Effect of Regulatory Quality on Wood Pulp Imports by India

Joy Das
Graduate Research Assistant
Department of Agricultural Economics and Agribusiness
Louisiana State University
Email: jdas2@lsu.edu
Phone(M): 225 931 0609

Dr. Shaun Tanger
Assistant Professor
Department of Agricultural Economics and Agribusiness
Louisiana State University
Email: Stanger@agcenter.lsu.edu
Phone(M): 225 578 0344

Dr. P. Lynn Kennedy,
Professor
Department of Agricultural Economics and Agribusiness
Louisiana State University
Email:Lkennedy@agcenter.lsu.edu
***Phone(M):* 225 578 2726**

Selected Paper prepared for presentation at the Southern Agricultural Economics Association's 2016 Annual Meeting,
San Antonio, Texas, February, 6-9 2016

Copyright 2016 by [authors]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

ABSTRACT

India is one of the largest importers of wood pulp in the world. The total value of wood pulp imported by India during 2004 was $ 171.9 million, which increased to approximately $744.5 million by 2013. With a population of about 1.2 billion people, the demand for paper and wood pulp is very high in India. Despite this harvesting timber for commercial use has been heavily restricted, therefore India has to import wood pulp to meet its growing domestic market demand. With a large population and limited resource access, India remains an attractive market for global wood pulp exporters.

Using a pooled ordinary least squared (POLS) regression model of estimation, the study examines a panel of trade flows during 2009-2013, exploring the influence of Regulatory Quality on the pattern of wood pulp imports by India from 67 exporting countries. The effect of Regulatory Quality and other explanatory variables such as the distance between the exporting country and India, total forest area of exporting country, GDP and population indicators on imports of wood pulp by India is estimated with the help of the above-mentioned model. Moreover, the study also looks into the volume of exports from countries belonging to specific regions such as East Asia and Pacific, Latin America & the Caribbean, Europe & Central Asia, North America, South Asia and Sub-Saharan Africa.

KEY WORDS: Wood Pulp, Imports, Regulatory Quality, India

INTRODUCTION

India is the 15th largest producer of paper in the world. The pulp and paper industry in India is one of the fastest growing with an annual increase in demand of about 6%. One of the major challenges of this industry in India is the lack of pulp wood supply (Johnston et al, 2011). So India imports wood pulp from 67 different countries across the world. India is a major importer of wood pulp since 1961. In 1961, the total value of India's wood pulp imports was

about $ 1.2 million, which had increased to $ 744.5 million by 2013. Wood pulp is mainly used to manufacture paper, paperboard and other cellulose products. It is a fibrous material prepared from wood chips particles and other cellulosic residues by different chemical and mechanical processes. Wood pulp, as analyzed in this study, is an aggregate that comprises of chemical wood pulp, semi-chemical wood pulp, mechanical wood pulp and dissolving wood pulp (FAOSTAT, 2015). Rapid economic growth, industrialization and increases in population in India indicate the surge in demand for most of the goods during the past few years (Malik & Dhanda, 2003). The amount of paper and other related goods produced by the available wood pulp in India do not meet the total demand of the country.

Inventions of modern energy efficient technologies, trade liberalization and flexibility in government rules and regulations have reduced the transaction costs of goods and services over the years. These increased the volume of trade across most of the countries including India over the past few decades. Freund & Bolaky (2006) have said in their study on 'trade, regulation and growth' that a country's regulatory environment is a direct reflection of the institutional quality and the functioning of the government. An improvement in the regulatory quality improves the volume of trade between countries. The study primarily focusses on examining the effect of exporting country's regulatory quality on wood pulp imports by India.

In the introduction we discuss India's wood pulp industry followed by an overview of wood pulp trade in the country. Subsequently, we perform a literature review describing related research and how this research adds novel contributions. Subsequently, we give the problem statement and objective of the study. Further, we describe the methodology, research model, hypothesis, and data. We conclude the manuscript with the results of the analysis and discussion.

LITERATURE REVIEW

The study has been developed from one of the earlier working papers by Dr. Richard Vlosky Joy Das (2015) that looked into the forest products imports by India. This study looks into a more specific sector of wood pulp imports using regulatory quality as the main variable in the model. The World Bank defines regulatory quality as the ability of the government to form rules and regulations and properly implement them to promote and permit private sector development (WGI, 2013). As shown in the earlier study, Regulatory quality of exporting countries has a positive effect on forest products imports by India. The size of economies and the distance between them also have significant impacts on trade. Most of the explanatory variables used in the current study are kept similar to the earlier study as it looks into a specific sector of the forest products industry.

The Regulatory Quality Index was formed by the World Bank. It ranges from -2.5 (weak) to 2.5 (strong), where the former represent weak governance and the later represent strong governance performance. There are about 31 different assessment reports and surveys that are being used to design the index of regulatory quality 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. 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.

In a study on institutional and regulatory quality, (Freund & Bolaky, 2006) have said that regulatory quality index of a country is an indication of the trend of economic growth and the volume of trade in that country because a positive regulatory quality index means there are more labor market flexibility, foreign investments and smooth functioning of bureaucracy in that country. Banerjee, (1997) and Guriev, (2004) have said that the level of regulatory environment and governance of trading countries are determined by the level of corruption and institutional quality, mentioned in (Breen & Gillanders, 2010).

Iwanow & Kirkpatrick, (2007) have taken the manufacturing sector to study the effect of regulatory quality on the volume of total exports. The have found that under ceteris paribus, a 1 percent improvement in the value of the regulatory quality index increases the volume of exports by about 1 percent, so an improvement in the value of regulatory quality index has a significant positive impact on exports, as mentioned in (Das, 2015). It is important and interesting to know how the volume of wood pulp imports by India from all the 67 exporting countries is being affected by the regulatory environment of India.

METHODOLOGY

In the model, we consider a 5 years panel data from 2009 to 2013 for 67 countries that are exporting wood pulp to India. A pooled ordinary least squares regression is used to find the effect of regulatory quality of exporting countries on wood pulp imports by India. The regression equation takes the following form:

$$Y_{ijt} = \beta_0 + \beta_1 REGUE_{jt} + \beta_2 REGUI_t + \beta_3 GDPI_t + \beta_4 GDPE_{jt} + \beta_5 POPE_{jt} + \beta_6 POPI_t + \beta_7 DIST_{ij} + \beta_8 FORE_{jt} + \beta_9 REG2_j + \beta_{10} REG3_j + \beta_{11} REG4_j + \beta_{12} REG5_j + \beta_{13} REG6_j + \beta_{14} REG7_j + \epsilon_{ijt} \ldots\ldots\ldots (1)$$

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 67 exporting countries that export wood pulp to India. All the subscripts and the other variables of equation (1) are explained in Table 1.

Table 1. Definitions of the Variables with Respective Hypothesized Directions

Variable Name	**Definition**	**Hypothesized Direction**
Y_{ijt}	The value of total Wood Pulp imports to India from country j at time t	
REGUIt	Regulatory Quality of India at time t	Positive
REGQEjt	Regulatory Quality of country j at time t	Positive
$GDPI_t$	Real GDPs of India at time t	Positive
GDPEjt	Real GDPs of country j at time t	Positive
$POPI_t$	Population of India at time t	Positive
POPEjt	Population of country j at time t	Negative
$DIST_{ij}$	Distance between the capital city of India (New Delhi) and the capital city of country j.	Negative
$FORIE_{jt}$	Total Forest Area of India as a Percentage of Country j's Forest Area	Negative
$REG2_j$	Denotes Europe and Central Asia is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise	
$REG3_j$	Denotes Latin America and the Caribbean is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise	
$REG4_j$	Denotes Middle East and North Africa is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise	
$REG5_j$	Denotes North America is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise	
$REG6_j$	Denotes South Asia is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise	
$REG7_j$	Denotes Sub-Saharan Africa is a binary 'dummy' variable which is unity if country j belongs to this region and zero otherwise	
ϵ_{ijt}	Error term	

The analysis is similar in methodology to Das and Vlosky (2015) considering the aggregate forest products sector. To capture the effect of region specific unobserved variables on wood pulp imports by India, region dummy variables are used in the model. East Asia/Pacific has been taken as the base region here.

The data for the dependent variable Y_{ijt} that is the values of wood pulp import are taken from (FAOSTAT, 2015) dataset. The main variable of the study $REGE_{jt}$ that is the regulatory quality of exporting country is taken from (Kaufmann, Kraay, & Mastruzzi, 2013) dataset and the data for this variable is from the World Bank, 2015 database. The data of other explanatory variables such as regulatory quality of India, GDP and population of exporting countries and India and distance between the trading countries are also taken from World Bank, 2015 database. The percentage share forest area of India relative to the forest area of the exporting countries have been calculated taking data from the World Bank, 2015 database as well. As mentioned earlier, a region dummy is included in the model to consider the effect of other unobserved variables that are affecting wood pulp imports by India but are not being captured by the explanatory variables that are already considered in the model (Cameron & Trivedi, 2009). For this East Asia and Pacific has been taken as the base region with Europe & Central Asia, Latin America & the Caribbean, Middle East & North Africa, North America, South Asia and, Sub-Saharan Africa and the six other regions that are being classified by the World Bank.

RESULTS AND DISCUSSION

The results are shown in table 2, indicates that regulatory quality and size of economies have a significant positive effect on wood pulp imports by India. A 1 percent improvement in the value of regulatory quality of exporting countries improves the volume of wood pulp imports by India, by about 9.3 percent. As the range of regulatory quality index is narrow, it is to be noted

that a subtle change in its value indicates a massive change in the structure of governance of a country. Regulatory quality of India though not have a significant impact on the volume of wood pulp imports by India, but its direction is in consistent with the hypothesis. Distance has a significant negative effect on wood pulp import by India. With a 1 percent increase in the distance between the exporting country and India, the volume of imports decreases by about 1.2 percent. This is because the transaction cost (mainly in terms of transportation cost), increases with increase in distance between the trading countries. GDP of exporting countries and GDP of India though not showing a significant effect on import of wood pulp in this model, their direction are in consistent with the hypothesis. Same is true with population of exporting countries. But population of India has a significant positive impact on imports as increase in population increases the demand for goods and services. The model shows that a 1 percent increase in India's population increases the wood pulp imports by India by about 65.3 percent. Also, as production of wood pulp is highly dependent on forests, the area covered by forests in both India and exporting countries have a significant effect on volume of wood pulp imports by India. With a 100 percent increase in the relative forest area of India as a percent of exporting country's forest area, the volume of wood pulp imports by India decreases by about 20 percent. This means if the forest area of India relative to the exporting country increases, India imports less wood pulp as she can meet the market demand with her indigenous resources. Most of the above results are in consistent with the hypothesis.

Considering the regional effect on wood pulp imports by India, the POLS regression results show that East Asia and Pacific, Latin America & the Caribbean, North America and, South Asia have significant effect on wood pulp imports by India. Countries belonging to Latin America & the Caribbean region has 2.5 percent more effect on wood pulp imports by India,

compared to the countries belonging to the East Asia and Pacific region. Similarly Countries belonging to North America has 3.7 percent more effect on wood pulp imports by India, compared to the countries belonging to the East Asia and Pacific region, whereas Countries belonging to South Asia have 1.5 percent lesser effect on wood pulp imports by India, compared to the countries belonging to the East Asia and Pacific region. Countries belonging to regions such as Europe & Central Asia, Middle East & North Africa and Sub-Saharan Africa do not have any significant effect on wood pulp imports by India compared to the countries belonging to the East Asia and Pacific region. By the use of region dummy variable, the model could capture the effect of a few region specific unobserved variables that might have been affecting wood pulp imports by India, and hence reducing the omitted variable bias.

Table 2. Pooled Ordinary Least Squares Regression (POLS) Results

	Import of Wood Pulp	**Std. Err**	**Directionality**
Regulatory Quality of Exporting country	**9.3****	**4.1**	consistent with the hypothesis
Regulatory Quality of India	**42.2**	**52.4**	consistent with the hypothesis
Distance	**-1.2***	**0.8**	consistent with the hypothesis
Total Forest Area of India as a Percentage of Exporting Country's Forest Area	**0.2****	**0.1**	consistent with the hypothesis
GDP of Exporting Country	**-0.1**	**0.3**	
GDP of India	**1.5**	**3.2**	consistent with the hypothesis
Population of Exporting Country	**0.2**	**0.3**	
Population of India	**65.3***	**39.1**	consistent with the hypothesis
Europe & Central Asia	**-0.4**	**0.4**	
Latin America & the Caribbean	**2.5****	**1.1**	
Middle East & North Africa	**-0.8**	**0.7**	
North America	**3.7*****	**0.9**	
South Asia	**-1.5***	**1.1**	
Sub-Saharan Africa	**1.3**	**1.2**	

Constant	**-1506.5**	**836.5**	
N	**166**		
R-squared	**0.4**		
Root MSE	**2.2**		
F-Statistic	**33.5**		

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

CONCLUSION

In the study, we show that a change in the regulatory quality index has a significant impact on trade across countries. The results in the current study highlight that an improvement in the regulatory quality of exporting countries has significant positive effect on wood pulp imports by India. In accordance with a similar kind of study performed by Das and Vlosky (2015) on forest products imports, this study highlights the fact that improvement in the governance and other regulatory environment of a country have a positive effect on trade across countries because improvements in Regulatory Quality help reduce transaction costs and thus result in more trade between countries (Das, 2015). Also due to trade liberalization, change in governance of the India over the years and increase in population the demand of wood pulp has increased drastically. The distance between India and the exporting countries and the relative size of the economies also play a significant role in trade. The distance between countries increases the transaction costs between them whereas the size of the economies represented by GDP, the area covered with forests and population affects trade by determining the country's demand and supply.

The effect of region specific unobserved variables on wood pulp imports by India that are considered in the model shows that countries belonging to the regions such as Latin America & the Caribbean and North America have relatively more effects on wood pulp imports by India compared to the countries of East Asia and Pacific region. It has been observed from the data

that over the years 2009-2013, major exporters of wood pulp to India are the United States of America, Canada, and Indonesia. Regionally, the former two countries belong to North America, and the later belongs to East Asia and Pacific. Also, countries belonging to the region Latin America & the Caribbean has different lenient trade agreements that enhance the flow of wood pulp imports by India from Brazil, Chile, Cuba, and others. Another factor that boosted wood pulp imports by India from the Latin America & Caribbean countries is that these countries have vast areas covered with forests and abundant resources to make wood pulp. To the contrary, though the South Asian countries are in proximity to India, India imports little wood pulp from those countries. One of the reasons might be that these countries do not have enough raw materials and the also the regulatory environment and the trade laws are quite stringent. Conversely, countries belonging to the other regions such as Europe & Central Asia, Middle East & North Africa and Sub-Saharan Africa do not have a significant effect on imports of wood pulp by India.

LIMITATIONS OF THE STUDY

Though the study considers a very specific sector, it only considers imports of wood pulp by India. A descriptive study can be done including both exports and imports of wood pulp. Along with India, all the exporting and importing countries can be included taking more years and more explanatory variables in the model. That will further reduce the omitted variable bias and make the model more robust.

REFERENCES

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 FAOSTAT. (2013). FAOSTAT.

Das, Joy. *Forest Stakeholders, Policies and Trade in India's Forest Sector*. Diss. Jadavpur University, 2015.

Das. J & Vlosky, R (2015). Working paper. Access from the Woodema 2015 proceedings at http://www.woodema.org/proceedings/WoodEMA_2015_Proceedings.pdf.

FAOSTAT. (2015).

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

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.

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

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

Johnson, T., et al. "India-an Emerging Giant in the Pulp and Paper Industry." (2011): 135.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2013). Governance Matters V: Aggregate and Individual Governance Indicators for 1996-2005

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 WGI. (2013).

World Governance Indicators Report. World Bank. WorldBank. (2014). World Bank Report. World Bank.