



Decomposing Sources of India's Petroleum Exports Growth (1990–2020)

A Constant Market Share Analysis

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ABSTRACT

The export basket of India has experienced a significant structural change since the early 1990s and its petroleum products have distinguished themselves as a standout commodity in the realm of exports, experienced a steady and remarkable increase since the post-liberalization era. In spite of this growth, the performance of petroleum exports has been fluctuating and disjointed over time, product category, and markets. Thus, it becomes pertinent to decompose the sources of this rapid export growth. Against this backdrop, this article applies the constant share market analysis to decompose sources of India's petroleum growth during 1990–2020. The results indicate that residual competitiveness effect had an overwhelming role in the petroleum exports growth of India between 1990 and 2020 with the effects of world demand, commodity composition and market distribution having a relatively lower role at the aggregate level. The disaggregated results, however, indicate a lot of instability. A comparatively balanced mix of competitiveness, world demand, market distribution and commodity composition effects underpinned the export boom in 2005–2010 but the contrary situation characterized the downturn in 2010–2015 with a significant loss of competitiveness. Further commodity-based and market-based decompositions indicate that the gains in competitiveness were focused in a few targeted petroleum products and destination markets besides that in a number of markets, positive demand or product-structure effects were offset by poor competitiveness. It is concluded that the petroleum export growth of India has been remarkable yet structurally disproportionate. A sustainable export policy demands diversification of products, modernization of refineries, export products that are market specific, efficient logistics and routine reassessment of product destination competitiveness.

Keywords: Export Growth, Competitiveness, Constant Market Share, India, Petroleum Exports, World Demand

INTRODUCTION

After the economic reforms of 1990s, India has emerged as one of the fastest growing economies in the world with its growth trajectory shaped by liberalisation, structural reforms, service sector expansion and deeper global integration (World Bank, 2018, 2024). India's export structure has experienced paramount changes and rise of petroleum exports as top exporting commodity is one of those changes (Singh, 2011; Singh, 2014; Shalu et al., 2023). These remarkable changes have been observed as result of liberalization, globalization, and privatization programs implemented in 1991 (Panagariya, 2004; EXIM, 2014). Under this strategy, exports of non-traditional items have grown at faster rate than traditional items. As a

result, the exports of petroleum products, whose share in India's export earnings was negligible has achieved remarkable rise and reached above 10 percent after 2005–06 (Krishna & Kumar, 2015; Shalu et al., 2023). Though, it has experience decline after 2010 due to loss of competitiveness which was mainly attributed to the decline in prices and appreciation of the rupee. (Kumar and Shipra, 2018). The emergence of petroleum exports after 2000 as leading export commodity in India's export basket was mainly due to remarkable expansion in the refining capacity which has increased to 249.36 MMTPA in 2020 (FICCI, 2018; MOPNG, 2020). The government has implemented several reforms in exploration and production of petroleum products. The Indian private companies along with

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foreign companies were allowed to invest in petroleum refining industry. Resultantly, the production capacity of India's oil companies was improved which further reduced the crude and petroleum products imports and saved foreign exchange earnings for the country. To increase the refining capacity by 20% by 2025, a target of \$27 billion has been set (Reuters, 2021).

The export performance of India has shown a distinct improvement after 1991 as the value of exports registered a growth of 12.45 percent annum during 1990–2019. The contribution of India's petroleum exports in total exports has increased sharply and it has become among leading refined petroleum exporting nations with its increasing refining capacity during 2001–02 (Singh et al., 2022). India has fairly become a major player in exports of refined petroleum products in the Asian market (Bhat, 2011; Sheryl, 2012; Sinha, 2016; Rashmi, 2013; Parikh et al, 2007; Veeramani, 2012; MOPNG, 2020; Azhar, 2022). India has experienced substantial rise in quality and value of petroleum products exports which was 61.10 MMT and Rs. 267697 crores respectively during 2018–19 (IBEF, 2019). India has achieved respectable place in terms of its share of petroleum exports in the world which was only 0.17 percent during the period 1990–99 to 2.54 percent during 2010–19. Export destination wise, India's petroleum export registered tremendous rise among selected developed and developing countries especially after 2010 (Shalu et al., 2023). The petroleum export performance has been influenced by several factors which laid down internal and external influences and are inter-dependent (Nayyar, 1976; Kapur, 1991; Singh and Singla, 2012; Singh, 2014; Kumar and Shipra, 2018). These factors are mainly related to the (i) world demand growth; (ii) exports' commodity composition of (iii) exports' market distribution (iv) exports competitiveness (v) foreign incomes level (vi) income elasticity of demand in the export destinations (Veeramani, 2007; Singh, 2014). Though, petroleum exports performance achieved rapid growth, it has remained prone to severe fluctuations. Therefore, it becomes pertinent to explore the sources of such export performance. Against this backdrop, this study decomposes sources of export growth of India's petroleum products during the period 1990–2020 by employing the constant market share analysis which consists of its main elements that

highlight the contribution of world demand, export specialisation, export destination selection, and export competitiveness.

This article is structured into five sections. Section I presents introduction, research problem statement along with need and objective of the study. The review of literature and research gap are presented in Section II. The methodology and data issues are explained in section III. The section IV presents results and discussion based on the data analysis. Lastly, section V presents concluding remarks, including policy implications and future research directions.

REVIEW OF LITERATURE

Constant-market-share (CMS) analysis is widely accepted method to examine export performance of India and other countries. Tyszynski (1951) has introduced CMS analysis in the field of international trade, followed by Baldwin (1958), Spiegeeglas (1959) and Naya (1967). Ashby (1964) has used it for analysing regional economic performance. Learner and Stern (1970, 2006) have improved this model and utilised it in the fields of international marketing and international trade. Afterwards, it was applied by Richardson (1971a, 1971b) on developing countries. He concluded that the economically less developed countries achieved market share at the expense of the more developed ones. Fagerberg and Sollie (1987) has also elaborated the model further. Singh et al. (2022) used this model to decompose China's export growth.

This approach has been used by Bhagwati and Srinivasan (1976) in the Indian context to evaluate the performance of the Indian exports during 1951–60 and concluded that country's inability to sustain its export share during the period resulted in decline in export earnings. Bishwas (1982) has found the negative structural and competitiveness effects have reduced the share of India in the world during 1959–1968 using CMS analysis. Tiwari (1986) has examined India's export competitiveness using CMS model during the period 1970–77. Agarwal (1988) and Kapur (1991) segmented the export sources into structural effects and competitiveness effects and concluded that the former were more competitiveness than the latter. Gupta and Ray (1998) identified real exchange rate as an important factor in the share of

the India's exports to USA. CMS has also used by Laursen (1999) and Montobbio and Ramp (2005) for analysing the competitiveness and structural changes in India's exports. Using this model, Veeramani (2007) found that the real growth of India's exports has been higher than the potential growth gained because of an increase in the demand for India's exports in the world from 1962 to 2005. Singh (2014) found that growth of India's total exports during the period 1991–2011 was attributed to the increasing world demand. A positive competitiveness effect was observed in case of the majority of the broad categories of exports during the study period. Adopting this model by Jain (2017) showed that the export competitiveness of India has improved in the textile and clothing industry. Varalakshmi and Devatkal (2017) have explained the export performance of the Indian bovine meat trade by CMS Analysis and found that the exports of bovine meat were highly competitive in the new market as compared to the major traditional market. Arora and Batra (2019) in their study on competitiveness in oilseeds exports to India through CMS analysis have revealed that India is not competitive in oilseeds exports. This model was also used by Kumar (2022) to examine the competitiveness of India's agriculture exports during 1990–2021.

Above review of previous studies brought out that performance of India's petroleum exports has not been analysed till date, though it has become India's top exporting item especially since 2010. Therefore, it is pertinent to decompose the sources of rapid export growth of petroleum products in India during 1991–2020.

METHODOLOGY

This study investigates the export performance of the petroleum products of India in the period 1991–2020 using the Constant Market Share (CMS) analysis. This study follows the CMS methodology as used by Singh (2014). CMS is a decomposition method that aims to identify the sources of export growth by breaking down the export growth into four components. First component shows contribution of world demand and denoted as world demand effect (WDE). The second important component indicates the role of country's export specialisation and called as commodity composition effect (CCE). Third component is

market distribution effect (MDE) which highlight the contributions country's export direction. Lastly, residual competitiveness effect (RCE) is a residual representing the effect of both price and non-price competitiveness of a country's exports.

The model used in the study for the CMS is given by:

$$\Delta X = \sum_i r X_i + \sum_i (r_i - r) X_i + \sum_i \sum_j (r_{ij} - r_i) X_{ij} + \left[\Delta X - \sum_i \sum_j r_{ij} X_{ij} \right]$$

where, ΔX = change in India's petroleum exports; r = world's exports (total) growth excluding India; r_i = world's commodity i^{th} exports growth of excluding India; r_{ij} = world's exports growth of commodity i^{th} to market j^{th} excluding India; X_i = commodity i^{th} exports from India in the base period; X_{ij} = commodity i^{th} exports of India to market j^{th} in the base period.

The world demand effect refers to the increase in exports that would have taken place had India's petroleum exports increased at the same rate as world exports. The commodity composition effect refers to the shift in India's export basket toward goods that are seeing faster or slower global demand growth. The market distribution effect reflects the nature of India's exports, namely whether they go to dynamic or stagnant destination markets. Residual competitiveness effect quantifies the difference between the actual export growth and the growth that would have occurred if the world demand, product composition and market distribution were not changing, reflecting the change in India's competitive position.

Analysis is conducted at both aggregate and disaggregated levels, with SITC Revision-2 classification, at the 2-digit and 4-digit levels. The study also projects the decomposition down to selected petroleum products and key export markets. The data have been gathered from World Integrated Trade Solution, Reserve Bank of India and Ministry of Petroleum and Natural Gas. The potential export growth is based on the growth in exports that would have happened if India had kept its share in world petroleum exports constant.

RESULTS AND DISCUSSION

Table 1 presents a comparative picture of the import demand of petroleum products of major partner countries and India's export penetration in those markets between 1995 and 2020. A clear reading of

the table indicates that the aggregate import demand of the selected economies expanded substantially during the period, rising from US\$ 290,692 thousands in 1995 to US\$ 1,342,561 thousands in 2020. Over the same period, imports from India into these markets increased sharply from US\$ 507 thousands to US\$ 19,001 thousands. Consequently, India's average share in the import basket of these countries rose from 0.17 percent in 1995 to 1.42 percent in 2020. This implies that India was not only capitalising on the growth of world demand, but also its share in some of the importing markets improved. However, the absolute size of the share is still small, suggesting that despite significant improvements, India's exports to these markets are still not in proportion to the overall import potential.

Detailed analysis of the country-specific pattern suggests that India's export growth was especially strong in a few Asian, African and other smaller trade-partner markets. For example, India's share increased significantly in Singapore (from 0.17 percent to 4.80

percent), Turkey (from 0.37 percent to 16.75 percent), Malaysia (6.87 percent), South Africa (7.24 percent), Sri Lanka (16.06 percent) and Kenya (16.34 percent). These data show a significant improvement in the market share of India in these regions where, perhaps, either trade complementarities, geographical proximity, policy complementarities, or competitiveness of India's exports may have played a role. Likewise, India also enhanced its participation in markets such as Italy, Brazil, Australia and Other Asia, where its share in 2020, although not leading, became more significant than in 1995.

The table also indicates that India's relative export performance was modest in some large and significant developed markets. In the USA, India's share grew from 0.08 percent to 1.60 percent, in Japan from 0.29 percent to 1.13 percent, in the UK from 0.27 percent to 1.32 percent, and in France from 0.29 percent to 1.40 percent. While these are significant relative increases, they are still low in absolute terms, given the size of

Table 1: Petroleum Products Imports (SITC-33) of India Partner Countries and India's Export Penetration from 1995–2020 (Value in US \$ '000)

Export Destinations	1995			2020		
	Total Imports	Imports from India	Share%	Total Imports	Imports from India	Share%
Singapore	10041	17	0.17	43822	2104	4.80
EU	0	0	0.00	189514	1387	0.73
USA	56067	47	0.08	118093	1885	1.60
Korea, Rep.	14687	210	1.43	57095	1059	1.85
Japan	36144	106	0.29	54683	619	1.13
Turkey	3317	12	0.37	5881	985	16.75
Brazil	5127	14	0.28	10901	287	2.64
Other Asia, nes	5282	0	0.00	18158	534	2.94
Netherlands	10290	0	0.00	43292	409	0.95
South Africa	2194	0	0.00	8222	595	7.24
France	13774	40	0.29	29678	415	1.40
Malaysia	1570	0	0.03	17371	1193	6.87
UAE	0	0	0.00	36076	2240	6.21
UK	7403	20	0.27	25691	339	1.32
Sri Lanka	0	0	0.00	1384	222	16.06
Kenya	408	0	0.00	1699	278	16.34
Australia	2867	0	0.00	16616	349	2.10
Italy	13349	0	0.00	21000	974	4.64
Indonesia	3045	0	0.00	11916	153	1.28
Spain	7540	0	0.01	23736	58	0.24
Others	92918	34	0.04	399970	2675	0.67
Total	290692	507	0.17	1342561	19001	1.42

Source: Authors' computations-based World Bank data.

these countries' import markets. This points to the fact that while India's exports have grown impressively in absolute terms, they have yet to achieve a substantial competitive position in these major advanced economies.

Taken together, the table suggests a mixed but positive trend. India substantially increased the value of its exports to a broad spectrum of partner countries and enhanced its market share in most of them in 1995–2020. But the improvements were not uniform, with better performance in some emerging markets and in some regional markets, and lower in the major industrial markets. Hence, the data also point to the fact that India's petroleum exports growth over the period was accompanied by a better market access and/or competitiveness, but also signal that, if India is to consolidate its position in the major world import markets, it needs to diversify, upgrade its products and develop market-specific export strategies.

Table 2 presents the analysis of decomposing sources of petroleum exports growth in India between 1990 and 2020 based on the constant market share model. The growth in the petroleum export of India during the

whole study period was US\$ 887,074 thousand with the residual competitiveness effect (RCE) contributing the largest share of US\$ 871,574 thousand or 98.25 percent of the total increase in the petroleum export. In contrast, the contributions of the world demand effect (WDE), commodity composition effect (CCE), and market distribution effect (MDE) were extremely small, contributing only 0.26 percent, 0.27 percent, and 1.22 percent, respectively. This trend is a clear indication that the long-run growth in the export of petroleum in India was propelled more by the competitiveness effect than by positive changes in the global demand, commodity structure, or market distribution. That is, the export performance in petroleum in India seems to have been influenced far more by the ability of the country to compete in the global markets than by the benefits of the exogenous demand.

Disaggregated analysis of sub-periods indicates that there are significant fluctuations in the sources of export growth. In 1990–95, the competitiveness effect (99.91 percent) was seen to explain almost all of the increase in petroleum exports (in US\$ 44,169.11 thousands), with a minor positive contribution made by the commodity

Table 2: Decomposition of India's Total Petroleum Exports Growth during 1990-2020 (Value in '000 US\$)

Year	Exports Growth	WDE	CCE	MDE	RCE
	ΔX	rXi	$riXi - rXi$	$rijXij - riXi$	$changeX - rijXij$
1990-2020	887074 (100)	2331 (0.26)	2364 (0.27)	10803 (1.22)	871574 (98.25)
1990-1995	44169 (100)	0 (0.00)	201 (0.45)	-163 (-0.37)	44131 (99.91)
1995-2000	-4512 (100)	74239 (-1645.23)	-14186 (314.37)	704404 (-15610.38)	-768970 (17041.24)
2000-2005	290899 (100)	31249 (10.74)	6678 (2.30)	10578 (3.64)	242394 (83.33)
2005-2010	719663 (100)	224697 (31.22)	99770 (13.86)	143387 (19.92)	251809 (34.99)
2010-2015	-237684 (100)	-272687 (114.73)	379796.95 (-159.79)	5051164 (-2125.16)	-5395958 (2270.22)
2015-2020	74539 (100)	-286786 (-384.75)	114055 (153.01)	209106 (280.53)	38164 (51.20)
1990-2000	39658 (100)	1385 (3.49)	-882 (-2.22)	1172 (2.96)	37981 (95.77)
2000-2010	1010562 (100)	79894 (7.91)	45824 (4.53)	1318 (0.13)	883525 (87.43)
2010-2020	-163145 (100)	-547132 (335.36)	631271 (-386.94)	2523017 (-1546.48)	-2770302 (1698.06)

Source: Authors' computations-based World Bank data.

Note: The percentage shares are presented in brackets below the corresponding dollar values (\$)

composition effect and a small negative contribution by the market distribution effect. This implies that early reform era India did not experience a structural shift in product composition or market dispersion in facilitating its export growth, but in fact, in enhancing its own export competitiveness. Nonetheless, this changed in 1995–2000 with petroleum exports recording a decrease of US\$ 4,512 thousands. The market distribution effect and the world demand effect were both positive in absolute terms, but the negative competitiveness effect was sharp, which overshadowed the gains, causing an overall contraction. This implies that there were unfavourable competitive factors that overwhelmed the positive gains that accrued as a result of external demand growth and market positioning in the second half of the 1990s. There was a vigorous recovery in the period 2000–2005 and petroleum exports increased by US\$ 290,899 thousands. Again, the competitiveness effect (83.33 percent) contributed the largest portion of this growth, but world demand, commodity composition and market distribution effects contributed more comparatively smaller but positive amounts. The next quarter, 2005–10, was the strongest period of the whole decomposition, as exports went up by US\$ 719,663 thousands. This was a broad-based growth as compared to the previous times. The competitiveness effect was the only largest contributor (34.99 percent), but the world demand effect (31.22 percent), market distribution effect (19.92 percent), and commodity composition effect (13.86 percent) were also important contributors. This implies that the export boom during this period was not only facilitated by the enhanced competitiveness but also by the positive demand conditions in the world market as well as more favourable market and commodity structure. An entirely different trend was experienced in 2010 to 2015 where the exports of petroleum in India went down by US\$ 237,684 thousands. The decomposition results during this period indicate very off-setting forces. Although the commodity composition and market distribution effect were very strong in absolute terms, it was overwhelmed by a very large negative competitiveness effect and a negative world demand effect. It means that although India could have been in a stronger position in regard to market distribution and product organization, the undermining of competitiveness was extremely detrimental to its overall export performance. This structural weakness can be

observed in the wider time frame of 2010–2020, where petroleum exports fell by US\$ 163,145 thousands. The beneficial impacts of commodity composition and market allocation were here again swamped with a huge negative competitiveness impact, suggesting that loss of competitive strength was the most important factor in the later decade contributing to export decline.

The last sub-period, 2015–20 indicates a slight recovery of US\$ 74,538 thousands in exports of petroleum. Interestingly this growth was achieved in the face of a strongly negative world demand effect, implying that global conditions were not favourable. Instead, the recovery was driven primarily by the market distribution effect and commodity composition effect, along with a smaller positive competitiveness effect. This reveals that petroleum export growth of India in the latter years was sustained due to improved market orientation and product mix than by an expansion in external demand. Taken together, the decomposition results suggest that competitiveness has been the most decisive determinant of India's petroleum export growth over the long period, but its contribution has been highly unstable across sub-periods. Periods of export acceleration were generally associated with strong competitive gains, whereas periods of decline were largely attributable to the erosion of competitiveness, even when market and commodity effects remained favourable.

Table 3 extends the constant market share decomposition to the disaggregate commodity level (SITC digit 4) and identifies the relative importance of the world demand effect (WDE), market distribution effect (MDE), and competitiveness effect (CE) in shaping the export growth of petroleum product groups. Unlike the aggregate decomposition, the commodity composition effect does not appear here because the analysis is already undertaken at the level of specific product codes. The results reveal that the sources of export growth differ substantially across petroleum product categories, indicating that India's petroleum export performance was far from uniform across commodities. In most cases, the competitiveness effect emerges as the dominant explanatory factor, although the relative role of world demand and market distribution becomes important in certain products and sub-periods. The table therefore suggests that growth in India's petroleum exports at the disaggregate level was

Table 3: Commodity-wise Decomposition of India's Petroleum Exports Growth (Value in '000 US \$)

Year	Product Codes	Exports Growth	WDE	MDE	RCE
		ΔX	rXi	$rijXij - riXi$	$changeX - rijXij$
2005–2010	SITC – 3330	3731 (100.0)	10559 (283.0)	104797 (2808.8)	–111625 (–2991.8)
1990–2020	SITC – 3345	17629 (100.0)	–25 (–0.1)	92 (0.5)	17562 (99.6)
1990–2020	SITC – 3351	71002 (100)	379 (0.5)	–151 (–0.21)	70775 (99.68)
1990–2020	SITC – 3352	415202 (100.0)	4226 (1.0)	10984 (2.7)	399992 (96.3)
2010–2015	SITC – 3353	–7757 (100.0)	–6001.79 (77.4)	–6705.357 (86.4)	4949.954 (–63.8)
2010–2015	SITC – 3354	155349 (100.0)	–1859 (–1.2)	283817 (182.69)	–126609 (–81.50)
2010–2015	SITC – 3413	148819 (100.0)	10446 (7.0)	–9487 (–6.4)	147860 (99.4)
2015–2020	SITC – 3414	–462 (100.0)	–279 (60.5)	195 (–42.3)	–377 (81.7)
2005–2010	SITC – 3415	–6470 (100.0)	1752 (–27.1)	873 (–13.5)	–9096 (140.6)

Source: Authors' computations-based World Bank data.

Notes:

1. The coverage period varies across product codes within the overall study period. Accordingly, the analysis considers only those periods for which data are available. Refer to Appendix-1 for description of the commodities from SITC – 3330 to SITC- 3415.
2. The percentage shares are presented in brackets below the corresponding dollar values (\$)

driven not only by external market conditions but also, and more importantly, by product-specific competitive strength or weakness in international markets.

The long-period results for 1990–2020 clearly show that India's export growth in major petroleum product groups was overwhelmingly shaped by competitiveness. For product code 3345, the actual increase in exports amounted to US\$ 17,629 thousands, of which US\$ 17,562 thousands, or 99.6 percent, was explained by the competitiveness effect, while the contributions of world demand and market distribution were negligible. A similar pattern is visible for product code 3351, where the actual increase of US\$ 71,002 thousands was explained almost entirely by competitiveness (99.7 percent), with only a marginal positive contribution from world demand and a very small negative market distribution effect. The same broad conclusion applies to product code 3352, which recorded the largest increase among the listed long-period commodity groups, namely US\$ 415,202 thousands. Once again, competitiveness effect

explained 96.3 percent of the overall growth in exports whereas the world demand and market distribution had only small positive contributions. The findings are strong indicators that the success of India in these petroleum products lines in the long term was more to do with its capacity to enhance price, quality, supply capacity or general competitiveness in the export of these products than with positive shifts in the global demand or market positioning alone. Meanwhile, the sub-period results show that the decomposition differed strongly either among commodities or among export expansion and contraction phases. Product code 3330 in the 2005–2010 period recorded an increase of US\$ 3731 thousands, but the decomposition clearly shows that both the world demand and market distribution effects are positive, at 283.0 percent and 2808.8 percent respectively, but the competitiveness effect is strongly negative at –2991 percent. This means that the growth in exports of this product has been obtained whilst there was a significant decline in competitiveness and that the growth has been maintained by the strong forces of a good world demand and by

Table 4: Market-wise Decomposition of India's Petroleum Exports Growth at Disaggregate Level (Values in '000 US\$) during 1990–2020

Year	Export Destinations	Exports Growth	WDE	CCE	RCE
		ΔX	rXi	$riXi - rXi$	$changeX - rijXij$
2005–2010	UAE	271569 (100.0)	364908 (134.3)	–163383 (–60.1)	70044 (25.7)
2005–2010	Nepal	71819 (100.0)	20502 (28.6)	3924 (5.5)	47392 (65.9)
1995–2005	Singapore	55251 (100.0)	68853 (124.62)	–6059 (–10.9)	–7543 (–13.6)
2005–2010	Other Asia	95078 (100.0)	14507 (15.2)	37194 (39.1)	43376 (45.6)
1995–2005	Malaysia	6097 (100.0)	3117 (51.1)	–2710 (–44.46)	5691 (93.34)
1995–2010	Korea Rep.	54238 (100.0)	19810 (36.5)	68919 (127.0)	–34490 (–63.6)
2005–2010	China	48647 (100.0)	8852 (18.2)	–6151 (–12.7)	45946 (94.5)
1995–2020	Saudi Arabia	22344 (100)	2907 (13.0)	8085 (36.2)	11351 (50.8)
2005–2020	Oman	24891 (100.0)	2085 (8.3)	–2134 (–8.5)	24940 (100.2)
1990–2020	Bangladesh	8949 (100)	113 (1.27)	–119 (–1.34)	8955 (100.07)
1995–2020	Indonesia	6580 (100.0)	5571 (84.66)	–2900 (–44.0)	3909 (59.4)
2010–2015	Mozambique	396 (100.0)	1342 (338.9)	–1553 (–392.0)	606 (153.2)
1995–2020	Nigeria	10676 (100)	1559 (14.6)	–1401 (–13.13)	10518 (98.53)
1995–2005	Japan	25398 (100)	357 (1.1)	–9 (–0.04)	25051 (98.63)
2000–2005	Venezuela	14042 (100)	–379 (–2.7)	512 (3.7)	13910 (99.1)
2005–2010	South Africa	5462 (100)	29212 (534.8)	–25163 (–460.7)	1413 (25.88)
2010–2020	Qatar	18919 (100)	2248 (11.9)	323 (1.71)	16346 (86.40)
1995–2020	USA	10240 (100.0)	80 (0.8)	225 (2.2)	9933 (97.0)
2000–2020	Korea Dem.Rep.	2 (100.0)	–13 (–654.6)	6 (303.03)	9 (451.55)
2000–2020	Sri Lanka	2145 (100.0)	–322 (–15.01)	804 (37.52)	1662 (77.50)
1995–2020	Thailand	2848 (100)	3178 (111.57)	1014405 (35611.17)	–1014736 (–35622.75)
2005–2015	Bhutan	1644 (100)	566 (34.48)	–1177 (–71.62)	2255 (137.14)
2005–2020	Netherland	3103 (100.0)	–31 (–1.0)	549 (17.7)	2584 (83.3)

Year	Export Destinations	Exports Growth	WDE	CCE	RCE
		ΔX	rXi	$riXi - rXi$	$changeX - rijXij$
1995–2020	Kuwait	334 (100.0)	1204 (360.3)	–1056 (–316.0)	186 (55.7)
2000–2020	Iraq	197 (100.0)	544 (275.6)	285 (144.4)	–631 (–320.0)
1995–2020	France	–100 (100.0)	54 (–53.0)	–75 (74.1)	–80 (78.9)
1990–2020	OTHERS	52271 (100.0)	346 (0.6)	–162 (–0.3)	52087 (99.6)

Source: Authors' computations-based World Bank data.

Notes:

1. The coverage period varies across export destinations within the overall study period. Accordingly, the analysis considers only those periods for which data are available.
2. The countries selected for the analysis comprise 46.95 percent share of India's petroleum exports during the study period.
3. The percentage shares are presented in brackets below the corresponding dollar values (\$)

very favourable market orientation. Likewise, product code 3415 was negatively affected by a decrease of US\$ 6,470 thousands in the same period, though there was a positive impact of world demand and market distribution, the negative competitiveness effect was large, resulting in an overall decrease. These findings point to the fact that in the case of certain petroleum products, competitive weakness nullifies the benefits that would otherwise have been realized due to the enhanced global demand or enhanced market allocation. The 2010 to 2015 is another significant difference of commodities. Product code 3353 recorded a fall of US\$ 7,757 thousands which was primarily caused by negative world demand and market distribution impacts whereas competitiveness impact was positive and partially offset the fall. This implies that the shrinkage of exports of this commodity was not majorly caused by the deteriorating export competitiveness, but by the poor international demand environment and poor market allocation. Product code 3354, on the other hand, had a significant improvement of US\$ 155,349 thousands which was due to the market distribution effect (182.7 percent) as opposed to competitiveness (negative) (–81.5 percent) and a marginally negative world demand effect. The implication of such a pattern is that the increased growth in exports in this line of business was realized in large part by better directing exports to more active or open markets, in spite of the fact that India lost its competitiveness in the same commodity. The situation is slightly different with the product code 3413 where the growth of exports was US\$ 148,819 thousands and the competitiveness effect

contributed 99.4 percent of the growth. Demand in the world in this instance played a minor positive role and market distribution played a minor negative role again confirming that competitive strength had been central in explaining export success of some groups of petroleum products.

The subsequent evidence of the later time period (2015–2020) also indicates product-specific instability. Product code 3414 experienced a slight decrease in US\$ 462 thousand, with the world demand, competitiveness having negative impacts, but the market distribution effect was positive and not enough to overcome the general decrease. This indicates that the enhanced market allocation could not have been able to offset poor external demand and waning competitiveness in this commodity. In general, the disaggregated findings show that the factors of growth of petroleum exports were not equal across product lines. Although a large part of product lines, especially 3345, 3351, 3352 and 3413, was dominated by competitiveness, there were products that were more influenced by changes in external demand or market orientation like 3330 and 3354. In this manner, the table highlights that the performance of India with respect to petroleum exports cannot be analyzed in a manner that is purely at the aggregate level; instead, it is an interplay of product-specific competitiveness, evolving world demand conditions, and varying success in reaching out to export markets.

Table 4 presents a market-wise constant market share decomposition of the growth of India's petroleum

exports at the disaggregate level. In this framework, the observed change in exports is separated into three components: the world demand effect (WDE), which captures the contribution of growth in partner-country import demand; the commodity composition effect (CCE), which reflects whether exports were concentrated in relatively fast- or slow-growing product lines within a destination; and the residual competitiveness effect (RCE), which represents the portion of export change attributable to India's competitive performance after controlling for structural demand conditions. In the constant market share literature, this residual effect is interpreted as a broad measure of competitiveness, incorporating influences such as price, quality, marketing, supply capability, and related policy or cost factors.

A broad reading of the table suggests that the growth of India's petroleum exports was highly uneven across destination markets, with no single effect dominating uniformly across all countries. Nevertheless, the RCE emerges as the principal driver in a large number of markets, indicating that India's export expansion was often associated more with destination-specific competitive gains than with favourable world demand alone. This is particularly visible in Bangladesh during 1990–2020, where almost the entire export increase of US\$ 8,949 thousands was explained by RCE (100.1 percent), with only negligible contributions from WDE and a mildly negative CCE. A similar pattern is evident in the United States (97.0 percent), Japan (98.6 percent), Nigeria (98.5 percent), Oman (100.2 percent), Malaysia (93.3 percent), China (94.4 percent), Qatar (86.4 percent), and the residual group of Others (99.65 percent). In these markets, India's petroleum export growth appears to have been sustained primarily by improvements in competitive position rather than by favourable structural conditions in the destination market.

A second group of markets demonstrates the significance of demand-driven growth of the world. The example of the UAE in 2005–10 is particularly impressive. The petroleum exports of India to the UAE grew by US\$ 271,569 thousands, with the WDE reflecting 134.4 percent of the increase, the CCE was strongly negative (–60.2 percent) and the RCE reflected 25.8 percent. This means that the growth in exports to the UAE was fuelled mainly by a high growth in

the import demand in the market but the alignment of India on the commodities in the market was not good and partially counteracted the growth. A slightly different trend is observed in Singapore between 1995 and 2005 with the growth of export of US\$ 55,251 thousands being completely explained by WDE (124.6 percent) and both CCE (–10.9 percent) and RCE (–13.7 percent) negative. Therefore, the increase in exports in Singapore might have been demand driven and not due to the increase in competitiveness in India. WDE was very high (534.8 percent) in South Africa as well, but the largest part was offset by a very negative CCE (–460.7 percent), with a small increase in net exports. The table also determines markets where the composition of commodities was significant. In the case of Korea, Rep. 1995–2010, the actual export growth of US\$ 54,238 thousands was correlated with a very large positive CCE (127.1 percent) and a positive WDE (36.5 percent), but a very negative RCE (73.6 percent). This implies that India enjoyed the advantages of being in relatively dynamic petroleum product segments in the Korean market despite its weakened competitive positions. Similarly, CCE is simply gigantic and favourable in the period 1995–2020, Thailand, as is RCE, and thus, to the extent that product composition is favourable, the loss of competitiveness has negated it almost as a whole. Thailand row must be read with care since the percentage shares are highly overstated against the tiny net change, but this does indicate that there are strong counteracting forces between structural advantage and competitive weakness. In Other Asia in 2005–2010, however, the export growth was more balanced: WDE contributed 15.3 percent, CCE 39.1 percent, and RCE 45.6 percent indicating that the success of India in this market was the result of favourable demand, the right product composition and competitiveness. The coexistence of positive net export growth despite negative competitiveness, or vice versa, weak net growth despite positive structural effects is another interesting trend. To illustrate, in 2010–2015 in Mozambique, the growth of exports of US\$ 396.2 thousands was realized despite a very large negative CCE (–392.0 percent); the growth was driven by a very large WDE (339.0 percent) and positive RCE (153.2 percent). During 2000–20 WDE and CCE were positive in Iraq but the RCE was strongly negative (–320.0 percent) which constrained the total export growth severely. The negative CCE (–71.6 percent)

was counteracted by a high positive RCE (137.1 percent) in Bhutan in 2005 to 2015, meaning that the competitive advantages of India offset an undesirable product structure. These examples indicate that market growth in itself could not be a guarantee of export success but the ultimate result was determined by the interplay between demand factors, the composition of exports and competitiveness in each destination. The row of France is analytically significant since it shows a negative actual growth of exports (–US\$ 100.9 thousand), which reflects the overall contraction in the petroleum exports to the market in India during the years of 1995–2020. In this case, WDE is indicated as negative in percentage terms since the denominator is negative, and CCE and RCE also indicate unfavourable structural and competitive situations. This is an indication that the French market was among the few destinations where India was not able to improve its petroleum export performance but instead, it declined. Likewise, extremely minimal export variations in markets like Korea Dem. Rep. produce very large percentages shares and these should not be understood as proportions of economic significance. Rather, they indicate that the three effects are counterbalancing each other about a very small net change. Combined, the findings suggest that three different patterns determined the performance of India in the export of petroleum at the market level. To begin with, in some of the destinations, particularly Bangladesh, the US, Japan, China, Oman, Nigeria and Qatar, there was too much competitiveness-based export growth. Second, in other markets like UAE and Singapore, the expansion of exports was mostly driven by demand and structural or competitive weaknesses neutralized some of the gains. Third, there was a strong dependence on commodity structure of exports in the destination market in markets like Korea, Rep., Thailand, and Other Asia, where the direction of export performance was determined. In this way, the table illustrates that the growth of petroleum exports of India was not due to a homogenous global trend; it was a highly differentiated combination of the demand of partners countries, the structure of products and competitive performance in the market.

CONCLUSION

The results obtained in the decomposition analysis using CMS model give a sophisticated and precise

image of the dynamics of the performance of petroleum exports in India in the period 1990–2020. At the aggregate level, the paper demonstrates that the competitiveness effect prevailed overwhelmingly in the long-term growth of the petroleum exports in India, whereas the effects of world demand, commodity composition, and market distribution were relatively minor throughout the entire study period. This indicates that growth of petroleum exports in India did not just happen to be a passive reaction to the rise of global demand, but was primarily influenced by India's capacity to advance its export competitiveness in the global markets. Meanwhile, the results of sub-periods indicate a lot of instability. Market distribution effect and commodity composition effects have not been uniformly positive in a few sub-periods, particularly in periods of decline in exports, and this suggests that the performance of petroleum exports in India has not been a smooth and straight line. The disaggregated analysis at the commodity-level also indicates that exports growth had been very uneven among the product categories of petroleum products. Competitiveness virtually accounted for export growth on a range of products, but in other products, the positive effects of increased world demand or market distribution were neutralized by negative competitiveness impacts. This means that India has been able to focus its petroleum export success in a few product lines as opposed to being broad based in the petroleum basket. Similarly, market-wise analysis indicates that export growth determinants were significantly different in the destination countries. Export growth in certain markets including Bangladesh, United States, Japan and Oman was largely competitiveness-driven. In other countries, including the UAE and Singapore, the expansion of import demand rather than highly competitive gains contributed to growth. In yet other destinations, the composition of products was of paramount importance. In this way, the general evidence indicates that the strength of product, destination-specific demand conditions, and the shifting competitive advantage have interacted in a complex way to determine the performance of petroleum exports in India. Combined, the findings suggest that the expansion of petroleum exports in India in 1990–2020 was both large, but structurally imbalanced. Competitiveness was the main driving force of growth, but the competitiveness was not constant over time and evenly distributed among

commodities and markets. Thus, although India has already shown potential to increase petroleum exports by a large margin, the sustainability of the growth will be based on enhanced competitiveness, which is more diversified and resilient.

POLICY IMPLICATIONS

The results indicate that there is a necessity of competitiveness-based export policy in the Indian petroleum industry. As competitiveness is found to be the most significant long-run determinant of export growth, the policy should aim at enhancing these underlying conditions that determine export competitiveness. It involves the increase of the efficiency of refineries, lessening the costs of logistics and transactions, enhancing the connectivity of ports, ensuring timely access to crude inputs, reinforcing storage and supply-chain, and technological modernization of petroleum refining and processing. The success of the export policy in India should focus on cost efficiency and quality reliability in case the country wants to retain and increase its market in the international petroleum markets. The second policy implication is that there should be market-specific export strategies. The market-wise break down is a clear indication that the identical export strategy cannot be applied in the same manner to all destinations. India must strive to stabilize its market in markets where the export growth has been largely demand-based by establishing stronger long-term business relationships and enhancing its product mix. When competition in the market is already intense, it is necessary to focus on maintaining price-quality benefits and avoiding the erosion of the market. The export policy must also promote the alignment of the petroleum export basket of India with the changing import profile of these countries in destinations where the composition of commodities has featured significantly. This requires increased focused export intelligence, destination mapping, and trade promotion. The findings also emphasize the significance of product diversification in petroleum products export. Because in the disaggregate analysis, export performance is focused in few products, India must not rely on few limited categories of products. The policy must encourage diversification to more value-added petroleum products and refined specialized products with more stable demand in the international

market. This would help to minimize the risks of being exposed to changes in demand or competitiveness of any one product line. Trade diplomacy and regional market integration are another priority policy. Indian petroleum exports have good potential in several markets in Asia, Africa, and the Gulf region. India, therefore, needs to enhance trade facilitation, bilateral energy cooperation, and commercial diplomacy in these regions. Exclusivity in trade terms, less non-tariff barriers, and greater institutional involvement with high-potential destinations might be used to enhance export stability and market access. Lastly, the results indicate that it is important to have an active export monitoring system. Given that the sources of export growth are highly diverse over time, commodity and destination, policymakers need to have frequent monitoring based on decomposition as opposed to the aggregate export statistics. A more detailed monitoring system would be useful in detecting any emergent competitive losses, changes in the demand of imports and structural changes in the destination markets at an earlier stage, thus responding to policy changes in a timely manner.

FUTURE RESEARCH DIRECTIONS

This study can be extended to future research by analysing India's petroleum export performance beyond the year 2020, especially in the post-pandemic era considering the price volatility, shifting refinery trade flows, and global energy security concerns and transition towards cleaner fuels. The present paper demonstrates that the residual competitiveness effect has been a major contributor to the growth in petroleum exports; future research could focus on determining which factors have led to this competitiveness, including refinery efficiency, exchange-rate changes, sourcing of crude oil, freight costs, port infrastructure, logistics efficiency and market-specific quality standards. Further research could also be undertaken to differentiate value-based, volume-based and unit-value growth in exports and identify the true export competitiveness as opposed to price-induced export growth. It would also be helpful to have a more disaggregated product-wise and destination-wise analysis as the results show that there is a lot of variation across petroleum product categories and export markets. Comparative studies with other major economies that produce refinery exports, like

the Middle Eastern countries, China, Singapore and South Korea, can be useful in determining if India's gains are due to a newfound competitiveness or to a change in global market shares. Last but not least, the future can be expected to bring new challenges such as energy transition, decarbonisation of the refinery sector, cleaner fuels, and trade policies based on climate change impacts, which should be taken into account.

Appendix-1: Product Description

Product Code	Product Description
SITC-3330	Crude petroleum and oils obtained from bituminous materials
SITC-3345	Lubricating petroleum oils, and preparations, nes
SITC-3351	Petroleum jelly and mineral waxes
SITC-3352	Mineral tars and products
SITC-3353	Mineral tar pitch, pitch coke
SITC-3354	Petroleum bitumen, petroleum coke and bituminous mixtures, nes
SITC-3413	Petroleum gases and other gaseous hydrocarbons, nes, liquefied
SITC-3414	Petroleum gases, nes, in gaseous state
SITC-3415	Coal gas, water gas and similar gases

Source: WITS-Comtrade

REFERENCES

- Agarwal, M. (1988). A Comparative Analysis of India's Export Performance, 1965–80. *Indian Economic Review*, 23(2), 231–262.
- Arora, A., & Batra, D. (2019). Export competitiveness of Indian oilseeds: The method of constant market share (CMS) with special reference to groundnut. *International Journal of Innovative and Exploring Engineering*, 8(9S), 1098–1105.
- Ashby, L. D. (1964). The geographical redistribution of employment: an examination of the elements of change. *Survey of Current Business*, 44(10), 13–20.
- Azhar, M. (2022). India's emergence as a petroleum products exporter, *The Journal of Energy and Development*, 47(1/2), 75–100.
- Baldwin, R.E. (1958). The commodity composition of trade: Selected industrial countries, 1890–1954. *The Review of Economics and Statistics*, 40(1), 50–71.
- Bhagwati, J.N., & Srinivasan, T.N. (1976). *Foreign trade regimes and economic development: India*. New Delhi: Macmillan Company of India Ltd.
- Bhat, T.P. (2011). Structural changes in India's foreign trade. *Working paper, Institute for Studies in Industrial Development*, New Delhi, 42–45.
- Biswas, B. (1982). Constant Market Share Analysis of Export Performance: The Case of India. *The Indian Economic Journal*, 29(4), 41–51.
- EXIM. (2014). *Trade liberalization, product variety and growth*, No. 84 September 2014.
- Fagerberg, J., & Sollie, G. (1985). The Method of Constant-Market-Shares Analysis Revisited. *Discussion Paper 9*, Central Bureau of Statistics.
- FICCI (Federation of Indian Chambers of Commerce & Industry), (2018). Economy insight: trends in India's foreign trade. *FICCI Economic Affairs and Research Division*. Retrieved January 1. http://ficci.in/SPdocument/20858/Trends_in_India's_Foreign_Trade.pdf
- Gupta, B., & Ray, A.S. (1998). Real exchange rates and manufactured exports: A study of India's potential exports to the USA. *Journal of Asian Economics*, 9(2), 333–344.
- IBEF [Indian Brand Equity Foundation], (2019). The Indian Oil and Gas Industry Report, Government of India, New Delhi.
- Jain, M.P. (2017). Constant market share analysis of export competitiveness of cotton: A comparative study of India and China. *Pacific Business Review International*, 10(1), 77–84.
- Kapur, S.N. (1991). The Structure and Competitiveness of India's Exports. *Indian Economic Review*, 26(2), 221–237. <https://www.jstor.org/stable/29793559>
- Krishna, G. D. and Kumar, R. (2015). Indian Exports Loss of Global Competitiveness. *Economic & Political Weekly*. 50(34), 20–23. <https://www.jstor.org/stable/24482587>
- Kumar, A. & Shipra (2018). Oil and international trade in petroleum crude and products: An Indian perspective. Working Paper No. 70. *Export-Import Bank of India*. <https://www.eximbankindia.in>
- Kumar, K.N.R., (2022). Competitiveness of Indian Agricultural Exports: A Constant Market Share Analysis. *Research on World Agricultural Economy*. 3(2), 25–38. <http://dx.doi.org/10.36956/rwae.v3i2.514>
- Laursen, K. (1999). The impact of technological opportunity on the dynamics of trade performance. *Structural Change and Economic Dynamics*, 10(3), 341–357.
- Leamer, E. E., & Stern, R. M. (1970). Constant-market-share analysis of export growth. *Quantitative international economics*. Boston: Allyn and Bacon, 171–183.
- Leamer, E.E., & Stern, R.M. (2006). *Quantitative international economics*. New Brunswick and London: Aldine Transaction Ltd.

- Montobbio, F., & Rampa, F. (2005). The impact of technology and structural change on export performance in nine developing countries. *World Development*, 33(4), 527–547.
- MOPNG [Ministry of Petroleum & Natural Gas Industry] (2020). Basic statistics on Indian Petroleum and Natural Gas 2018–19. Government of India, New Delhi. <https://www.petroleum.nic.in>
- Naya, S. (1967). Commodity pattern and export performance of developing Asian countries to the developed areas. *Economic Development and Cultural Change*, 15(4), 420–437.
- Nayyar, D. (1976). India's Export and Export Policies in the 1960s, Cambridge University Press, Cambridge.
- Panagariya, A. (2004). India's Trade Reform. *India Policy Forum*: Brookings Institute.
- Parikh, et al. (2007). Demand projections of petroleum products and natural gas in India. *Energy*, 32 (2007), 1825–1837
- Rashmi, T. (2013). India's export performance analysis – An analysis. *Global Journal of Commerce and Management and Education*, 2(5), 63–67. <https://www.longdom.org/articles/indias-export-performance-analysis-analysis.pdf>
- Reuters (2021). Indian firms plan to invest \$27 bln to boost refining capacity by 2025. August 4. <https://www.reuters.com/world/india/indian-firms-plan-invest-27-bln-boost-refining-capacity-by-2025-2021-08-04/>
- Richardson, J.D. (1971a). Constant Market Share Analysis of Export Growth. *Journal of International Economics*, 1(2), 227–239.
- Richardson, J.D. (1971b). Some Sensitivity Test for a Constant Market Share Analysis of Export Growth. *Review of Economics and Statistics*, 53(3), 300–304.
- Shalu, K., Singh, K., Kaur, S., & Sikka, P. (2023). Petroleum Export Performance in India: Analysis of Growth and Structural Dynamics. *Indian Journal of Economics and Development*, 19(4), 776–785.
- Sheryl, J. C. (2012). *An economic study on oil energy in India during the pre-reform period and reform period* (Doctoral dissertation, Bharathidasan University, Tiruchirappalli). <http://hdl.handle.net/10603/215545>.
- Singh, K. & Singla K. S. (2012). An Analysis of India's Exports Competitiveness. *International Journal of South Asian Studies*. 5(1), 112–28.
- Singh, K. & Singla, S.K. and Singh, J. (2018). China's Export Performance during Liberalized Era. *Indian Journal of Economics and Development*, 14 (3), 420–429.
- Singh, K. (2011). Economic Reforms, WTO and India's Exports: An Analysis. Ph.D. Thesis, Unpublished, Punjabi University, Patiala, Punjab.
- Singh, K. (2014). A constant market share analysis of India's export performance. *Foreign Trade Review*, 49(2), 141–161.
- Singh, K., Ranga, A. and Kumar, R. (2022). Sources of China's Export Growth: A Constant Market Share Analysis. In Kaur, Sandeep (Eds.), *Revisiting India–East Asia Connections: Problems and Prospects*, New Delhi: KW Publishers Pvt. Ltd.
- Singh, K., Sandhu, S. and Ranga, A. (2022). India's rising import dependence: An analysis of its current status, concerns, and strategies. *Indian Journal of Economics and Development*, 18(1), 93–104.
- Sinha, M. (2016). Structural change in composition of India's export during post economic reform period. *Business Analyst*, 37(1), 99–116.
- Spiegeeglas, S. (1959). World export of manufacturers: 1956 versus 1937. *The Manchester School of Economic and Social Studies*, 27(2), 111–139.
- Tiwari, R.S. (1986). India's export performance. New Delhi: Deep & Deep.
- Tyszynski, H. (1951). World Trade in Manufactured Commodities, 1899–19501. *The Manchester School*, 19(3), 272–304.
- Varalakshmi, K., & Devatkal, S. (2017). Competitiveness of Indian bovine meat exports constant market share analysis. *Indian Journal of Animal Sciences*, 87(8), 1026–1033.
- Veeramani, C. (2007). Sources of India's export growth in pre-and post-reform periods. *Economic and Political Weekly*, 42(25), 2419–2427.
- Veeramani, C. (2012). Anatomy of India's merchandise export growth. *Economic and Political Weekly*, 47(1), 94–104.
- World Bank. (2018). *India's growth story since the 1990s remarkably stable and resilient*. World Bank.
- World Bank. (2024). *Becoming a high-income economy in a generation: India country economic memorandum*. World Bank.