THE RELATIONSHIP BETWEEN TRADE OPENNESS AND REGIONAL INEQUALITY: CASE OF INDIAN MANUFACTURING INDUSTRIES

***Prateek Kukreja*[1]**

The present study aims at analysing the relationship between the trade openness of 20 major Indian states to international trade and per-capita income disparity between them. There are two contrasting views within the 'new economic geography (NEG) school' concerning the impact of trade liberalisation on regional inequality. While one group, pioneered by Krugman and Livas (1996) argues that trade liberalisation leads to de-concentration of economic activity as a result of the weakening of the process of agglomeration (i.e. backward and forward linkages), thus reducing regional disparity. On the other hand, there is another group of NEG theorists, including Paluzie (2001), who argue that trade liberalization benefits those regions the most, which have some initial advantage, such as regions favoured by the trading partner countries for some reason. This leads to the development of the favoured region at the cost of other regions. This further leads to concentration of economic activity, implying polarisation and therefore, greater regional disparity. The main objective of the study is to look at the trends of regional disparity in India, the contribution of various manufacturing industries to international trade and thereby examining the relationship between openness to trade and rising income disparity across Indian states over the years, with the help of the trade openness index and relative rankings of states based on the export performance and import competing performance. The findings suggest that the inter-regional income disparity has been rising over the years as shown by a sharply rising coefficient of variation as well as Gini coefficient over the years. However, it is found that richer states (with relatively higher level of per capita SDP) may not have a greater exposure to international trade (in terms of export performance as well as import competing performance) neither do the poorer states necessarily have a constrained access to international markets. Thus, "openness" of a state to trade does not have any significant relationship with its "richness" or "poorness". Therefore, our results suggest that openness to international trade per se, is not a significant factor causing polarisation; nor does it play a significant role in reducing inter-state disparity as suggested by the New Economic Geography literature.

INTRODUCTION

The Indian economy continues to be among the fastest growing economies in the world. Despite being one of the most populous countries, India has managed to not only maintain, but consistently improve its growth rate figure over time. However, this impressive growth rate has been maintained against the backdrop of historically widespread poverty and inequality conditions. There is a strong concentration of prosperity and wealth to specific regions and sectors. Economic reforms, such as trade liberalisation no doubt, have resulted in a spurt in the growth rate of national income (World Bank, 2008). However, it remains to be seen, whether, and if, to what extent this spurt in growth has translated into greater and equitable regional welfare within the country. There are two contrasting views within the 'new economic geography (NEG) school' concerning the impact of trade liberalisation on regional inequality. While one group, pioneered by Krugman and Livas (1996) argues that trade liberalisation leads to de-concentration of economic activity as a result of the weakening of the process of agglomeration (i.e. backward and forward linkages), as the domestic producers would now have their major markets, not in their

[1] Research Scholar, Centre for Study of Regional Development, Jawaharlal Nehru University, New Delhi, Email: prateekukreja89@gmail.com

domestic economy, but in their trading partners' countries and most of the required inputs will be imported. This would result in the shrinking of the large metropolis formed as a result of protectionist policies. On the other hand, there is another group of NEG theorists, including Paluzie (2001), who argue that trade liberalization benefits those regions the most, which have some initial advantage, such as regions favoured by the trading partner countries for some reason. The favoured region would then increase the demand for skilled labour. As they assume labour to be mobile within the country, so it can always move to the favoured regions and as a result, some particular regions may grow at the cost of others and therefore it may result in polarization rather than dispersal.

Also, traditional trade theories suggest that as a nation opens up to international trade, the exporting regions within the country should gain and import competing regions should lose. Therefore, if initially, the exporting regions were relatively well off, trade liberalisation is going to increase inter-regional disparity.

This study aims at analysing the relative income pattern in 20 major states of India, and examining its relationship with the "openness" of these states to trade, with the help of a trade openness index, a proxy which ranks states over time in terms of their openness to trade[1]. These states are ranked according to the export performance as well as their import competing nature.

LITERATURE REVIEW

Theoretical Literature

There are two contrasting views in the literature concerning the relationship between trade openness and regional inequality. One strand of literature including Paluzie (2001), Krugman and Venables (1995) etc. argues that trade liberalization necessarily leads to greater regional inequality. While Paluzie (2001) uses a NEG model and emphasises on the importance of labour mobility and considers it as a major force causing industrial agglomeration, brought about by trade liberalization, on the other hand, Krugman and Venables (1995) attempt to explain the relationship on the basis of the core-periphery framework.

NEG models typically involve a tension between the "centripetal forces" (pulling population and production into agglomerations) and the centrifugal forces, which tend to break such agglomerations up. Paluzie (2001) uses the interactions of economies of scale, market size and transport costs as the centripetal forces, whereas 'pull of the dispersed rural market' as the centrifugal force. According to Paluzie (2001), in autarky, concentration, and thus, regional inequality is limited because the rural as well as urban demand has to be met by the domestic industries, which requires industries to be more dispersed. When the country opens to international trade, it favours certain particular regions in the domestic economy, where the agglomerations take place, as now, domestic demand increasingly gets replaced by foreign demand and industries have an incentive to locate at the centre in order to take advantage of the agglomeration and have a better access to export and import markets. As labour is assumed to be mobile within country, so a greater demand for skilled labour arising in the favoured region leads to a drain of workers towards this region. This results in greater polarisation in terms of income inequality as well as overall regional imbalance.

Crozet and Koening (2004) also show that openness to international trade increases regional inequality. They argue that some of the regions of the country may have better access to foreign

markets. Thus, geographic factors may lead to an increase in concentration of industries, through cumulative agglomeration process in this advantaged region (provided the competition between firms is not very strong).

Krugman and Venables (1995) take declining transportation costs as the major force leading to greater concentration of industries. The declining transportation costs gradually result in the formation of the "Core" and the "Periphery". The region enjoying greater concentration of industries, becomes the core and the region losing by way of lower transportation cost, the periphery. The critical assumption of 'barriers to labour mobility' made by the authors allows for wage differential between the "core" and the "periphery". However, in the long run, in case transportation costs continue to fall, the significance of operating close to market also declines, so-much-so that the lower wages in the periphery may offset the disadvantage of being remote from consumers and thus, there will be an incentive for the manufacturers to move out from the "core" towards the "periphery" and thus may eventually lead to convergence of wage rates. However, this long run remains undefined.

Another strand of literature, pioneered by Krugman and Livas (1996) argues that trade liberalisation leads to lower regional inequality. Krugman and Livas (1996) use a NEG model to explain the Mexican case, which began to decentralize as it liberalized trade. They explain the growth of large Third World metropolis as a result of strong production linkages, arising due to largely inward oriented policies. However, as the economy opens up to international trade, these linkages get weakened as a result of factors like congestion costs and urban diseconomies like traffic congestion and pollution; and therefore, the large Third World metropolis tends to shrink. Consequently, economic activity becomes dispersed. The centripetal forces in operation are the same as in the case of Paluzie (2001), i.e. interactions between the economies of scale, market size and transport costs, whereas commuting cost/land rent, congestion costs, pollution etc. act as the centrifugal forces.

The main idea of the new economic geography models is that trade openness affects the location of economic activities, which is a major determinant of regional inequality.

Empirical Literature

The present study estimates the trade openness index based on the methodology adopted by Marjit et al. (2007). They devise an openness index based on rankings of 15 major Indian states according to their exposure to international trade. They, then rank the Per Capita Net State Domestic Products (PCNSDP) for these 15 states, and estimate the correlation coefficients between these two sets of ranks, in order to explain the dynamics of export-led regional development. Their findings support the explanation provided by the traditional trade theories, that exporting states are getting richer over years, while the import competing states are falling behind.

Daumal (2013) empirically investigates the effects of trade openness on regional inequality in India and in Brazil. She uses a co-integration technique and the Granger causality test. Gini coefficient is used as an indicator of regional inequality, whereas the ratio of (exports + imports) to GDP is used as a proxy for measuring trade openness. The study finds that Brazil's trade openness results in reduction of regional inequality, while India's trade openness aggravates regional inequality. On the other hand, Barua and Chakraborty (2006) find that trade openness reduces regional inequality in India.

There are certain studies estimating the impact of economic liberalisation on regional disparities. Gaur (2010) studies the impact of economic growth on regional disparity in India for 20 major states. The empirical results relating to inter-state disparity in terms of total and per capita SDP indicate huge disparities. Moreover, the inequality indices show a moderate increase during the post-reform period, relative to the pre-reform period. The study realizes widening income gap among the rich and poor, based on σ convergence and β convergence. Next, Aghion et al. (2004) show that India's 1991 economic liberalization boosted growth only in the specific, most productive Indian industries located in prosperous, high income states, like Karnataka, Andhra Pradesh and Tamil Nadu, and further aggravating regional inequality.

Another study by Pandey (2008) analyses the impact of Structural Adjustment Programmes (SAPs) and WTO arrangements on India's economic growth and export performance, using a simple linear regression model and employing the technique of slope dummy and intercept dummy, in order to incorporate the breaks caused by economic reforms and WTO. The study finds that the per annum growth in India's GDP, its components and exports have decreased after the economic reforms (i.e. 1991), and further declined after the advent of WTO (i.e. 1995).

OBJECTIVE

Traditional trade theories suggest that as a nation opens up to international trade, the exporting regions should gain from an increased market for exports, whereas the regions dominating in import competing industries should lose as they need to compete now with a larger international market. Therefore, if initially, the exporting regions were relatively rich, trade openness would lead to a greater regional income disparity.

So, our objective is to rank the Indian states, according to their exposure to international trade, based on the openness index constructed and estimating the relationship between their relative per capita incomes and their relative export performance, their relative import competitiveness and their relative "openness" to trade.

DATA AND METHODOLOGY

Trends in per capita income across states

We begin by analysing the recent trends in the PCNSDP (Per Capita Net State Domestic Product) for 25 major Indian states, over the period 2004-05 to 2011-12, as shown in table 1. The data on PCNSDP is taken from Directorate of Economics and Statistics of respective state governments, CSO. The series for the period was taken at current prices.

The Trade Openness Index

Our next task is to construct an openness index using a methodology developed by Marjit et al. (2007). First step involves estimating GVA of each industry, at 2-digit level of NIC-98 classification, for 16 major Indian states from 1998-99 to 2003-04. Only the manufacturing goods industries are considered, which requires a transformation of industrial classification by way of grouping each two digit product category (manufacturing) into one of the following groups: (a) Food, Beverages and Tobacco, (b) Textiles and Clothing, (c) Wood, (d) Paper, (e) Leather, (f) Chemical, (g) Rubber, plastics and Petroleum, (h) Non-Metals, (i) Base Metals, (j) Metal Products, (k) Machinery and Equipments, (l) Transport.

The share of value added contributed by each industrial group for all the states is calculated over the given period. The state-wise data on GVA at the 2-digit level of industrial classification is collected from Annual Survey of Industries (ASI), using the EPWRF (Economic and Political Weekly Research Foundation) database.

The share of value added (s_{it}^{k}) by each industrial group (i), for a particular state (k) is calculated using the following formula:

$$s_{it}^{k} = \frac{GVA_{it}^{k}}{TVA_{it}^{k}} \; ;$$

s_{it}^{k}: Production share of i^{th} industry in k^{th} state at time period t;

GVA_{it}^{k}: Gross Value Added of i^{th} industry in k^{th} state at time period t;

TVA_{it}^{k}: Total of all gross value added of industries

The next step is to analyse how these industrial groups performed with the export profile of India for each year under consideration. Now, the industrial classification for trade data (export and import) according to the Directorate General of Commercial Intelligence and Statistics (DGCI&S) publications, which uses the Harmonized System (HS) of trade classification, is different from the NIC-98 industrial classification. Therefore, we use the grouping (HS trade classifications tallied with NIC-98), used by Marjit et al (2007)[2].

Once the data on trade (exports and imports) has been collected and classified as per the groupings formed for all the years under consideration, the share of the industrial groups in total exports of India is calculated in the following way:

$$x_{it} = \frac{X_{it}}{X_t}$$

Where x_{it} measures the share of i^{th} industry in total exports in the t^{th} period; X_{it} is the export value of the i^{th} industry in the t^{th} period. X_t is the total export value of India in the t^{th} period.

Similarly, the import share is calculated in the following way:

$$m_{it} = \frac{M_{it}}{M_t}$$

Where m_{it} measures the share of i^{th} industry in total imports in the t^{th} period; M_{it} is the import value of the i^{th} industry in the t^{th} period. M_t is the total import value of India in the t^{th} period.

The export shares and import shares of all the industrial groups, over the years are shown in Table B and Table C respectively.

Now we have the share of value added by each industrial group for each state (s_{it}^{k}) over the period under consideration, as well as the export and import shares (x_{it} *and* m_{it}) of these industrial groupings to total exports and imports of India respectively, during the period. Next, we find the correlation coefficient between s_{it}^{k} and x_{it} and between s_{it}^{k} and m_{it}. These correlation coefficients reflect how well the production of states matches with the trade pattern of the country as a whole. These correlation coefficients are then ranked across states for each particular year, such that R_{xt}^{k}

and $\check{R}^k_{mt} \in (1,2,3,\ldots,16)$ provide the rank of the correlation between export and import shares respectively. A rank 1 is allocated to the state with the highest correlation between x_{it} and s^k_{it}. On the other hand, in case of imports, inverse ranking is followed. The state with the lowest correlation coefficient between m_{it} and s^k_{it} is given rank 1 (implying that it is the least import competing state)[3].

Finally, we arrive at constructing the trade openness index. Once we have R^k_{xt} and $\check{R}^k_{mt}$, we assign a weight half to each of these ranks, and estimate the openness index in the following way:

$$O^k_t = 1/2\ (R^k_{xt} + \check{R}^k_{mt})$$

Now, we rank the openness index across states, giving lowest rank to the highest score. Thus, the state with the highest score, which is the most "open" state, would be ranked 1, and so on, as shown in Table 4.

Table 1

PCNSDP at Current Prices over Time across States

State	1999-00	2004-05	2009-10	2010-11	2011-12
Andhra Pradesh	16327	25321	51114	62148	69742
Assam	12196	16782	28383	33087	36415
Bihar	6147	7914	15457	19111	22582
Jharkhand	13743	18510	28223	34721	36554
Gujarat	20940	32021	64097	77485	87175
Haryana	23401	37972	82037	93852	106358
Himachal Pradesh	22241	33348	58402	68297	75185
Jammu & Kashmir	15529	21734	33650	40089	46734
Karnataka	19041	26882	51364	62251	68053
Kerala	21335	31871	60226	67652	78387
Madhya Pradesh	13215	15442	28651	32453	37979
Chhattisgarh	12713	18559	34366	41165	48366
Maharashtra	25641	36077	69765	84858	93748
Orissa	11460	17650	33029	39537	41876
Punjab	25735	33103	61805	69582	76895
Rajasthan	14984	18565	35254	44644	52735
Tamil Nadu	21233	30062	64338	78473	89050
Uttar Pradesh	10351	12950	23671	26698	30071
Uttarakhand	14487	24726	62757	73819	85372
West Bengal	15870	22649	41039	47245	53383

Source: Directorate of Economics and Statistics, Central Statistics Office (CSO), MoSPI

FINDINGS AND INTERPRETATIONS

Trends in per capita income across states

Table 1 shows the recent trends in PCNSDP at current prices, across 20 major states over the period 1999-00 to 2011-12. As one may clearly infer, Haryana has witnessed the highest PCNSDP almost throughout the period. Bihar, on the other hand witnesses lowest PCNSDP figures (among these 20 major states) over the entire period.

For most of the other states as well, it can be clearly inferred from the table that barring very slight variations in rankings, the relative rankings in terms of PCNSDP have more-or-less remained same over the entire period. This shows that the rich states have remained rich, whereas the poor states have remained poor over the years. Therefore, the regional inequality in terms of per capita income has been rising.

The Trade Openness Index

As explained above, the first step in calculating the openness index is estimating the production share of each industrial group for each of the 20 major Indian states under consideration during a particular time period. Next, the export shares and import shares of these industry groups are calculated. Then, these production shares are correlated with the export shares and import shares separately.

Ranks of correlation coefficient between export share and gross value added share of industries in various states is estimated in table 2.This is also known as the export performance rank.

Table 2

Rank of correlation coefficients between export shares and GVA share of industries

States	2004-05	2009-10	2010-11	2011-12
Andhra Pradesh	11	6	6	6
Assam	14	10	16	10
Bihar	20	20	20	20
Chhattisgarh	16	16	15	19
Gujarat	3	1	2	2
Haryana	18	19	18	18
Himachal Pradesh	9	5	7	4
Jammu & Kashmir	1	3	3	3
Jharkhand	17	17	14	17
Karnataka	7	7	5	15
Kerala	10	11	8	9
Madhya Pradesh	5	13	11	11
Maharashtra	8	2	4	5
Orissa	15	15	12	16
Punjab	4	4	13	1
Rajasthan	12	14	19	14
Tamil Nadu	6	18	17	13
Uttarakhand	13	12	9	7
Uttar Pradesh	19	8	10	8
West Bengal	2	9	1	12

Source: Author's calculation based on data obtained from Directorate of Economics and Statistics, CSO, MoSPI

As can be inferred from the table, Gujarat shows the second highest correlation between export shares and GVA shares for the years 2006-07 to 2008-09; and the highest, during 2009-10. This shows that Gujarat is the most export oriented state in India. On the other hand, Bihar and Haryana are among the least export oriented regions, as the export correlation is the lowest for these states during the time period considered[4].

Inverse ranks of correlation coefficient between import share and gross value added share of industries in various states is estimated in Table 3. Inverse ranks are estimated in this case because higher import correlation means that state is contributing less to the import substituting production. This rank is therefore also called as the import competing performance rank.

Table 3

Inverse Rank of correlation coefficients between import shares and GVA share of industries

States	2004-05	2009-10	2010-11	2011-12
Andhra Pradesh	19	18	15	15
Assam	9	7	5	6
Bihar	1	8	1	1
Chhattisgarh	15	15	19	18
Gujarat	13	19	14	10
Haryana	3	2	4	2
Himachal Pradesh	8	11	11	9
Jammu & Kashmir	12	12	12	12
Jharkhand	14	13	18	17
Karnataka	18	17	16	20
Kerala	7	5	8	4
Madhya Pradesh	10	4	7	7
Maharashtra	17	16	13	13
Orissa	16	14	20	19
Punjab	5	10	2	8
Rajasthan	6	3	6	3
Tamil Nadu	2	1	3	5
Uttarakhand	11	6	9	14
Uttar Pradesh	4	9	10	11
West Bengal	20	20	17	16

Source: Author's calculation based on data obtained from Directorate of Economics and Statistics, CSO, MoSPI

As table 3 shows, Bihar has the lowest import correlation through the period under consideration, and therefore has been assigned an inverse rank of 1 for all the years except 2008-09 (when it ranked 8). Thus, Bihar is found to be the least import competing state. West Bengal, on the other hand, has the highest import correlation coefficients for more-or-less the entire period under consideration. Therefore, West Bengal has been assigned an inverse rank of 20 for the periods 2004-05 to 2009-10; and an inverse rank of 17 and 16 for the periods 2010-11 and 2011-12 respectively. This shows that West Bengal is the most import competing state for the period under consideration.

Once the export performance ranks and the import competing performance ranks have been estimated, as discussed above, the next step is to construct the "openness index". Based on the openness index, we then rank the states, such that lowest rank is provided to the state with the highest openness score in that particular year; and vice-versa.

As one may infer by looking at Table 4, Punjab has the lowest "openness" score for the periods 2005-06, 2006-07 and 2008-09 to 2011-12 and therefore has been provided with rank 1 during these periods. Thus, we may say that Punjab is found to be the most open state for a majority of period under consideration. On the other hand, Chhattisgarh experiences the highest value of "openness index" during 2009-10 to 2011-12; and therefore has been assigned the highest rank over this period. Thus, Chhattisgarh is deemed to be the least open state for the most part of the period.

Table 4

Yearly Openness Index ranks of Indian States

States	2004-05	2009-10	2010-11	2011-12
Andhra Pradesh	4	6	6	6
Assam	12	5	12	6
Bihar	9	16	12	13
Chhattisgarh	18	20	20	20
Gujarat	5	12	3	2
Haryana	9	13	16	12
Himachal Pradesh	6	3	6	3
Jammu & Kashmir	3	2	1	5
Jharkhand	18	19	18	17
Karnataka	15	14	12	18
Kerala	6	3	3	3
Madhya Pradesh	4	5	6	8
Maharashtra	15	9	5	8
Orissa	18	17	18	18
Punjab	2	1	1	1
Rajasthan	8	5	17	7
Tamil Nadu	1	11	10	8
Uttarakhand	14	9	6	13
Uttar Pradesh	12	5	10	11
West Bengal	11	17	6	16

Source: Author's calculation based on data obtained from Directorate of Economics and Statistics, CSO, MoSPI

MEASURING REGIONAL INCOME DISPARITY

We attempt to measure the regional income disparity using the indices of (a) Coefficient of Variation.; (b) Gini Coefficient; and (c) Relative Mean Deviation.

We begin by observing the income disparity among the 20 major states over time in terms of the coefficient of variation in the PCNSDP. It has been observed that the coefficient of variation has risen from 31.12 during 1999-00 to around 38.07 during 2011-12; which is a rise of about 22.3 per cent. This shows a consistent rise in regional income disparity across states. During the same period, the Gini Coefficient of PCNSDP has increased from 0.176 to 0.218. Thus, there has been a rise in Gini Coefficient by about 23.5 per cent. Next, we move to the relative mean deviation, in order to estimate the relative position of a particular state with respect to mean income at a particular period. Then, each state is ranked according to the relative mean deviation value. It is observed that Punjab tops the list whereas Bihar is assigned the lowest rank based on the relative mean deviation estimate for the entire period under consideration. Thus, relatively speaking, Punjab has been the richest while Bihar has been the poorest state among all major states under consideration.

OPENNESS AND INTER-REGIONAL INCOME DISPARITY

We find the relationship between the export performance and PCNSDP across states for the period 2004-05 to 2011-12. We rank the states according to their PCNSDP from 2004-05 to 2011-12. States with a higher PCNSDP are assigned higher ranks, i.e. State with the highest PCNSDP would be assigned rank 1. This set of ranks is then correlated with the set of ranks based on the export performance across states[5]. Figure 1 depicts this relationship, which enables us to analyse

the dynamics of export-led regional development. As one could clearly infer from Figure 1 that although, the correlation coefficient between the two sets of ranks has remained positive over the entire period, it does not follow any particular trend. Therefore, over-time, the relationship neither seems to strengthen, nor does it seems to weaken. This shows that the more export oriented a state is, greater would be the chances of disparity in per capita SDP[6].

Figure 1

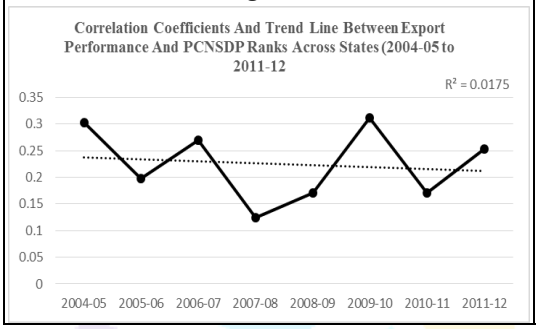
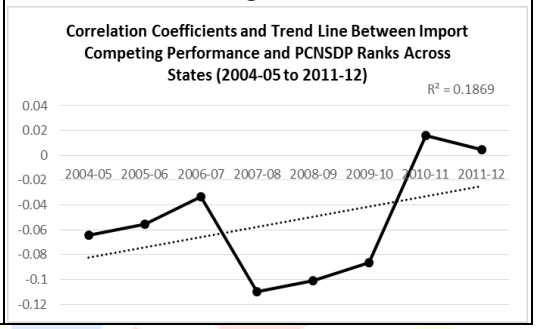


Figure 2



Source: Author's calculation based on data obtained from CSO, MoSPI

Next, we estimate the relationship between import competing performance and PCNSDP across states for the period 2004-05 to 2011-12, by correlating the set of PCNSDP ranks with the set of inverse ranks based on import competing performance[7]. The scatter plot for the correlation coefficient between the two sets of ranks is depicted in Figure 2. As one may clearly see, the correlation coefficient figures have remained negative for a major part of the period. This shows that more import-competing a state is; higher would be the PCNSDP over time. However, an upward sloping trend line shows that this relationship is getting weakened over time.

Figure 3

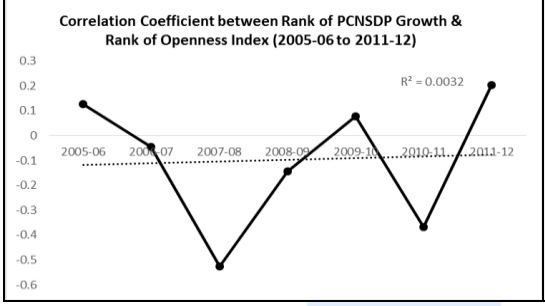
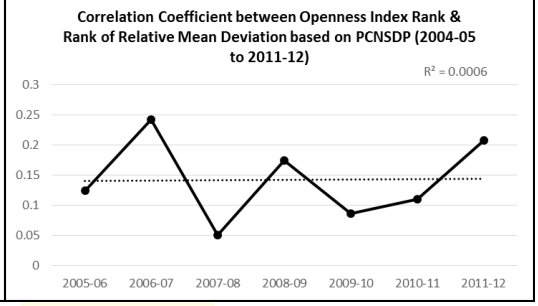


Figure 4



Source: Author's calculation based on data obtained from CSO, MoSPI

Next, in order to link states' openness to trade with the PCNSDP, we correlate the openness index ranks with the ranks of states according to PCNSDP growth rates. Figure 3 shows that the correlation coefficients do not depict any discernible pattern, suggesting that "openness" of a state to trade does not have any significant relationship with its "richness" or "poorness".

Finally, we show the relationship between openness index ranks and relative mean deviation ranks in Figure 4. As one may clearly infer that the correlation coefficient has remained positive throughout the period, suggesting that as states become more open to international markets, the

inter-regional disparity in per capita income rises. However, the relationship between variables is quite weak as shown by a close to zero R-squared value.

Therefore, our analysis supports the notion that there is very weak relationship, if any, existing between the trade openness and inter-state disparity in India. Our results are in conformity with the other state-level or district-level empirical studies carried out in this area in the Indian context.

CONCLUSION

Our objective in this study has been to analyse the relationship between the trade openness and inter-regional income disparity among 20 major Indian states, using the trade openness index initially developed by Marjit et al. (2007). The process involves a ranking of the states on the basis of the extent of their exposure to international trade. The extent of exposure is measured by the relative contribution of each state's industrial group in the manufacturing sector, in the total GVA; and matching the ranking with the ranking of these industrial groups, based on the export performance and import competing performance of these groups.

We find that firstly, the inter-regional income disparity has been rising over the years as shown by a sharply rising coefficient of variation as well as Gini coefficient over the years. Secondly, richer states (with relatively higher level of per capita SDP) may not have a greater exposure to international trade (in terms of export performance as well as import competing performance) neither do the poorer states necessarily have a constrained access to international markets . Thus, "openness" of a state to trade does not have any significant relationship with its "richness" or "poorness". Therefore, our results suggest that openness to international trade per se, is not a significant factor causing polarisation; nor does it play a significant role in reducing inter-state disparity as suggested by the New Economic Geography literature.

However, as for any analysis, there are some limitations of the present study as well. Firstly, the industrial groups have been formed on the basis of 2-digit industrial classification, and tallied it with the 3-digit as well, however any changes occurring below the three digit level will not be captured. Secondly, the period under consideration is too small. This is because the ASI data for the years beyond 1998-99 was available at NIC-2005, and the concordance of which with the HS systems of trade classification was not available. Therefore any changes occurring over long periods of time may not be captured in the study.

Notes

[1] A methodology used by Marjit et. al. (2007)

[2] See table A

[3] See table 2 and table 3

[4] Haryana was found to be the state with highest per capita SDP during the period

[5] See Table 2

[6] However, readers are cautioned here against drawing any conclusions based on such inference, since the relationship between variables is quite weak (depicted by a low R^2 value)

[7] See Table 3

References

Aghion, Philippe, Robin Burgess, Stephen Redding, and Fabrizio Zilibotti. "The Unequal Effects of Liberalization: Theory and Evidence from India." mimeo, UCL, LSE and IIES, 2004.

Barua, Alokesh, and Debashis Chakraborty. "Liberalization, trade and industrial performance: an empirical analysis for India." In paper for the 2nd APEA Conference, held at the Center for International Economics, University of Washington, Seattle. 2006.

Crozet, Matthieu, and Pamina Koenig-Soubeyran. "Trade liberalization and the internal geography of countries." Multinational Firms' Location and the New Economic Geography, Edward Elgar, Cheltenham (2004): 91-109.

Daumal, Marie. "The impact of trade openness on regional inequality: the cases of India and Brazil." The International Trade Journal 27, no. 3 (2013): 243-280.

Gaur, Achal Kumar. "Regional Disparities in Economic Growth: A Case Study of Indian States." In IARIW 31 st General Conference, St-Gallen, Switzerland. 2010

Krugman, Paul, and Anthony J. Venables. "Globalization and the Inequality of Nations" No. w5098. National Bureau of Economic Research, 1995.

Krugman, Paul, and Raul Livas Elizondo. "Trade policy and the third world metropolis." Journal of development economics 49, no. 1 (1996): 137-150.

Li, Muqun, and Ian Coxhead. Trade, Technology and Inequality in a Developing Country: Theory and Evidence from China. No. 539. University of Wisconsin, Agricultural and Applied Economics, 2009.

Marjit, Sugata, Saibal Kar, and Dibyendu S. Maiti. "Regional trade openness index and income disparity: a new methodology and the Indian experiment."Economic and Political Weekly (2007): 757-769.

Paluzie, Elisenda. "Trade policy and regional inequalities" Papers in regional science 80, no. 1 (2001): 67-85.

Pandey, Alok Kumar. "Globalization and WTO: Impact on India's economic growth and export." (2008).

Rodríguez-Pose, Andrés, and Nicholas Gill. "How does trade affect regional disparities?" World Development 34, no. 7 (2006): 1201-1222.

Sjöberg, Örjan, and Fredrik Sjöholm. "Trade liberalization and the geography of production: agglomeration, concentration, and dispersal in Indonesia's manufacturing industry." Economic Geography 80, no. 3 (2004): 287-310.

Annexure Tables

DGCI&S (HS trade classification) data tallied with ASI (NIC-98 classification) data

Industry	NIC-98 Code	DGCI&S (HS Classification)
Food, Beverage and Tobacco	15-16	Chapter 1-24
Textiles	17-18	Chapter 50-63
Wood	20	Chapter 44-46
Paper	21-22	Chapter 47-49
Leather	19	Chapter 41-43
Chemical	24	Chapter 28-38
Rubber, Plastics and petroleum	23,25	Chapter 27 + Chapter 39-40
Non-Metal	26	Chapter 68-70
Basic-Metals	27	Chapter 72-81
Metal Products	28	Chapter 82-83
Machinery and Equipments	29-33,36	Chapter 84-85 + Chapter 90-92
Transport	34-35	Chapter 86-89