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# Overseas trade vis-a-vis overseas shipping: Growth and performance in India (1999–2009)

Aparna Banerjee, Sudakshina Gupta*

*Centre for Urban Economic Studies, Department of Economics, University of Calcutta, 1, Reformatory Street, Kolkata 700 027, India*

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ABSTRACT

Maritime trade has been and even continues to account for about a lion's share of India's total cargo volumes. Despite the growth of multimodal transport (by land, water and air), shipping still continues to be the major mode of transport in the bulk carriage of country's overseas trade. In view of this vital role of shipping, in the first four decades of independence, under the initiative of planned development and active government support, India's shipping and port sector saw dramatic growth in their performance to build adequate national fleet, in keeping up with the transport of overseas cargo. However, the onset of economic liberalization in 1991 has given rise to many new dimensions in the development of the shipping and port sector of the country with a significant redefinition of shipping and port services, in response to the new global trend patterns. For instance, it has also established the new era of containerization in the mode of cargo delivery from the dominance of the era of bulk and break-bulk trade during the decade of sixties and seventies. Moreover, as global competition increases, in response to this emerging trade patterns within this country, India's volume of traffic growth also increases manifold. So, India's shipping and port sectors need, significantly, to build up and furnish their capacity by increasing the frequency of this mode of transport i.e. the growth of the national overseas fleet to meet this surging demand. This paper, therefore, have focused on this role of shipping in such rising overseas trade, with a view to examine the shipping performance (the growth of overseas fleet) in response to the growing overseas trade at all ports of India during the period (1999–2000 to 2008–2009), in terms of both a mathematical model and a graphical representation. Finally, it concludes that the absolute overseas trade, being highly import dependent, have led to a more or less stagnant performance in overseas shipping, owing to the lack of the adequate growth of absolute overseas exports during this period.



## 1. Introduction

Ocean transport or shipping plays an important role in the trade and economic development of nations as transport, trade and economic development are mutually supportive (Barke, 1986; Button, 1982; Wijnolst & Wergeland, 2008). The overwhelming share of shipping in the carriage (about 95 percent by volume and almost 70 percent by value) of international trade establishes its predominance and importance as a mode of international transportation system (Country Report of India, 2011, pub_2217_Inida.pdf; Marine_transport_in_India, 2002; National Maritime Development Programme (Port Sector), March, 2006, NMDP2134686903.pdf). Despite the tremendous growth of the multi-modal transport system such as roadways, railways and airways, the importance of shipping, over the period, has increased in handling the bulk transport within the country and also around the world. Hence, Indian Ports and Shipping sectors play an important role in India's EXIM trade (Ministry of Shipping, http://www.shipping.nic.in, http://www.shipping.gov.in). Indian Maritime sector comprises of Ports, Shipping, Shipbuilding and Ship-repair and Inland Water Transport Systems. India has a long coastline of about 7517 km, spread on the western and eastern shelves of the mainland and also along the Islands with 12 Major ports and 200 non-major ports, as per the latest information received from maritime studies. (Overview 71322403.pdf, 2011; Sundar, 1998; World Bank, 1995, India Port Sector Strategy Report; Report No 14059-IN). The Indian Shipping Sector has 23 shipyards, of which 7 are under administrative control of the Central Government, 2 with the State Governments, and the rest in the private sector (19 privately owned shipyards). India has over 110

* Corresponding author. Tel./fax: +91 33 24790156.
*E-mail address:* sudakshinagupta@yahoo.co.in (S. Gupta).

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shipping companies in the Shipping Sector with many domestic players, major being Shipping Corporation Of India Ltd. (National Maritime Development Programme (Port Sector), March, 2006, NMDP2134686903.pdf; Ray, 1993).

When a country opens her economy, it virtually increases the degree of its involvement with global trade, as it is known that a port grows by virtue of the trade it attracts (Ghosh & De, 2001; Weigend, 1958). Therefore it becomes necessary to strengthen her port systems to sustain the rising overseas trade. This is exactly what has happened in case of Indian economy in the post liberalization period (post 1990), when the globalization process has enhanced the importance of international trade in her closed economy. So far, India's shipping and port sector saw a dramatic growth in the first four decades of post-independence, with a basically inward looking economic policy perspective and together with the constricted overall trade and technology-driven growth of the economy. However, with the paradigm shift in economic policy, since early nineties, the situation changed as an impact of liberalization (India_ Port_ Report_ Numbered.pdf, 2011; Juhel, 1998). The high growth trend in Indian GDP is reflected in the country's flourishing international trade, and the consequent high growth in traffic volumes for the shipping and ports sector in the post liberalization period. Current traffic growth trend therefore suggests that the Indian Ports Sector would require a significant increase in capacity to meet the future cargo demand, which would in turn create additional demand pressures on the Indian Shipping Sector (Fagerholt, 2004; Fleming, 2000; Flor & Defilippi, 2003). As the global competition increases, the Indian Shipping Sector will need to upgrade its fleet to improve its efficiency and become more competitive. Thus, with the rise in international trade, it is the rising overseas trade which will, therefore, provide an economic explanation behind the growth of overseas shipping in all ports. Not only that, such a positive relationship is also expected between the growth rate of the overseas trade and that of the overseas vessels at all ports. This theory is captured in the following calculation sub-sections and also in terms of graphical representation below.

### 1.1. Objective

Against this theoretical backdrop, the main objective of the paper is to find out the role of shipping in such an increasing overseas trade in the recent period in India, as, so far, insights from this perspective have rarely been found in the context of Indian port literature. While doing so, this paper attempts to examine the relationship between the overseas trade (measured in terms of the growth of overseas exports and overseas imports in million tonnes) and the shipping performance (measured in terms of the growth of Indian overseas fleet in numbers) at all Ports of India.

The structure of this paper is as follows: Besides, Introduction and Objective in Section 1, Section 2 will cover Material and Methodology, Section 3 will cover Theory/Calculation Sections, Section 4 will cover the Results and Discussions and finally Section 5 will end up with the conclusion section.

## 2. Material and method

The data on shipping, exports (loaded), imports (unloaded), etc. relating to our study are secondary data as they are taken mainly from various issues and publications as well as from various websites of the following sources such as (i) Economic Survey (ii) Statistical Abstract (iii) Basic Port Statistics of India (iv) Indian Ports Association.

To test the above objective and also its validity, our methodology includes Multiple Regression Analysis (MRA), Simple Regression Analysis (SRA), the theory of Interval estimation and that of Hypothesis testing of the Regression Coefficients (slope coefficients). In case of Simple Regression Analysis (SRA) and Multiple Regression Analysis (MRA), the quantity known as Coefficient of Determination denoted by $r^2$ (Two-variable regression) and $R^2$ (Multi-variable regression) will be used to analyze the measure of the goodness of the fit of our regression equations. Verbally, $R^2$ akin to $r^2$ will measure how far the proportion or percentage of the total variation in dependent variable ($Y$) [the growth of overseas fleet (OV)] will be explained jointly by all independent (explanatory) variables ($X$s), [here, overseas exports ($L$), overseas imports (UL), and overseas trade (OT)]. Moreover, adjusted $R^2$ can also be used to compare our results of (MRM) and (SRM).

Next, in the language of Hypothesis testing, a stated hypothesis or a null hypothesis ($H_0$) is constructed and is usually tested against the alternative Hypothesis testing ($H_1$) in the following methods of testing the statistical hypotheses of the regression models. To test the significance of the individual partial regression coefficients (slope coefficients) of both our Multiple Regression Model (MRM) and the Simple Regression Model (SRM), two alternative but mutually complementary approaches, namely, Confidence Interval Approach (CIA) and Test of Significance Approach (TOSA) ($t$ test), yielding the same results and conclusions, will be used for deciding whether to reject or accept the null hypothesis. Moreover, Analysis of Variance (ANOVA) Technique ($F$-test) will be used for the Overall Significance of both the Estimated Simple and Multiple Regression Models.

In case of CIA, if the unknown parameter $\beta$ ($\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$) under ($H_0$: $\beta = 0$) falls within the confidence interval, ($H_0$) is not rejected and it is said that our finding is statistically insignificant. But, if it falls outside those confidence limits, then ($H_0$) is rejected so that our finding is statistically significant. Secondly, under (TOSA) Approach ($t$ test) or in ANOVA Technique, from a two-tailed test, with the given critical values (table values) of $t_{\alpha/2,n-k}$, and $F_{\alpha,(k-1,n-k)}$, if the computed (absolute) $t$ or $F$ value of our estimated slope coefficients ($\beta^*$s) exceeds their respective critical values at chosen level of significance ($\alpha = 5\%$), then ($H_0$) is rejected with $\beta^*$s being statistically significant: otherwise ($H_0$) is not rejected with their values being statistically insignificant. Alternatively, if the $p$-value (probability value) of the $t$ statistic is sufficiently low, then also ($H_0$) is rejected and all the $\beta^*$s are then said to be statistically significant with increasing confidence (Gujrati & Sangeetha, 2008; Maddala, 2001).

## 3. Theory/calculation section

### 3.1. Theory/calculation section: regression analysis

In the present context, our first objective is to obtain the mean response of the shipping performance ($Y$) for the given change in the volume of both overseas imports [Unloaded (UL)], say, $X_1$ and overseas exports [Loaded ($L$)] say, $X_2$ i.e. (all explanatory variables, $X$s) respectively, over a period of 10 years (1999–2000 to 2008–2009). For this it examines the joint impact of 1) the growth of UL, $L$ on the growth of Indian overseas fleet (OV) and also that of 2) the growth rate of UL, $L$ on the growth rate of OV.

For Eq. (1), a time series analysis of a Classical Linear Multiple Regression Model (CLMRM), with one dependent variable ($Y$), and more than one independent variables ($X$s), linear in their parameters, is constructed with the following Multiple Regression equation,

$$\mathrm{OV}_t = \beta_0 + \beta_1 \mathrm{UL}_t + \beta_2 L_t + u_t \quad (1)$$

Here, OV denotes the growth of overseas vessels, measured in numbers, as the dependent variable ($Y$). UL and $L$ denotes the growth of the volume of overseas imports and exports, both measured in million tonnes, as the two independent variables $X_1$