vanderbilt University Americas Barometer |
| WCY | Institute for Management and Development World Competitiveness Yearbook |
| WJP | World Justice Project Rule of Law Index |
| WMO | Global Insight Business Conditions and Risk Indicators |

# APPENDIX III

| List of Countries from which India Import Forest Products | | | | |
|---|---|---|---|---|
| Algeria | Croatia | Iceland | Nepal | Sri Lanka |
| Angola | Cuba | Indonesia | Netherlands | Sudan |
| Argentina | Cyprus | Iran (Islamic Republic of) | New Caledonia | Suriname |
| Australia | Czech Republic | Iraq | New Zealand | Sweden |
| Austria | Democratic People's Republic of Korea | Ireland | Nicaragua | Switzerland |
| Bahamas | Democratic Republic of the Congo | Israel | Nigeria | Syrian Arab Republic |
| Bahrain | Denmark | Italy | Norway | Thailand |
| Bangladesh | Dominican Republic | Jamaica | Oman | Togo |
| Barbados | Ecuador | Japan | Pakistan | Trinidad and Tobago |
| Belarus | Egypt | Jordan | Panama | Tunisia |
| Belgium | El Salvador | Kazakhstan | Papua New Guinea | Turkey |
| Belize | Equatorial Guinea | Kenya | Paraguay | Uganda |
| Benin | Eritrea | Kuwait | Peru | Ukraine |
| Bhutan | Estonia | Lao People's Democratic Republic | Philippines | United Arab Emirates |
| Bolivia | Ethiopia | Latvia | Poland | United Kingdom |
| Bosnia and Herzegovina | Finland | Lebanon | Portugal | United Republic of Tanzania |
| Brazil | France | Liberia | Qatar | Georgia |
| Bulgaria | Gabon | Libya | Luxembourg | Uruguay |
| Burkina Faso | Gambia | Lithuania | Romania | Uzbekistan |
| Central African Republic | United States of America | Republic of Korea | Russian Federation | Venezuela (Bolivarian Republic of) |
| Cameroon | Germany | Madagascar | Sao Tome and Principe | Viet Nam |
| Canada | Ghana | Malawi | Saudi Arabia | Zambia |
| Cambodia | Greece | Malaysia | Senegal | Zimbabwe |
| Chad | Guatemala | Malta | Sierra Leone | Costa Rica |
| Chile | Guinea | Mauritania | Singapore | Côte d'Ivoire |
| China | Guinea-Bissau | Mauritius | Slovakia | Honduras |
| Colombia | Guyana | Mexico | Slovenia | Hungary |
| Congo | Haiti | Morocco | Solomon Islands | Mozambique |
| | Myanmar | Spain | South Africa | |

# APPENDIX IV

Region-wise Classification of Countries by the World Bank

| East Asia and Pacific | |
|---|---|
| American Samoa | Myanmar |
| Cambodia | Palau |
| China | Papua New Guinea |
| Fiji | Philippines |
| Indonesia | Samoa |
| Kiribati | Solomon Islands |
| Korea, Dem. Rep. | Thailand |
| Lao PDR | Timor-Leste |
| Malaysia | Tonga |
| Marshall Islands | Tuvalu |
| Micronesia, Fed. Sts. | Vanuatu |
| Mongolia | Vietnam |

| Europe and Central Asia | |
|---|---|
| Kosovo | United Kingdom |
| Albania | Georgia |
| Andorra | Greece |
| Armenia | Greenland |
| Austria | Croatia |
| Azerbaijan | Hungary |
| Belgium | Isle of Man |
| Bulgaria | Ireland |
| Bosnia and Herzegovina | Iceland |
| Belarus | Italy |
| Switzerland | Kazakhstan |
| Channel Islands | Kyrgyz Republic |
| Cyprus | Liechtenstein |
| Czech Republic | Lithuania |
| Germany | Luxembourg |
| Denmark | Latvia |
| Spain | Monaco |
| Estonia | Moldova |
| Finland | Macedonia, FYR |

| | |
|---|---|
| France | Montenegro |
| Faeroe Islands | Netherlands |
| Slovak Republic | Norway |
| Slovenia | Poland |
| Sweden | Portugal |
| Tajikistan | Romania |
| Turkmenistan | Russian Federation |
| Turkey | San Marino |
| Ukraine | Serbia |
| Uzbekistan | |

| North America | |
|---|---|
| Bermuda | Canada |
| United States of America | |

| Middle East and North Africa | |
|---|---|
| Algeria | Libya |
| Djibouti | Morocco |
| Egypt, Arab Rep. | Syrian Arab Republic |
| Iran, Islamic Rep. | Tunisia |
| Iraq | West Bank and Gaza |
| Jordan | Yemen, Rep. |
| Lebanon | |

| Sub-Saharan Africa | |
|---|---|
| Angola | Malawi |
| Benin | Mali |
| Botswana | Mauritania |
| Burkina Faso | Mauritius |
| Burundi | Mozambique |
| Cabo Verde | Namibia |
| Cameroon | Niger |
| Central African Republic | Nigeria |

| | |
|---|---|
| Chad | Rwanda |
| Comoros | Sao Tome and Principe |
| Congo, Dem. Rep. | Senegal |
| Congo, Rep. | Seychelles |
| Cote d'Ivoire | Sierra Leone |
| Eritrea | Somalia |
| Ethiopia | South Africa |
| Gabon | South Sudan |
| Gambia, The | Sudan |
| Ghana | Swaziland |
| Guinea | Tanzania |
| Guinea-Bissau | Togo |
| Kenya | Uganda |
| Lesotho | Zambia |
| Liberia | Zimbabwe |
| Madagascar | |

| Latin American and Caribbean | |
|---|---|
| Costa Rica | Nicaragua |
| Cuba | Panama |
| Dominica | Paraguay |
| Dominican Republic | Peru |
| Ecuador | St. Lucia |
| El Salvador | St. Vincent and the Grenadines |
| Grenada | Suriname |
| Guatemala | Venezuela, RB |
| Colombia | Mexico |
| Argentina | Guyana |
| Belize | Haiti |
| Bolivia | Honduras |
| Brazil | Jamaica |

| South Asia | |
|---|---|
| Afghanistan | Maldives |
| Bangladesh | Nepal |
| Bhutan | Pakistan |
| India | Sri Lanka |

# APPENDIX V

| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
|---|---|---|---|---|---|---|
| 2009 | Algeria | -1.07 | Barbados | 0.53 | Brazil | 0.11 |
| 2010 | Algeria | -1.17 | Barbados | 0.45 | Brazil | 0.16 |
| 2011 | Algeria | -1.19 | Barbados | 0.60 | Brazil | 0.18 |
| 2012 | Algeria | -1.29 | Barbados | 0.42 | Brazil | 0.09 |
| 2013 | Algeria | -1.19 | Barbados | 0.43 | Brazil | 0.07 |
| 2009 | Angola | -1.02 | Belarus | -1.15 | Bulgaria | 0.66 |
| 2010 | Angola | -1.02 | Belarus | -1.16 | Bulgaria | 0.64 |
| 2011 | Angola | -1.08 | Belarus | -1.21 | Bulgaria | 0.54 |
| 2012 | Angola | -0.98 | Belarus | -1.10 | Bulgaria | 0.54 |
| 2013 | Angola | -1.05 | Belarus | -1.09 | Bulgaria | 0.52 |
| 2009 | Argentina | -0.85 | Belgium | 1.32 | Burkina Faso | -0.09 |
| 2010 | Argentina | -0.76 | Belgium | 1.29 | Burkina Faso | -0.14 |
| 2011 | Argentina | -0.72 | Belgium | 1.24 | Burkina Faso | -0.16 |
| 2012 | Argentina | -0.96 | Belgium | 1.22 | Burkina Faso | -0.12 |
| 2013 | Argentina | -0.99 | Belgium | 1.29 | Burkina Faso | -0.17 |
| 2009 | Australia | 1.82 | Belize | -0.47 | Cambodia | -0.47 |
| 2010 | Australia | 1.69 | Belize | -0.45 | Cambodia | -0.46 |
| 2011 | Australia | 1.85 | Belize | -0.54 | Cambodia | -0.57 |
| 2012 | Australia | 1.77 | Belize | -0.48 | Cambodia | -0.35 |
| 2013 | Australia | 1.79 | Belize | -0.49 | Cambodia | -0.35 |
| 2009 | Austria | 1.46 | Benin | -0.33 | Cameroon | -0.74 |
| 2010 | Austria | 1.47 | Benin | -0.32 | Cameroon | -0.73 |
| 2011 | Austria | 1.39 | Benin | -0.33 | Cameroon | -0.79 |
| 2012 | Austria | 1.51 | Benin | -0.39 | Cameroon | -0.93 |
| 2013 | Austria | 1.48 | Benin | -0.42 | Cameroon | -0.93 |
| 2009 | Bahamas | 0.76 | Bhutan | -1.10 | Canada | 1.70 |
| 2010 | Bahamas | 0.52 | Bhutan | -1.19 | Canada | 1.69 |
| 2011 | Bahamas | 0.49 | Bhutan | -1.18 | Canada | 1.68 |
| 2012 | Bahamas | 0.36 | Bhutan | -1.12 | Canada | 1.69 |
| 2013 | Bahamas | 0.16 | Bhutan | -1.10 | Canada | 1.71 |
| 2009 | Bahrain | 0.71 | Bolivia | -0.86 | Central African Republic | -1.25 |
| 2010 | Bahrain | 0.73 | Bolivia | -0.79 | Central African Republic | -1.15 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2011 | Bahrain | 0.74 | Bolivia | -0.74 | Central African Republic | -1.18 |
| 2012 | Bahrain | 0.69 | Bolivia | -0.83 | Central African Republic | -1.09 |
| 2013 | Bahrain | 0.60 | Bolivia | -0.79 | Central African Republic | -1.13 |
| 2009 | Bangladesh | -0.85 | Bosnia and Herzegovina | -0.10 | Chad | -1.04 |
| 2010 | Bangladesh | -0.83 | Bosnia and Herzegovina | -0.10 | Chad | -1.06 |
| 2011 | Bangladesh | -0.80 | Bosnia and Herzegovina | -0.04 | Chad | -1.01 |
| 2012 | Bangladesh | -0.96 | Bosnia and Herzegovina | -0.06 | Chad | -1.08 |
| 2013 | Bangladesh | -0.93 | Bosnia and Herzegovina | -0.08 | Chad | -1.02 |

| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
|---|---|---|---|---|---|---|
| 2009 | Chile | 1.48 | Cyprus | 1.37 | Jamaica | 0.28 |
| 2010 | Chile | 1.46 | Cyprus | 1.43 | Jamaica | 0.28 |
| 2011 | Chile | 1.48 | Cyprus | 1.24 | Jamaica | 0.30 |
| 2012 | Chile | 1.54 | Cyprus | 1.12 | Jamaica | 0.23 |
| 2013 | Chile | 1.48 | Cyprus | 0.91 | Jamaica | 0.23 |
| 2009 | China | -0.20 | Czech Republic | 1.33 | Japan | 1.09 |
| 2010 | China | -0.22 | Czech Republic | 1.30 | Japan | 1.03 |
| 2011 | China | -0.21 | Czech Republic | 1.21 | Japan | 1.08 |
| 2012 | China | -0.26 | Czech Republic | 1.06 | Japan | 1.12 |
| 2013 | China | -0.31 | Czech Republic | 1.09 | Japan | 1.10 |
| 2009 | Colombia | 0.15 | Democratic People's Republic of Korea | -2.40 | Jordan | 0.31 |
| 2010 | Colombia | 0.26 | Democratic People's Republic of Korea | -2.45 | Jordan | 0.25 |
| 2011 | Colombia | 0.37 | Democratic People's Republic of Korea | -2.46 | Jordan | 0.30 |
| 2012 | Colombia | 0.39 | Democratic People's Republic of Korea | -2.53 | Jordan | 0.18 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2013 | Colombia | 0.39 | Democratic People's Republic of Korea | -2.52 | Jordan | 0.11 |
| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
| 2009 | Congo | -1.28 | Democratic Republic of the Congo | -1.53 | Kazakhstan | -0.32 |
| 2010 | Congo | -1.27 | Democratic Republic of the Congo | -1.58 | Kazakhstan | -0.34 |
| 2011 | Congo | -1.26 | Democratic Republic of the Congo | -1.52 | Kazakhstan | -0.26 |
| 2012 | Congo | -1.38 | Democratic Republic of the Congo | -1.51 | Kazakhstan | -0.39 |
| 2013 | Congo | -1.36 | Democratic Republic of the Congo | -1.28 | Kazakhstan | -0.38 |
| 2009 | Costa Rica | 0.46 | Denmark | 1.90 | Kenya | -0.13 |
| 2010 | Costa Rica | 0.50 | Denmark | 1.88 | Kenya | -0.07 |
| 2011 | Costa Rica | 0.45 | Denmark | 1.91 | Kenya | -0.21 |
| 2012 | Costa Rica | 0.57 | Denmark | 1.79 | Kenya | -0.31 |
| 2013 | Costa Rica | 0.58 | Denmark | 1.80 | Kenya | -0.35 |
| 2009 | Côte d'Ivoire | -0.95 | Dominican Republic | -0.19 | Kuwait | 0.16 |
| 2010 | Côte d'Ivoire | -0.91 | Dominican Republic | -0.15 | Kuwait | 0.17 |
| 2011 | Côte d'Ivoire | -0.86 | Dominican Republic | -0.19 | Kuwait | 0.09 |

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|---|---|---|---|---|---|---|
| 2012 | Côte d'Ivoire | -0.77 | Dominican Republic | -0.14 | Kuwait | -0.05 |
| 2013 | Côte d'Ivoire | -0.73 | Dominican Republic | -0.11 | Kuwait | -0.09 |
| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
| 2009 | Croatia | 0.55 | Ecuador | -1.28 | Lao People's Democratic Republic | -1.06 |
| 2010 | Croatia | 0.55 | Ecuador | -1.16 | Lao People's Democratic Republic | -1.01 |
| 2011 | Croatia | 0.52 | Ecuador | -1.02 | Lao People's Democratic Republic | -0.97 |
| 2012 | Croatia | 0.44 | Ecuador | -1.04 | Lao People's Democratic Republic | -0.84 |
| 2013 | Croatia | 0.44 | Ecuador | -0.94 | Lao People's Democratic Republic | -0.85 |
| 2009 | Cuba | -1.63 | Egypt | -0.19 | | |
| 2010 | Cuba | -1.69 | Egypt | -0.16 | | |
| 2011 | Cuba | -1.65 | Egypt | -0.33 | | |
| 2012 | Cuba | -1.60 | Egypt | -0.49 | | |
| 2013 | Cuba | -1.62 | Egypt | -0.70 | | |

| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
|---|---|---|---|---|---|---|
| 2009 | El Salvador | 0.35 | Georgia | 0.52 | Honduras | -0.26 |
| 2010 | El Salvador | 0.38 | Georgia | 0.59 | Honduras | -0.21 |
| 2011 | El Salvador | 0.49 | Georgia | 0.65 | Honduras | -0.12 |
| 2012 | El Salvador | 0.32 | Georgia | 0.68 | Honduras | -0.20 |
| 2013 | El Salvador | 0.31 | Georgia | 0.74 | Honduras | -0.20 |
| 2009 | Equatorial Guinea | -1.28 | Germany | 1.53 | Hungary | 1.08 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2010 | Equatorial Guinea | -1.38 | Germany | 1.58 | Hungary | 1.02 |
| 2011 | Equatorial Guinea | -1.34 | Germany | 1.56 | Hungary | 1.03 |
| 2012 | Equatorial Guinea | -1.42 | Germany | 1.53 | Hungary | 0.97 |
| 2013 | Equatorial Guinea | -1.44 | Germany | 1.55 | Hungary | 0.89 |
| 2009 | Eritrea | -2.26 | Ghana | 0.09 | Iceland | 1.00 |
| 2010 | Eritrea | -2.25 | Ghana | 0.12 | Iceland | 0.88 |
| 2011 | Eritrea | -2.22 | Ghana | 0.13 | Iceland | 1.01 |
| 2012 | Eritrea | -2.24 | Ghana | 0.12 | Iceland | 1.06 |
| 2013 | Eritrea | -2.23 | Ghana | 0.08 | Iceland | 1.09 |
| 2009 | Estonia | 1.41 | Greece | 0.82 | Indonesia | -0.33 |
| 2010 | Estonia | 1.40 | Greece | 0.64 | Indonesia | -0.39 |
| 2011 | Estonia | 1.39 | Greece | 0.51 | Indonesia | -0.33 |
| 2012 | Estonia | 1.40 | Greece | 0.50 | Indonesia | -0.28 |
| 2013 | Estonia | 1.43 | Greece | 0.62 | Indonesia | -0.20 |
| 2009 | Ethiopia | -0.92 | Guatemala | -0.12 | Iran (Islamic Republic of) | -1.73 |
| 2010 | Ethiopia | -0.85 | Guatemala | -0.13 | Iran (Islamic Republic of) | -1.70 |
| 2011 | Ethiopia | -0.99 | Guatemala | -0.11 | Iran (Islamic Republic of) | -1.51 |
| 2012 | Ethiopia | -1.07 | Guatemala | -0.18 | Iran (Islamic Republic of) | -1.43 |
| 2013 | Ethiopia | -1.13 | Guatemala | -0.21 | Iran (Islamic Republic of) | -1.50 |
| 2009 | Finland | 1.83 | Guinea | -1.13 | Iraq | -1.01 |
| 2010 | Finland | 1.89 | Guinea | -1.08 | Iraq | -1.05 |
| 2011 | Finland | 1.83 | Guinea | -1.00 | Iraq | -1.09 |
| 2012 | Finland | 1.82 | Guinea | -1.02 | Iraq | -1.27 |
| 2013 | Finland | 1.85 | Guinea | -1.01 | Iraq | -1.26 |
| 2009 | France | 1.21 | Guinea-Bissau | -1.18 | Ireland | 1.70 |
| 2010 | France | 1.31 | Guinea-Bissau | -1.14 | Ireland | 1.61 |
| 2011 | France | 1.15 | Guinea-Bissau | -1.12 | Ireland | 1.59 |
| 2012 | France | 1.11 | Guinea-Bissau | -1.24 | Ireland | 1.56 |
| 2013 | France | 1.15 | Guinea-Bissau | -1.30 | Ireland | 1.58 |
| 2009 | Gabon | -0.59 | Guyana | -0.60 | Israel | 1.11 |
| 2010 | Gabon | -0.57 | Guyana | -0.58 | Israel | 1.22 |
| 2011 | Gabon | -0.56 | Guyana | -0.66 | Israel | 1.32 |
| 2012 | Gabon | -0.51 | Guyana | -0.63 | Israel | 1.16 |
| 2013 | Gabon | -0.56 | Guyana | -0.62 | Israel | 1.16 |
| 2009 | Gambia | -0.32 | Haiti | -0.92 | Italy | 0.95 |

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|---|---|---|---|---|---|---|
| 2010 | Gambia | -0.38 | Haiti | -1.01 | Italy | 0.89 |
| 2011 | Gambia | -0.27 | Haiti | -1.04 | Italy | 0.71 |
| 2012 | Gambia | -0.23 | Haiti | -0.95 | Italy | 0.73 |
| 2013 | Gambia | -0.37 | Haiti | -0.95 | Italy | 0.77 |

| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
|---|---|---|---|---|---|---|
| 2009 | Latvia | 0.99 | Malaysia | 0.31 | Nepal | -0.70 |
| 2010 | Latvia | 0.99 | Malaysia | 0.59 | Nepal | -0.74 |
| 2011 | Latvia | 0.97 | Malaysia | 0.59 | Nepal | -0.72 |
| 2012 | Latvia | 1.00 | Malaysia | 0.55 | Nepal | -0.81 |
| 2013 | Latvia | 1.03 | Malaysia | 0.62 | Nepal | -0.87 |
| 2009 | Lebanon | -0.03 | Malta | 1.37 | Netherlands | 1.71 |
| 2010 | Lebanon | 0.08 | Malta | 1.43 | Netherlands | 1.74 |
| 2011 | Lebanon | -0.04 | Malta | 1.33 | Netherlands | 1.82 |
| 2012 | Lebanon | -0.12 | Malta | 1.31 | Netherlands | 1.75 |
| 2013 | Lebanon | -0.09 | Malta | 1.29 | Netherlands | 1.77 |
| 2009 | Liberia | -1.19 | Mauritania | -0.67 | New Caledonia | #N/A |
| 2010 | Liberia | -1.05 | Mauritania | -0.82 | New Caledonia | #N/A |
| 2011 | Liberia | -1.09 | Mauritania | -0.77 | New Caledonia | #N/A |
| 2012 | Liberia | -1.05 | Mauritania | -0.64 | New Caledonia | #N/A |
| 2013 | Liberia | -0.92 | Mauritania | -0.70 | New Caledonia | #N/A |
| 2009 | Libya | -1.13 | Mauritius | 0.87 | New Zealand | 1.83 |
| 2010 | Libya | -1.18 | Mauritius | 0.90 | New Zealand | 1.81 |
| 2011 | Libya | -1.54 | Mauritius | 0.85 | New Zealand | 1.97 |
| 2012 | Libya | -1.66 | Mauritius | 0.98 | New Zealand | 1.84 |
| 2013 | Libya | -1.83 | Mauritius | 0.94 | New Zealand | 1.81 |
| 2009 | Lithuania | 0.95 | Mexico | 0.23 | Nicaragua | -0.41 |
| 2010 | Lithuania | 0.97 | Mexico | 0.26 | Nicaragua | -0.26 |
| 2011 | Lithuania | 0.93 | Mexico | 0.29 | Nicaragua | -0.32 |

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|---|---|---|---|---|---|---|
| 2012 | Lithuania | 1.10 | Mexico | 0.47 | Nicaragua | -0.30 |
| 2013 | Lithuania | 1.13 | Mexico | 0.46 | Nicaragua | -0.30 |
| 2009 | Luxembourg | 1.66 | Morocco | -0.05 | Nigeria | -0.73 |
| 2010 | Luxembourg | 1.69 | Morocco | -0.07 | Nigeria | -0.71 |
| 2011 | Luxembourg | 1.86 | Morocco | -0.11 | Nigeria | -0.67 |
| 2012 | Luxembourg | 1.76 | Morocco | -0.09 | Nigeria | -0.72 |
| 2013 | Luxembourg | 1.76 | Morocco | -0.17 | Nigeria | -0.71 |
| 2009 | Madagascar | -0.50 | Mozambique | -0.39 | Norway | 1.47 |
| 2010 | Madagascar | -0.56 | Mozambique | -0.39 | Norway | 1.51 |
| 2011 | Madagascar | -0.52 | Mozambique | -0.42 | Norway | 1.60 |
| 2012 | Madagascar | -0.58 | Mozambique | -0.46 | Norway | 1.53 |
| 2013 | Madagascar | -0.67 | Mozambique | -0.41 | Norway | 1.65 |
| 2009 | Malawi | -0.44 | Myanmar | -2.25 | Oman | 0.54 |
| 2010 | Malawi | -0.58 | Myanmar | -2.25 | Oman | 0.46 |
| 2011 | Malawi | -0.70 | Myanmar | -2.13 | Oman | 0.34 |
| 2012 | Malawi | -0.71 | Myanmar | -1.87 | Oman | 0.47 |
| 2013 | Malawi | -0.68 | Myanmar | -1.51 | Oman | 0.47 |

| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
|---|---|---|---|---|---|---|
| 2009 | Pakistan | -0.55 | Qatar | 0.69 | Singapore | 1.80 |
| 2010 | Pakistan | -0.58 | Qatar | 0.61 | Singapore | 1.80 |
| 2011 | Pakistan | -0.63 | Qatar | 0.49 | Singapore | 1.80 |
| 2012 | Pakistan | -0.73 | Qatar | 0.80 | Singapore | 1.96 |
| 2013 | Pakistan | -0.71 | Qatar | 0.74 | Singapore | 1.96 |
| 2009 | Panama | 0.38 | Republic of Korea | 0.84 | Slovakia | 1.06 |
| 2010 | Panama | 0.38 | Republic of Korea | 0.94 | Slovakia | 1.00 |
| 2011 | Panama | 0.43 | Republic of Korea | 0.99 | Slovakia | 1.00 |
| 2012 | Panama | 0.39 | Republic of Korea | 0.89 | Slovakia | 1.03 |
| 2013 | Panama | 0.37 | Republic of Korea | 0.98 | Slovakia | 0.91 |
| 2009 | Papua New Guinea | -0.57 | Romania | 0.59 | Slovenia | 0.91 |

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|---|---|---|---|---|---|---|
| 2010 | Papua New Guinea | -0.56 | Romania | 0.64 | Slovenia | 0.75 |
| 2011 | Papua New Guinea | -0.51 | Romania | 0.66 | Slovenia | 0.68 |
| 2012 | Papua New Guinea | -0.52 | Romania | 0.54 | Slovenia | 0.61 |
| 2013 | Papua New Guinea | -0.52 | Romania | 0.59 | Slovenia | 0.61 |
| 2009 | Paraguay | -0.42 | Russian Federation | -0.35 | Solomon Islands | -1.22 |
| 2010 | Paraguay | -0.34 | Russian Federation | -0.37 | Solomon Islands | -1.21 |
| 2011 | Paraguay | -0.35 | Russian Federation | -0.36 | Solomon Islands | -1.07 |
| 2012 | Paraguay | -0.32 | Russian Federation | -0.36 | Solomon Islands | -1.07 |
| 2013 | Paraguay | -0.32 | Russian Federation | -0.37 | Solomon Islands | -1.13 |
| 2009 | Peru | 0.40 | Sao Tome and Principe | -0.76 | South Africa | 0.40 |
| 2010 | Peru | 0.46 | Sao Tome and Principe | -0.86 | South Africa | 0.36 |
| 2011 | Peru | 0.48 | Sao Tome and Principe | -0.74 | South Africa | 0.41 |
| 2012 | Peru | 0.49 | Sao Tome and Principe | -0.80 | South Africa | 0.38 |
| 2013 | Peru | 0.45 | Sao Tome and Principe | -0.81 | South Africa | 0.41 |
| 2009 | Philippines | -0.09 | Saudi Arabia | 0.18 | Spain | 1.18 |
| 2010 | Philippines | -0.22 | Saudi Arabia | 0.18 | Spain | 1.16 |
| 2011 | Philippines | -0.21 | Saudi Arabia | 0.03 | Spain | 1.07 |
| 2012 | Philippines | -0.06 | Saudi Arabia | 0.10 | Spain | 0.94 |
| 2013 | Philippines | -0.07 | Saudi Arabia | 0.08 | Spain | 0.93 |

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|---|---|---|---|---|---|---|
| 2009 | Poland | 0.95 | Senegal | -0.29 | Sri Lanka | -0.26 |
| 2010 | Poland | 0.99 | Senegal | -0.27 | Sri Lanka | -0.20 |
| 2011 | Poland | 0.94 | Senegal | -0.21 | Sri Lanka | -0.11 |
| 2012 | Poland | 0.96 | Senegal | -0.10 | Sri Lanka | -0.12 |
| 2013 | Poland | 1.05 | Senegal | -0.05 | Sri Lanka | -0.16 |
| 2009 | Portugal | 0.97 | Sierra Leone | -0.78 | Sudan | -1.25 |
| 2010 | Portugal | 0.72 | Sierra Leone | -0.72 | Sudan | -1.33 |
| 2011 | Portugal | 0.62 | Sierra Leone | -0.70 | Sudan | -1.30 |
| 2012 | Portugal | 0.81 | Sierra Leone | -0.71 | Sudan | -1.51 |
| 2013 | Portugal | 0.79 | Sierra Leone | -0.69 | Sudan | -1.44 |

| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
|---|---|---|---|---|---|---|
| 2009 | Suriname | -0.64 | Turkey | 0.30 | Uzbekistan | -1.49 |
| 2010 | Suriname | -0.69 | Turkey | 0.31 | Uzbekistan | -1.58 |
| 2011 | Suriname | -0.60 | Turkey | 0.38 | Uzbekistan | -1.58 |
| 2012 | Suriname | -0.38 | Turkey | 0.42 | Uzbekistan | -1.61 |
| 2013 | Suriname | -0.34 | Turkey | 0.42 | Uzbekistan | -1.63 |
| 2009 | Sweden | 1.67 | Uganda | -0.15 | Venezuela (Bolivarian Republic of) | -1.58 |
| 2010 | Sweden | 1.67 | Uganda | -0.15 | Venezuela (Bolivarian Republic of) | -1.61 |
| 2011 | Sweden | 1.91 | Uganda | -0.14 | Venezuela (Bolivarian Republic of) | -1.47 |
| 2012 | Sweden | 1.89 | Uganda | -0.24 | Venezuela (Bolivarian Republic of) | -1.54 |
| 2013 | Sweden | 1.89 | Uganda | -0.24 | Venezuela (Bolivarian Republic of) | -1.64 |

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|---|---|---|---|---|---|---|
| 2009 | Switzerland | 1.58 | Ukraine | -0.57 | Viet Nam | -0.62 |
| 2010 | Switzerland | 1.65 | Ukraine | -0.52 | Viet Nam | -0.61 |
| 2011 | Switzerland | 1.64 | Ukraine | -0.61 | Viet Nam | -0.59 |
| 2012 | Switzerland | 1.66 | Ukraine | -0.61 | Viet Nam | -0.68 |
| 2013 | Switzerland | 1.63 | Ukraine | -0.64 | Viet Nam | -0.65 |
| Year | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality | Partner Country | Regulatory Quality |
| 2009 | Syrian Arab Republic | -0.95 | United Arab Emirates | 0.47 | Zambia | -0.50 |
| 2010 | Syrian Arab Republic | -0.89 | United Arab Emirates | 0.34 | Zambia | -0.48 |
| 2011 | Syrian Arab Republic | -0.93 | United Arab Emirates | 0.47 | Zambia | -0.42 |
| 2012 | Syrian Arab Republic | -1.56 | United Arab Emirates | 0.67 | Zambia | -0.43 |
| 2013 | Syrian Arab Republic | -1.61 | United Arab Emirates | 0.78 | Zambia | -0.47 |
| 2009 | Thailand | 0.24 | United Kingdom | 1.59 | Zimbabwe | -2.10 |
| 2010 | Thailand | 0.19 | United Kingdom | 1.74 | Zimbabwe | -2.05 |
| 2011 | Thailand | 0.21 | United Kingdom | 1.66 | Zimbabwe | -1.92 |
| 2012 | Thailand | 0.23 | United Kingdom | 1.64 | Zimbabwe | -1.83 |
| 2013 | Thailand | 0.21 | United Kingdom | 1.77 | Zimbabwe | -1.80 |
| 2009 | Togo | -0.86 | United Republic of Tanzania | -0.42 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2010 | Togo | -0.87 | United Republic of Tanzania | -0.41 | | |
| 2011 | Togo | -1.00 | United Republic of Tanzania | -0.40 | | |
| 2012 | Togo | -0.86 | United Republic of Tanzania | -0.40 | | |
| 2013 | Togo | -0.95 | United Republic of Tanzania | -0.34 | | |
| 2009 | Trinidad and Tobago | 0.54 | United States of America | 1.39 | | |
| 2010 | Trinidad and Tobago | 0.50 | United States of America | 1.43 | | |
| 2011 | Trinidad and Tobago | 0.40 | United States of America | 1.45 | | |
| 2012 | Trinidad and Tobago | 0.22 | United States of America | 1.29 | | |
| 2013 | Trinidad and Tobago | 0.25 | United States of America | 1.26 | | |
| 2009 | Tunisia | 0.00 | Uruguay | 0.37 | | |
| 2010 | Tunisia | -0.02 | Uruguay | 0.38 | | |
| 2011 | Tunisia | -0.19 | Uruguay | 0.43 | | |
| 2012 | Tunisia | -0.21 | Uruguay | 0.40 | | |
| 2013 | Tunisia | -0.35 | Uruguay | 0.52 | | |

# APPENDIX VI

## List of Regression Tables

1. Pooled OLS

| limp | Coef. | Std. Err. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| | | | | | | |
| lREGQ_PA | 7.17168 | 1.72418 | 4.16 | 0 | 3.78316 | 10.5602 |
| lREGQ_IN | 24.9456 | 29.8007 | 0.84 | 0.403 | -33.621 | 83.5125 |
| ldist | -0.535 | 0.18601 | -2.88 | 0.004 | -0.9006 | -0.1694 |
| lforP | 0.25699 | 0.05405 | 4.76 | 0 | 0.15077 | 0.3632 |
| lgdpI | 2.04563 | 1.96377 | 1.04 | 0.298 | -1.8137 | 5.90499 |
| lgdpP | 0.46574 | 0.10918 | 4.27 | 0 | 0.25118 | 0.6803 |
| lpopI | 11.3915 | 23.1675 | 0.49 | 0.623 | -34.139 | 56.9223 |
| lpopP | -0.0523 | 0.13418 | -0.39 | 0.697 | -0.316 | 0.21144 |
| _cons | -369.9 | 493.807 | -0.75 | 0.454 | -1340.4 | 600.571 |

2. Pooled Regression Results with Cluster, Distance

| limp | Coef. | Robust Std. Err. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| | | | | | | |
| lREGQ_PA | 7.17168 | 3.13853 | 2.29 | 0.024 | 0.95965 | 13.3837 |
| lREGQ_IN | 24.9456 | 14.2517 | 1.75 | 0.083 | -3.2625 | 53.1537 |
| ldist | -0.535 | 0.34506 | -1.55 | 0.124 | -1.218 | 0.14798 |
| lforP | 0.25699 | 0.09257 | 2.78 | 0.006 | 0.07377 | 0.44021 |
| lgdpI | 2.04563 | 0.95505 | 2.14 | 0.034 | 0.15531 | 3.93594 |
| lgdpP | 0.46574 | 0.19794 | 2.35 | 0.02 | 0.07397 | 0.85751 |
| lpopI | 11.3915 | 12.0841 | 0.94 | 0.348 | -12.526 | 35.3093 |
| lpopP | -0.0523 | 0.25123 | -0.21 | 0.836 | -0.5495 | 0.44499 |
| _cons | -369.9 | 258.7 | -1.43 | 0.155 | -881.94 | 142.138 |

3. Random Effect GLS Heteroskedasticity Robust Model

| limp | Coef. | Robust Std. Err. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| | | | | | | |
| lREGQ_PA | 7.17168 | 3.13853 | 2.29 | 0.024 | 0.95965 | 13.3837 |
| lREGQ_IN | 24.9456 | 14.2517 | 1.75 | 0.083 | -3.2625 | 53.1537 |
| ldist | -0.535 | 0.34506 | -1.55 | 0.124 | -1.218 | 0.14798 |
| lforP | 0.25699 | 0.09257 | 2.78 | 0.006 | 0.07377 | 0.44021 |
| lgdpI | 2.04563 | 0.95505 | 2.14 | 0.034 | 0.15531 | 3.93594 |
| lgdpP | 0.46574 | 0.19794 | 2.35 | 0.02 | 0.07397 | 0.85751 |
| lpopI | 11.3915 | 12.0841 | 0.94 | 0.348 | -12.526 | 35.3093 |
| lpopP | -0.0523 | 0.25123 | -0.21 | 0.836 | -0.5495 | 0.44499 |
| _cons | -369.9 | 258.7 | -1.43 | 0.155 | -881.94 | 142.138 |

4. FGLS Regression Result

| limp | Coef. | Std. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| | | | | | | |
| lREGQ_PA | 8.12189 | 2.82429 | 2.88 | 0.004 | 2.58637 | 13.6574 |
| lREGQ_IN | 38.1016 | 10.0681 | 3.78 | 0 | 18.3685 | 57.8347 |
| ldist | -0.5764 | 0.35254 | -1.64 | 0.102 | -1.2674 | 0.11453 |
| lforP | 0.25904 | 0.096 | 2.7 | 0.007 | 0.07088 | 0.44719 |
| lgdpI | 1.6689 | 0.82104 | 2.03 | 0.042 | 0.05969 | 3.27811 |
| lgdpP | 0.46943 | 0.18592 | 2.52 | 0.012 | 0.10503 | 0.83383 |
| lpopI | 25.6725 | 9.49702 | 2.7 | 0.007 | 7.05865 | 44.2863 |
| lpopP | -0.0448 | 0.23907 | -0.19 | 0.851 | -0.5134 | 0.42374 |
| _cons | -690.06 | 197.95 | -3.49 | 0 | -1078 | -302.09 |

5. FGLS Regression Using Regional Variability

| limp | Coef. | Robust Std. | Err. | t | P>t | [95% Conf. Interval |
|---|---|---|---|---|---|---|
| | | | | | | |
| lREGQ_PA | 6.103077 | 2.247368 | 2.72 | 0.007 | 1.686195 | 10.51996 |
| lREGQ_IN | 22.97747 | 27.19887 | 0.84 | 0.399 | -30.4781 | 76.43299 |
| ldist | -0.60061 | 0.298252 | -2.01 | 0.045 | -1.18679 | -0.01444 |
| lforP | 0.241623 | 0.06264 | 3.86 | 0 | 0.118512 | 0.364734 |
| lgdpI | 1.990983 | 1.796597 | 1.11 | 0.268 | -1.53997 | 5.521939 |
| lgdpP | 0.758323 | 0.153443 | 4.94 | 0 | 0.456753 | 1.059894 |
| lpopI | 10.08093 | 19.96608 | 0.5 | 0.614 | -29.1596 | 49.32141 |
| lpopP | -0.43239 | 0.165142 | -2.62 | 0.009 | -0.75696 | -0.10783 |
| _IREGIONDUM_2 | -2.10703 | 0.35442 | -5.95 | 0 | -2.80359 | -1.41047 |
| _IREGIONDUM_3 | -1.47629 | 0.565281 | -2.61 | 0.009 | -2.58727 | -0.36531 |
| _IREGIONDUM_4 | -1.47565 | 0.43753 | -3.37 | 0.001 | -2.33555 | -0.61575 |
| _IREGIONDUM_5 | 0.145323 | 0.48632 | 0.3 | 0.765 | -0.81047 | 1.101116 |
| _IREGIONDUM_6 | -1.24874 | 0.643392 | -1.94 | 0.053 | -2.51324 | 0.015754 |
| _IREGIONDUM_7 | -0.2792 | 0.481894 | -0.58 | 0.563 | -1.2263 | 0.66789 |
| _cons | -333.211 | 426.083 | -0.78 | 0.435 | -1170.62 | 504.1948 |

# VITA

Joy Das was born in India in 1990. In 2011 he obtained a Bachelor of Arts degree in Economics at “Jadavpur University”, Kolkata, India. In 2013 he obtained his Master of Arts degree in Economics at “Jadavpur University”, Kolkata, India. After working as an executive at “Confederation of Indian Industry”, India, in 2014-2015 he finished a Master of Science program in Renewable Natural Resources at Louisiana State University. He will receive the degree of Master of Science in August 2015, after which he intends to pursue a doctoral study on Agricultural Economics and Agribusiness. His academic and professional interest includes international trade of forest products and game-theoretic approach and its applications in the forest products industry.