

Leading Role of Shipping Transport in Overseas Trade at Indian Major Ports

Aparna Banerjee

Serampore College, Kolkata, West Bengal, India. Email: aparnab17@gmail.com

ABSTRACT

The present paper attempts to study the effective role of total shipping performance in overall growth of the overseas traffic performance at major ports of India during the period 1999-2000 to 2008-09, against the backdrop of liberalisation and globalisation of Indian economy, thus focusing on how far the growth of the total shipping performance is responsive to growth of overseas cargo traffic performance at these ports, in compliance with the policy measures. So, this paper ends up with the scenario of both the actual and expected performances, focusing on the strengthening of effective policy planning, drawing attention to the roles of various policy practitioners in this respect.

Keywords: Overseas Trade, Shipping Performance, Major Ports, India

INTRODUCTION

Shipping plays an important role in trade and economic development of nations as trade, transport, and economic development are found to be mutually supportive to one another in their respective arenas. The overwhelming share of shipping in the carriage (about 90 percent by volume and almost 70 percent by value) of international trade establishes its predominance and importance as a mode of international transportation system, in spite of the culminating growth in multimodal transportation within the country (Barke, 1986; Button, 1982). The importance of shipping has also increased within the country due to the technological developments in transport around the world, especially in terms of containerisation, since majority of the containers move by this mode of transport over the recent period of globalisation (Flor & Defilippi, 2003). So, an open economy of a country like India also has to increase the degree of its involvement with global trade, as it is known that a port grows by virtue of the trade it attracts. Therefore it becomes necessary for Indian economy in the post liberalisation period (post 90s) to strengthen her port systems to sustain the rising overseas trade (Ghosh & De, 2001), when the globalisation process has enhanced the importance of international trade in her closed economy. During this period, the high growth trend in Indian GDP is reflected both in the country's flourishing international trade, and also in their consequent high growth in traffic volumes for the shipping and ports sector (Ghosh & De,

1998). India has also witnessed a rise in her overseas trade (both by volume and value) through the maritime transport (routes). This is mostly evident from the over-utilisation of the Indian ports, particularly, major ports who have played an important role in India's EXIM trade over this period of globalisation (De, 1999).

As already mentioned above that shipping plays an important role in the transport sector of India's economy with approximately, 90 percent of the country's trade by volume (70 percent in terms of value) is moved by sea. India has the largest merchant shipping fleet among the developing countries and ranks 20th amongst those countries with the largest cargo carrying fleet with 8.83 million GT in 2008, while the average of the fleet being 18 years old. Indian maritime sector facilitates not only transportation of national and international cargo but also provides a variety of other services such as cargo handling services, shipbuilding and ship repairing, freight forwarding, lighthouse facilities and training of marine personnel etc. (www.shipping.nic.in). It is therefore expected that as the volumes of overseas trade increases with the rise in international trade, there will be higher demand for the growth of the total shipping (total fleet) at the major ports. Not only that, a positive relationship is also expected between the growth rate of the overseas traffic growth and that of the total fleet (vessels) at these ports. Now, the classification of the vessels includes: 1) total category wise - cargo vessels (TV) in carrying all

types of cargo and 2) total grand fleet (TGV) consisting the above mentioned total vessels (category wise), that is, TV and the other vessels which include tugs, passenger vessels and non-cargo vessels.

LITERATURE REVIEW

Port literature had always been considered as a relatively neglected branch of Indian economic literature as it is regarded as an interdisciplinary subject of mention since mid-60s. The first major credit goes to (Mukherjee, 1968) in his writings regarding the history of Calcutta Port. Other important studies relating to the history and developmental issues concerning Calcutta Port Trust and also Calcutta and Haldia Ports include those made by Banerjee (1975), Ray (1993), Chakraborty (1995) (ed), and Sau (1997). Panda (1991) and others, however, have examined various issues involved in cargo handling in major ports of India. Apart from these books, other research reports of the official committees of Transport Research Division in the Ministry of Shipping and Transport had also provided detailed surveys on different aspects of traffic development at major ports of India. So far, ports and their development aspects has been only major discussed issues with very little importance being given to the role of the shipping in overseas trade through ports in India, against the theoretical backdrop of recent globalisation policy programme in Indian economy in the existing port literature. This paper attempts to examine such response of shipping in overseas trade in policy planning perspective during the said period in India.

OBJECTIVES

The main objective of this paper is, therefore, to study the relative responsiveness of the overall growth of the volume of the overseas trade (measured in million tonnes) on the total shipping performance at the major ports of India over the period (1999-2000 to 2008-09) against the backdrop of liberalisation and globalisation of Indian economy. As major objectives, this paper first attempts to analyse the growth of the volume of overseas trade performance (measured in terms of the growth of the volumes of overseas exports (loaded), overseas imports (unloaded) and even overseas trade) and the shipping performance [measured in terms of the growth of total fleet (in numbers)] over the said period. The aforesaid period (1999-2000 to 2008-09) is chosen as the study period in order to find out whether there is any immediate impact of globalisation in the transport sector in the Indian economy in the next recent

following decade as a major change, since New Economic Policy as globalisation/ privatisation/ liberalisation policy was adopted in India in 1991. Next, it analyses the relationship between the growth of the overseas traffic and the growth of i) total fleet (category-wise cargo) and ii) the total grand fleet, for the above mentioned functional classification of the total fleet at these major ports. While, doing so, this paper analyses the extent of dependency of 1) the growth of a) overseas exports or loaded (L), b) overseas imports or unloaded (UL) and c) overseas trade (OT) on the both the growth of total category-wise cargo fleet (TV) and total grand fleet (TGV) respectively, and also that of 2) the growth rate of a) overseas exports (L1), b) overseas imports (UL1) and c) overseas trade (OT1) on both the growth rate of total category-wise cargo fleet (TV1) and total grand fleet (TGV1) respectively.

The paper is therefore structured as follows. Besides introduction in first section, second section will cover literature review, third section will cover objective of the study, fourth section will cover data sources and methodology, fifth section will cover results and discussions, sixth section will summarise the above sections while seventh section will end up with conclusion, finally, focusing on policy prescriptions.

DATA SOURCES AND METHODOLOGY

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

However, this paper deals graphically to analyse the above objectives. But, the above mentioned extent of dependency between both the absolute as well as relative growth (growth rate) of the volume of trade and those of the total shipping is analysed by using the value of R². This is because R² measures such dependency between a dependent variable and an independent variable, indicating how much proportion of the dependent variable is being explained by the independent variable (Gujrati & Sangeetha, 2008).

RESULTS AND DISCUSSION

In this section, underlying the above mentioned primary objective, over the period of 10 years (1999-2000 to 2008-

09), this paper first attempts to study the performance of overseas traffic to examine the change in the growth of overseas exports (L), overseas imports (UL), overseas trade (OT) and also the growth rate of overseas exports (L1), overseas imports (UL1) and overseas trade (OT1) over time. As against the above change in the overseas trade scenario, it, then, examines the change in the growth of 1) (i) total category-wise cargo fleet (TV) and ii) total grand fleet (TGV) in response to the change in a) overseas exports (L), b) overseas imports (UL), and c) overseas trade (OT) respectively, and 2) the change in the growth rate of (i) total category-wise cargo fleet (TV1) and ii) total grand fleet (TGV1) in relation to the change in the growth rate of a) overseas exports (L1), b) overseas imports (UL1) and c) overseas trade (OT1) respectively over time. Finally,

to study the overall shipping performance over time, it examines the change in growth of total category-wise cargo fleet (TV), total grand fleet (TGV) and the change in growth rate of total category-wise cargo fleet (TV1) and total grand fleet (TGV1) over time.

Regarding the growth of overseas traffic performance over time, shown in Figs. 1(a) and 1(b) respectively, all the components of overseas traffic viz. absolute volumes of overseas exports (L), overseas imports (UL), overseas trade (OT) have increased significantly over the said period (1999 to 2008-09). However, the rise in the growth of the volume of overseas imports (UL) as well as that of the growth rate of the volume of overseas imports (UL1) is higher than those of the overseas exports (L) over time.

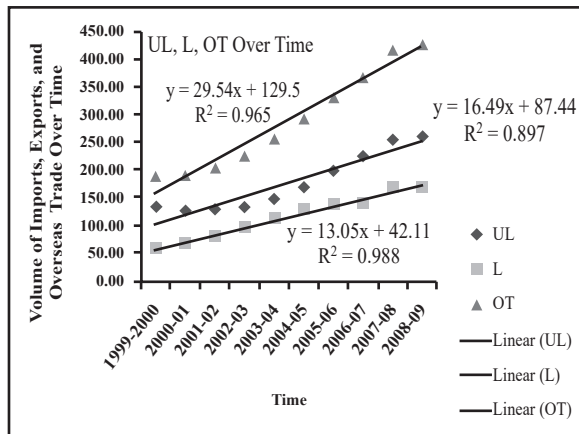


Fig. 1(a): Growth of Volume (in million tonnes) of Overseas Exports (L), Overseas Imports (UL), Overseas Trade (OT) during 1999 to 2008-09

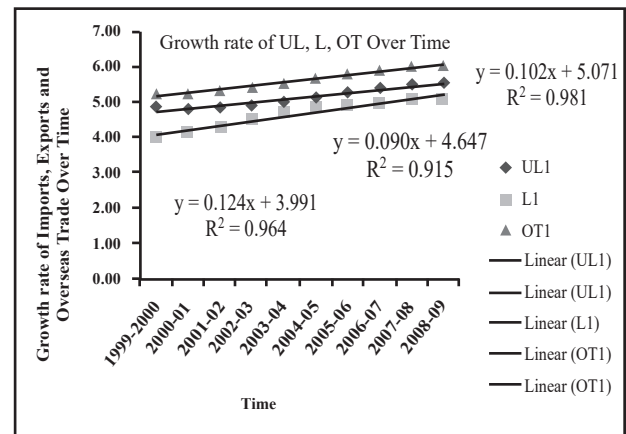


Fig. 1(b): Growth Rate of Overseas Exports (L1), Overseas Imports (UL1) and Overseas Trade (OT1) Over Time

Source: Indian Ports Association, <http://www.ipa.nic.in>, <http://www.shipping.nic.in>

This is evident from both the trend lines (regression lines) of the growth (UL) as well as the growth rate of overseas imports (UL1), both being lying above than those of overseas exports (L) over time as shown in Figs. 1(a) and 1(b). In the diagrams, time (independent variable) is plotted on the horizontal axis, while all the trade components (dependent variables) are plotted on the vertical axis.

In response to the above highly positive absolute trade performance of all components of overseas trade over time as shown in Fig. 1(a), the impact of the sole performance of absolute imports, exports and even overseas trade respectively on shipping are discussed below in Figs. 2(a) – 3(c) respectively. All these results are obtained from these

diagrams, where, growth of shipping (dependent variables viz. growth of TV, TGV) is plotted on the vertical axis, while all the trade components (independent variables viz. growth of UL, L OT) are plotted on the horizontal axis respectively.

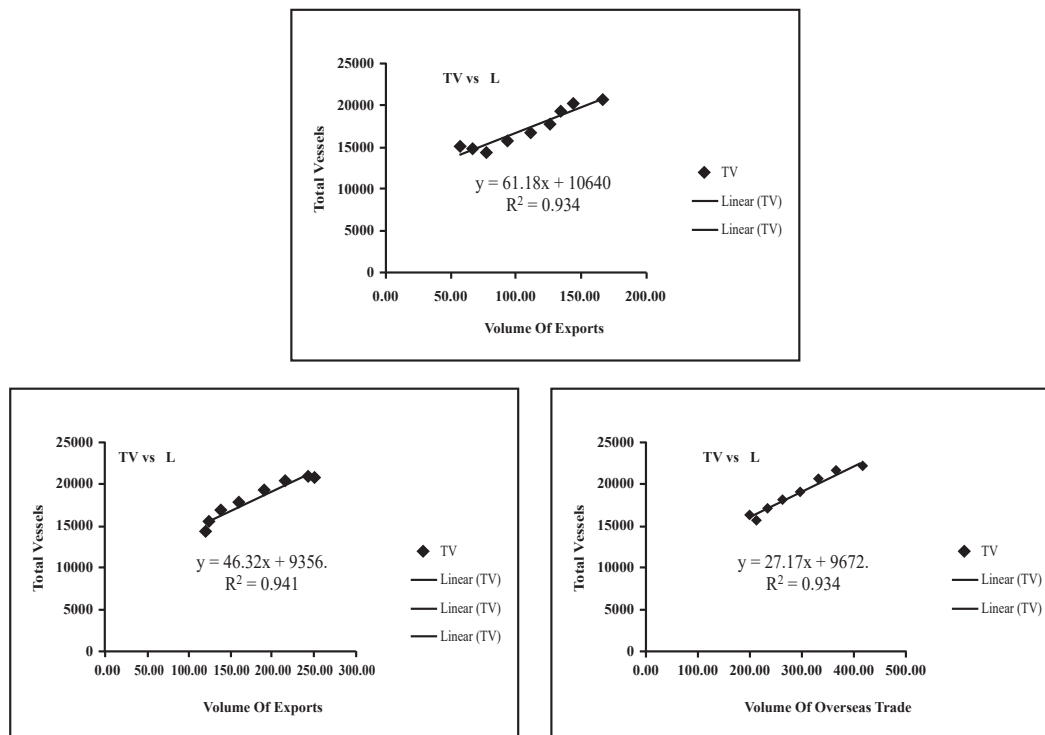


Fig. 2(a), (b) and (c): Growth of the Total Category Wise Cargo Vessels (TV) in Response to the Growth of the Volume (in million tonnes) of Overseas Exports (L), Overseas Imports (UL), and Overseas Trade (OT) Respectively during 1999 to 2008-09

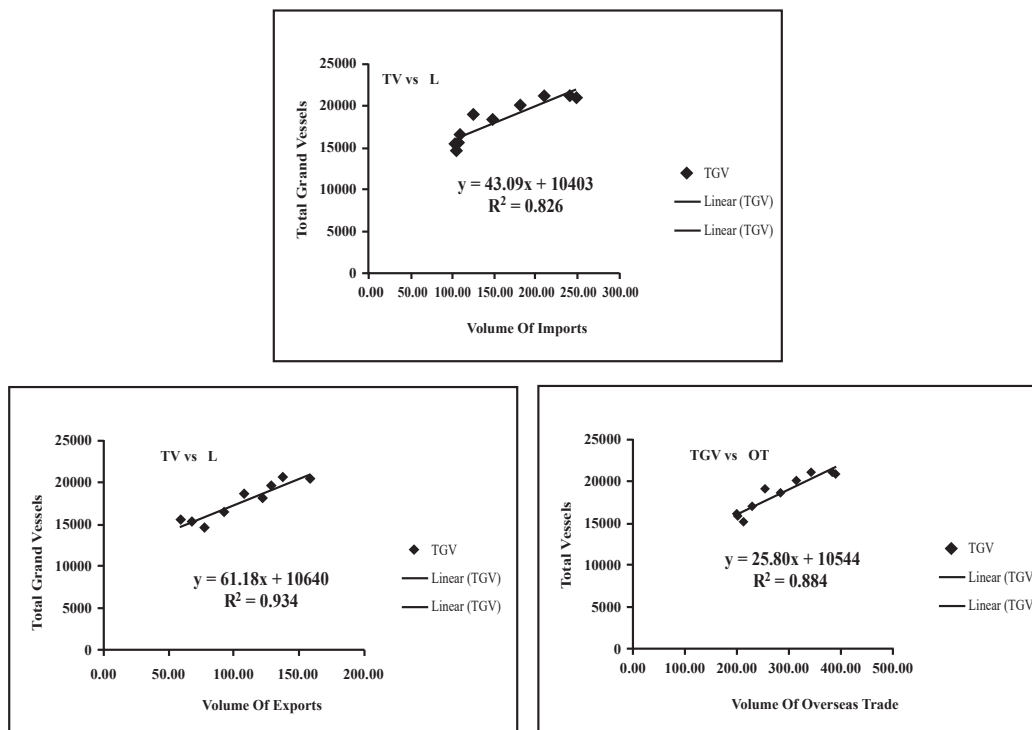


Fig. 3(a), (b) and (c): Growth of the Total Category Wise Cargo Vessels (TV) in Response to the Growth of the Volume (in million tonnes) of Overseas Imports (UL), Overseas Exports (L), and Overseas Trade (OT) Respectively During 1999 to 2008-09

Source: Indian Ports Association, <http://www.ipa.nic.in>, <http://www.shipping.nic.in>.

It has been found that the growth of both the total category-wise cargo fleet (TV) and the total grand fleet (TGV) with respect to the change in a) overseas exports (L), b) overseas imports (UL), and c) overseas trade (OT) respectively, has increased significantly, as reflected from their sharp rising trend lines in Figs. 2(a) - 3(c). Moreover, growth of overseas imports (UL) has led to the growth of TV much more than that of TGV as is evident from both the values of R^2 and also from the individual slope coefficients of UL in the trend lines of Fig. 2(b) and Fig. 3(a) respectively. Again, the growth of overseas exports (L) has led to the growth of TV much more than TGV as is evident from both the values of R^2 and also from the individual slope coefficients of L in the trend lines of Fig. 2(a) and Fig. 3 (b) respectively. But it has also been reflected from the individual slope coefficients of UL and L that the absolute growth of the volumes of TV being much greater per unit rise in L (Fig. 2(a)) than UL (Fig. 2(b)). This may be

because of the greater usage of the empty loaded cargo vessels for unloading purposes often due to deficiency of the required unloaded vessels in times of need (Ghosh & De, 2001), as volume of overseas imports dominates the volume of overseas exports in that of overseas trade. However, it has also been reflected from both the values of R^2 and also from the individual slope coefficients of UL and L, that the absolute growth of the volumes of TGV being much greater per unit rise in L (Fig. 3(b)) than UL (Fig. 3(a)).

Not only that, in response to the above positive performance about the growth rate of all components of overseas trade over time as shown in Fig. 1(b), the impact of the sole performance of the relative growth (growth rates) of imports, exports and even overseas trade respectively on shipping are discussed in Figs. 4(a) - 5(c) respectively.

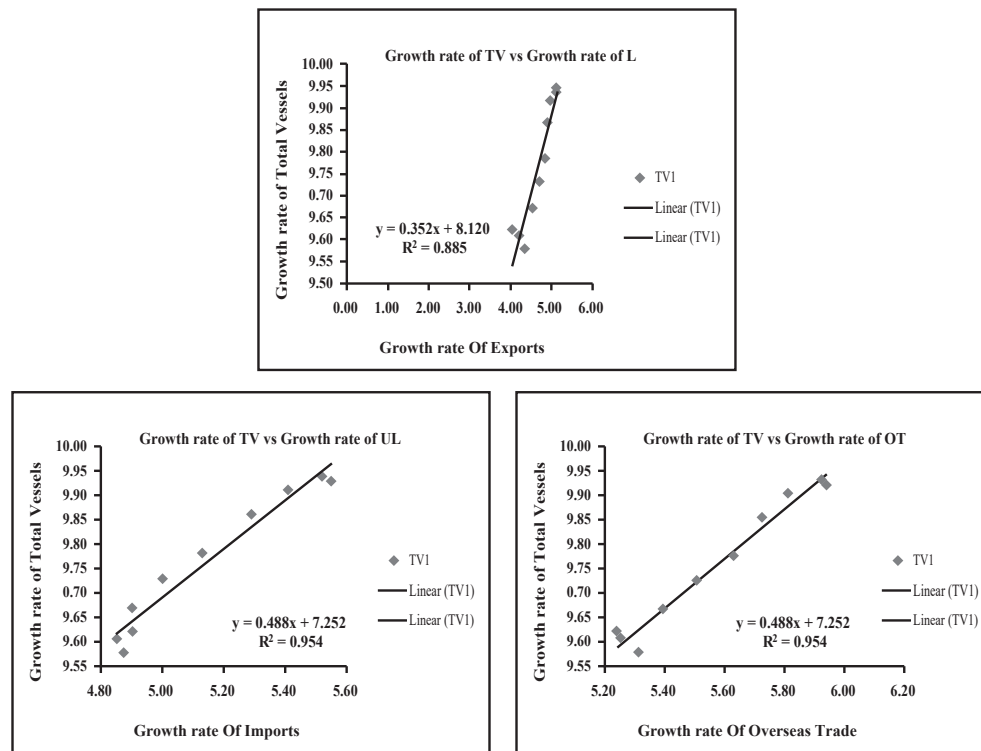


Fig. 4(a), (b) and (c): Growth rate of the Total Category Wise Cargo Vessels (TV1) in Response to the Growth rate of the Volume (in million tonnes) of Overseas Exports (L1), Overseas Imports (UL1), and Overseas Trade (OT1) Respectively During 1999 to 2008-09

All these results are discussed in Figs. 5(a) - (c) where growth rate of shipping (dependent variable viz. growth of TV1, TGV1) is plotted on the vertical axis, while

all the trade components (independent variables viz. growth of TV1, TGV1) are plotted on the horizontal axis respectively.

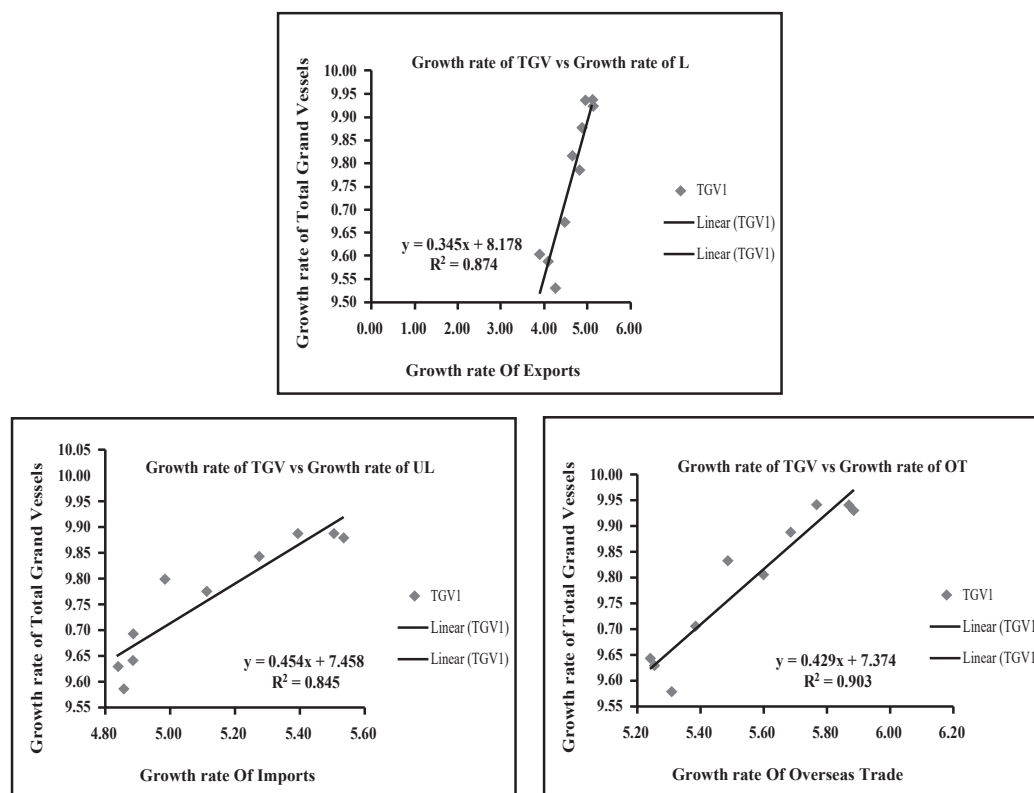


Fig. 5(a), (b) and (c): Growth of the Total Category Wise Cargo Vessels (TV) in Response to the Growth of the Volume (in million tonnes) of Overseas Exports (L1), Overseas Imports (UL1), and Overseas Trade (OT1) Respectively During 1999 to 2008-09

Source: Indian Ports Association, <http://www.ipa.nic.in>, <http://www.shipping.nic.in>.

It has been found that the growth rates of both, total category-wise cargo fleet (TV1) and total grand fleet (TGV1) with respect to change in growth rate of a) overseas exports (L1), b) overseas imports (UL1), and c) overseas trade (OT1) respectively over time, have also increased significantly, as reflected from their sharp rising trend lines in Figs. 4(a) - 5(c). Moreover, the growth rate of the overseas imports (UL1) has led to the growth of TV1 much more than TGV1 as is evident from both, values of R^2 and individual slope coefficients of UL1 in the trend lines of Fig. 4(b) and Fig. 5(b) respectively. Again, the growth rate of overseas exports, L1, has led to the growth of TV1 more than TGV1 as is evident from both, values of R^2 and individual slope coefficients of L1 in the trend lines of Fig. 4(a) and Fig. 5 (a) respectively.

But it has also been reflected from the individual slope coefficients of UL1 and L1 that the relative growth of the volumes of TGV1 is much greater per unit rise in UL1 (Fig. 5(b)) than L1 (Fig. 5(a)). This may be because of the higher volume of overseas imports than that the volume

of overseas exports in that of overseas trade, which has led to the greater usage of the empty vessels for unloading purposes (Ghosh & De, 2001).

As a consequence, it is found from Figs. 2(c) and 3(c) that the absolute growth of OT has led to the higher growth of TV than TGV as is evident from both, values of R^2 and individual slope coefficients of OT in the trend lines of Figs. 2(c) and 3(c) respectively. Again, as a consequence, the relative growth of OT1 has led to the higher growth of TV1 than TGV1 as is found from both, values of R^2 and individual slope coefficients of OT1 in the trend lines of Figs. 4(a) - 5(c).

Moreover, it is to be noted that relative growths of overseas imports (UL1), exports (L1), and overseas trade (OT1) have led to the greater relative growth of TV1 than the absolute growth of overseas imports (UL), exports (L), and overseas trade (OT), all of which have led to the much lesser absolute growth of TV. However, relative growths of overseas imports (UL1) and overseas trade (OT1) have led

to the greater relative growth of TGV1 than the absolute growth of overseas imports (UL) and overseas trade (OT), both of which have led to the much lesser absolute growth of TGV. But absolute growth of overseas exports (L) has led to the greater absolute growth of TGV than the relative growth of overseas exports (L1) which has led to the lesser relative growth of TGV1.

Regarding the growth of shipping performance over the period of time (1999 to 2008-09), in Figs. 6(a) and 6(b), time (independent variable) is plotted on the horizontal axis, while all the shipping components (dependent variables viz. TV, TGV, TV1, TGV1) are plotted on the vertical axis.

It is found in both the Figs. 6(a) and 6(b) respectively that the growths of total category-wise cargo fleet (TV) and total grand fleet (TGV) have increased significantly over time. It is evident from their high values of R² and also from their positive slope coefficients of the sharp rising trend lines in Fig. 6(a). Not only that, the growth rates

of total category-wise cargo fleet (TV1) and total grand fleet (TGV1) over time have also increased significantly, with the sharp rising trend lines as evident from their high values of R² and positive slope coefficients in Fig. 6(b). However, both the growth as well as the growth rate of the total category-wise cargo fleet (TV) are higher than those of total grand fleet (TGV) over time, together with a greater variation in the absolute growth of the total category-wise cargo vessels (TV). This is also evident from the much higher values of R² and higher positive slope coefficients for the growth as well as the growth rate of the total category-wise cargo fleet (TV) in Fig. 6(a) than those for the total grand fleet (TGV) in Fig. 6(b), together with the greater values of R² and positive slope coefficients for the absolute growth of the total category-wise cargo vessels, (TV) over time as shown in Figs. 6(a) and 6(b). Moreover, the absolute growth of total category-wise cargo fleet (TV) as well as that of total grand fleet (TGV) are much higher than their relative growths (growth rates) as evident from their much higher values of R² in Fig. 6 (a) than those in Fig. 6(b).

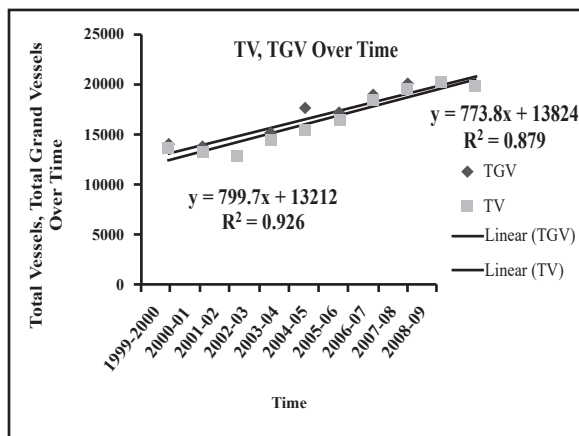


Figure 6(a): Growth of Total Category-Wise Cargo Vessels (TV) and Total Grand Vessels (TGV) during 1999 to 2008-09

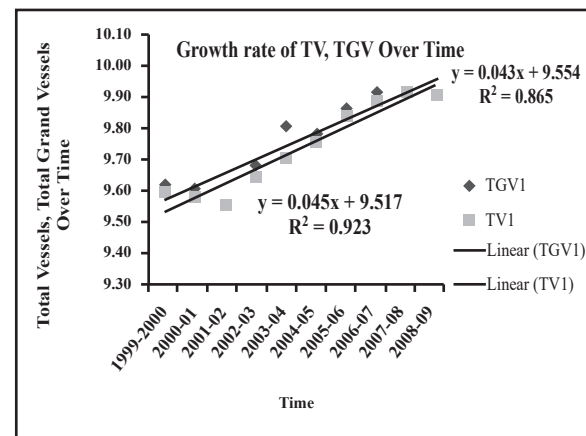


Figure 6(b): Growth Rate of Total Category-Wise Cargo vessels (TV1) and Total Grand Vessels (TGV1) during 1999 to 2008-09

Source: Indian Ports Association, <http://www.ipa.nic.in>, <http://www.shipping.nic.in>

SUMMARY

Regarding the trade performance over time, it has been found that both the absolute and the relative components of trade have significantly increased over the time. However, the volume of overseas imports (UL) is higher than that of overseas exports (L) over time, in both absolute and relative amounts. As a result, both the growth and the growth rate of the overseas trade have also increased over time, with a greater significant rise in the growth of relative overseas

trade (OT1), as explained by the much higher values of R² of both the relative components of trade. Regarding the shipping performance over the same time period, it has been found that the absolute growths of the category-wise cargo vessels and the total grand fleet are higher than their relative growths, together with a much higher absolute growth of the total category-wise cargo vessels than the total grand fleet, as reflected by the much higher values of R² for the absolute growth of shipping.

Regarding the relative responsiveness of the overseas

trade on total shipping, all the components of trade with both their absolute and the relative growth, have led to the greater rise of both the absolute and the relative growth of the total category-wise cargo vessels (TV) than the total grand fleet (TGV) respectively. Further, both the absolute and the relative growth of overseas imports rather than those of exports have shown much higher impact on the growth of both the absolute and the relative growth of the total category-wise cargo vessels (TV). As a result, both the growth and the growth rate of the overseas trade have a greater impact on the growth (TV) as well as the growth rate of the total category-wise cargo fleet (TV1) rather than on both the absolute (TGV) and relative growth of the total grand fleet (TGV1). Moreover, the relative growth of trade with all of the components of trade (viz. overseas imports (UL1), exports (L1) and overseas trade (OT1)) has a greater impact on shipping (higher relative growth of TV1) than their respective absolute growth impact (lesser absolute growth of TV). However, in particular, relative growths of overseas imports (UL1) and overseas trade (OT1) have led to the greater relative growth of TGV1 but absolute growth of overseas exports (L) has led to the greater absolute growth of TGV.

As a result, relative overseas trade, (OT1) has shown a greater impact than that of the absolute growth, (OT) on the growth of total shipping, particularly, on the relative growth of the total category-wise cargo vessels, (TV1), in response to the greater contribution of the relative growth of overseas trade components (i.e. both exports and imports).

CONCLUSION

It can be concluded that in case of both these trade and shipping performances, there has been significant rise in relative growth of overseas trade and absolute growth of shipping over the said time period. Both of the performances are in fact, the reality phenomenon in Indian economy as an impact of globalisation. But both the absolute and the relative growths of overseas trade have higher impact on both the absolute and the relative growths of the total category-wise cargo vessels and also the total grand fleet, more significantly, on the absolute and the relative growth of the total category-wise cargo vessels. Moreover, the impact of the relative growth of overseas trade on shipping is found to be much higher than its absolute growth, in response to the significant rise in the relative growth of overseas trade, as contributed by the much higher relative growth of overseas imports and exports respectively, as mentioned earlier. This is due to

the domination of voluminous share of overseas imports in that of international trade, because of the adoption of trade liberalisation policy measures in the Indian economy as an impact of globalisation. Such relative growth of overall shipping performance, with the relative growth of total category-wise cargo fleet (TV), implying a higher response with respect to the relative growth (growth rate) of the overseas trade over time, thus, signifies a gap between the actual and expected scenario as found from the above mentioned trade and shipping performances.

POLICY IMPLICATIONS

Further, the shipping performance over time also has led to both higher absolute and relative growth of the total category-wise cargo vessels, meant for solely trade, rather than that of the total grand fleet, also meant for the non-trade purposes, in response to the rising overseas trade. Herein arises the importance of the relative growth of total category-wise cargo vessels rather than its absolute growth, in relation to the growth of the overseas trade which may provoke the policy makers of governments, both at the centre as well as at the state level and other policy decision makers such as businessmen, economists, planners, NGOs etc., to frame various new policies in different sectors of the economy, in order to keep at par with this era of globalisation, so as to fill the above mentioned gap between the demand (expected) and the supply (actual) as found in shipping performance. Moreover, eco-friendly policies are needed to be framed, realising the vital roles of various inter-related sectors such as trade and transport in our economy, together with the growing importance of containerisation in these sectors as a mode of transport. In particular, there should be policies to improve technological innovations in the various engineering sectors, especially, transport engineering sectors for the development of world class modernised fleet such as merchant fleet, cruise ships, etc. so as to cope with the growing global demand of seaborne trade. Further, thrust should be given to growth and development of only world-class standard specialised category-wise cargo fleet such as oil tankers (supertankers (VLCC and ULCC)), bulk carriers, container ships, gas carriers, chemical tankers, reefers, etc., both in volume and capacity, in response to growing importance in the shifting composition of trade in the international trade as an impact of globalisation, thus, keeping an eye on the trend on the growth of world seaborne trade. For this, both centralised planning as well as decentralised transport planning are needed from ground root level at every state of the developing country, like, India, which may too, throw light even on the role of transport engineers

in this respect. Hence, the positive role and team work of the above mentioned policy prescriptioners are highly addressed, with a warm welcome in order to make the overall transport planning much more fruitful and decisive to speed up the much better and successful management of the transport sector of such a developing country like India. Let's hope for the best in the coming future.

REFERENCES

- Annual Shipping Report (2007-08). Retrieved from <http://www.shipping.nic.in>
- Banerjee, P. (1975). *Calcutta and its hinterlands*. Progressive Publishers. Calcutta.
- Barke, M. (1986). *Transport and trade*. Oliver & Boyd. Edinburgh.
- Bossche, M. V., & Gujar, G. (2010). Competition, excess capacity and pricing of dry ports in India: Some policy implications. *International Journal of Shipping and Transport Logistics*, 2(2), 151-167.
- Button, K. J. (1982). *Transport economics* (2nd ed.). Edward Elgar Publishing Company. USA.
- Chakraborty, S. (ed.) (1995). *Port of Calcutta, 125 years*, Calcutta Port Trust. Calcutta.
- Confederation of Indian Industry. (2006). *India Maritime Summit - India Maritime Landscape- A Background Note*. KPMG International. Mumbai.
- De, P. (1999). Performance of Indian ports. *Indian Ports*, 35(2), 5-12.
- Flor, L., & Defilippi, E. (2003). Port infrastructure: An access model for the essential facility. *Maritime Economics and Logistics*, 5(2), 116-132.
- Ghosh, B., & De, P. (1998). Role of infrastructure in regional development: A study over plan period. *Economic and Political Weekly*, 35(18-19), 3039-3048.
- Ghosh, B., & De, P., (2001). Indian Ports and Globalisation - Grounding Economics in Geography. *Economic and Political Weekly*, 36, 3271-3283.
- Ghosh, B., Marjit, S., & Neogi, C. (1998). Economic growth and regional divergence in India: 1960 to 1995. *Economic and Political Weekly*, 33(20).
- Gujrati, D. N., & Sangeetha. (2008). *Basic econometrics*. Tata Mc. Graw Hill Publications. New Delhi.
- <http://www.shipping.nic.in>
- Indian Ports Association, Major Ports of India, IPA, New Delhi - Various Issues. <http://www.ipa.nic.in>
- Jensen, A., & Bergqvist, R. (2013). Seaport Strategies for Pre-emptive defence of market share under changing hinterland transport system performance. *International Journal of Shipping and Transport Logistics*, 5(4/5), 432-448.
- Ministry of Shipping (GOI). Retrieved from <http://www.shipping.nic.in>
- Ministry of Shipping, Road, Transport & Highways. (2006). *National Maritime Development Report (Port Sector)*. Department of Shipping(GOI). New Delhi.
- Mukherjee, N. (1968). *The port of Calcutta: A short history*. The Commissioners for the Port of Calcutta: Calcutta.
- Ramkrishnan, R. (2003). Scenario of port handling & vision. *Indian Ports*, 35(2), 5-17.
- Ray, A. (1993). *Maritime India: Ports and shipping*. Pearl Publishers. Calcutta.
- Sau, S. (1997). *Port and development: A study of Calcutta port in India*. Firma Klm Private Limited. Calcutta.
- Taaffe, E. J., Morrill, R. L., & Gould, P. R. (1963). Transport expansion in underdeveloped countries: a comparative analysis. *Geographical Review*, 53, 503-529.
- Weigend, G. G. (1958). Some elements in the study of port geography. *Geographical Review*, 48, 185-200.
- Wu, J., & Liang, L. (2009). Performances and benchmarks of container ports using data envelopment analysis. *International Journal of Shipping and Transport Logistics*, 1(3), 295-310.