

**Indian Institute of Foreign Trade
Working Paper**

**No. EC-21-06
March 2021**

**The Proposed India-EU Trade Agreement and
UNECE 1958 Provisions:
Empirical Results for Indian Automobile Sector**

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Printed and published by

Indian Institute of Foreign Trade

Delhi Centre

IIFT Bhawan, B-21, Qutab Institutional Area, New Delhi – 110016

Kolkata Centre

1583 Madurdaha, Chowbagha Road,

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The Proposed India-EU Trade Agreement and UNECE 1958 Provisions: Empirical Results for Indian Automobile Sector

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Abstract

In 2014, India adopted the 'Act East' Policy to enhance trade flows with the East and Southeast Asian partners. A degree of caution in the outlook has however been noticed with the pull-out from the Regional Comprehensive Economic Partnership (RCEP) negotiations in November 2019, on the ground of domestic economic considerations. In the subsequent period, India has expressed willingness to enter with trade agreements with the 'West', namely, the European Union (EU) and the United States of America (USA). However, these trade partnerships may not be effective in enhancing Indian exports only through tariff reforms, and the role of quality harmonization needs to be acknowledged in this context. The automobile sector is an important case in point. The United Nations Economic Commission for Europe (UNECE) World Forum for Harmonization of Vehicle Regulations Working Party 29 (WP.29) has three agreements for harmonizing technical regulations on vehicles and auto-components to facilitate road safety, namely: UNECE 1958, 1997 and 1998. India joined the UNECE 1998 agreement in April 2006. It deserves mention that EU members are party to UNECE 1958 and have requested India at times to consider joining the 1958 Agreement. India has so far refrained from joining the UNECE 1958 standard, given the reservations against certain provisions of the same. The current paper intends to analyse the potential impact of the tariff reforms on the India-EU bilateral trade flows using the WITS-SMART analytical framework. The simulation results indicate that India's export benefits would be limited vis-à-vis the EU, arguably owing to competition from countries already conforming to the UNECE 1958 standards. The analysis concludes that India needs to closely evaluate its options, keeping in mind the growing inclination towards UNECE 1958 even among some of the existing RTA partner countries (e.g., ASEAN). Thus, the Indian policymakers need to assess all these potential challenges before coming to a decision on the practicality of joining UNECE 1958 forum.

JEL Classification: F13, F15, F17

Keywords: Automobile safety standards, UNECE, WP29, Indian automotive sector trade, Intra-Industry Trade, EU-India FTA, WITS-SMART Simulation

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Introduction

India had traditionally depended more on the multilateral route for export promotion upto 2005. Given the slow pace of WTO negotiations, in the post-2005 period however the country started exploring the regional trade agreements (RTA) path more intensively (Chaisse et al, 2011). Encouraged by the potential economic benefits from collaborations with East and Southeast Asia (Kumar et al., 2006; Palit, 2016), the country replaced the ‘Look East Policy’ (1991) initially followed by the ‘Act East Policy’ (2014). Under the influence of these policy initiatives, a series of east-centric RTAs, namely: Indo-Singapore Comprehensive Economic Cooperation Agreement (CECA) (2005), the India-ASEAN Free Trade Agreement (FTA) (2010), India-Korea Comprehensive Economic Partnership Agreement (CEPA) (2010), India-Japan CEPA (2011) and India-Malaysia CECA (2011) has been brought into operation over the period. It has been observed that India’s trade relations with the RTA partners countries have gradually intensified (Chakraborty et al, 2019a; Singh, 2015).

The ‘East’ focus in India’s RTA strategy however came to a pause, when in November 2019 the country decided to opt out of the ‘East’ integration process of Regional Comprehensive Economic Partnership (RCEP), on the ground of domestic economic considerations (GoI, 2019). After the pull-out, a significant section of the industry came forward to support the decision, which indicate the perceived threat from the mega-bloc (Hindu, 2019). As several empirical estimates also indicated that it may not benefit India to re-join RCEP in future (Pant and Paul, 2018; Sharma et al, 2020), the country did not go back to the negotiating forum, despite overtures from the ‘Eastern’ partners (ET, 2020). The RCEP agreement was finally signed on November 15, 2020, and India emphasised that the non-fulfilment of its economic concerns has been the main driver behind its decision of staying out (Roche, 2020).

In the aftermath of the RCEP pull-out, India has recently started exploring the possible opportunities from entering into free trade agreements (FTAs) with the ‘West’, namely: the EU and the US (Sikarwar, 2020). The economic motivation is understandable, as existing empirical literature has shown possible trade benefits for India by joining into FTAs with both the EU (Khorana and Perdakis, 2010) and the US (Fukase and Martin, 2016) respectively. While the initiative is likely to benefit the country, it needs to be borne in mind that the EU-India FTA proposal is not new. The two sides initiated the negotiations for entering into the EU-India Bilateral Trade and Investment Agreement (BTIA) since 2007. However, the negotiation lost momentum in the last few years because of disagreement over a wide range of issues, including: agricultural subsidy, extent of tariff reforms, movement of professionals, intellectual property rights and data protection, inclusion of areas such as environment and labour standards and so on (Chaisse and Chakraborty, 2014; Khandekar, 2011).

The current analysis intends to focus on a particular sector, namely the auto-component and vehicles segment, in the context of the proposed EU-India FTA. It deserves mention that differences over tariff reforms in the automobile sector was a major driver that hindered the EU-India BTIA negotiations earlier (Chaisse and Chakraborty, 2014). In recent times, encouraged by the growing sectoral exports, India aspires to emerge both as an exporter of auto-components as well as global auto assembly hub (Exim Bank, 2017). Therefore, the country is likely to demand a steep cut in tariff barriers in the EU market during negotiations. On the other hand, the EU players have long been vocal about the market access challenges in

India's auto-segment, and there is no recent indication in any change of that standpoint (Reed, 2012). There is a need to understand in which direction the trade benefits would flow in case of a deep tariff cut (i.e., reduction of tariff to zero percent) through the EU-India FTA. In addition, there is one more perspective that has a crucial bearing on the future EU-India trade in the automobile sector. For the purpose of global standard harmonization on road safety involving the automobile sector, the United Nations Economic Commission for Europe (UNECE) standards play a crucial role. Now the EU countries are members of the UNECE 1958 convention for a long time, while India has joined the UNECE 1998 convention from April 2006. Hence, it is important to analyse whether a preferential arrangement would indeed be helpful in enhancing the trade flows.

The current analysis is arranged along the following lines. First, a brief discussion on the purpose of the UNECE forums is conducted, followed by India's trade trends in automobile sector. The WITS-SMART simulation results, in case of a deep tariff reform (i.e., assuming reduction of tariff to zero percent in both the EU and India) are presented next, based on which certain policy conclusions are drawn.

UNECE Forums and India

The discussion in this section draws from the analysis of Chakraborty and Nag (2021). The process on harmonization of vehicle and auto-components standards through mutual recognition of the approval of equipment and parts of motor vehicles was initiated by UNECE, under the aegis of the Working Party 29 (WP.29). The goal of the UNECE forum included: (i) improve vehicle safety (both passive as well as active road transport safety), (ii) protect the environment by controlling relevant pollution standards (e.g., air quality and noise related), (iii) promote energy efficiency (through engine efficiency and other abatement standards) and (iv) increase anti-theft performance (UNECE, undated a). The European countries took a leadership role in operationalizing UNECE 1958 agreement, which covers 120 technical regulations on road and passenger safety (UNECE, undated b). Another UNECE agreement was introduced in 1997 on periodic technical inspections, with an active involvement of Russia. This new agreement primarily integrated the standards in Commonwealth of Independent States (CIS) countries. The last UNECE agreement came to force in 1998 with enthusiastic support from the USA, which focused on mutual recognition of standards and harmonization through 20 Global Technical Regulations (GTRs) (UNECE, undated c).

The underlying reason behind the attraction for membership in a UNECE forum is the anticipation of smoother trade flows with partner countries. Interestingly, the 1958, 1997 and 1998 UNECE agreements have only 53, 15 and 38 members, respectively. The continent-wise details of the members in the three UNECE forums are reported in Annex 1. It is clearly visible from Annex 1 that while African and Asian countries have shown only a limited inclination to join UNECE forum, Latin America is not represented in the forum at all. Conversely, both North American, European countries and developed countries from the Asia-Pacific participate intensely in this forum. The guarded reaction from the developing countries and less developed countries (LDCs) can be explained by their perceived uncertainty over future gains as well as impending policy flexibility anticipations. While the UNECE agreements provide room for certain flexibilities in terms of right to implement specific Technical Regulations, in line with the national priorities (EC, 2015), the differences on future policy trajectory plays an important role. For instance, the UNECE 1958 forum can introduce a new safety-related provision or amend an existing one, if such a proposal is approved by a two-third majority among member countries. Now given the predominance of the European countries in UNECE 1958 agreement,

the decision-making appears to be tilted towards their preferences. In contrast, decisions in the UNECE 1998 forum are based on consensus, i.e., any change in the safety-related provisions cannot be influenced by any particular member or group of countries (Ramos, 2011).

Till the nineties, India did not feel the urge to join the UNECE forums. However, as the export focus subsequently grew, the need to align domestic standards with a globally recognized norms intensified. The country initially joined WP.29 as an observer in 2003 and considered the options. Given the concerns over democratic set-up in decision-making and future trajectory of standards, joining UNECE 1958 could have posed a challenge for India (Chakraborty et al, 2020). India therefore joined UNECE 1998 agreement in April 2006 and agreed to harmonize domestic standards with UN GTRs (Marathe, 2008). The necessary amendments in the Central Motor Vehicle Rules (CMVR) took place in the subsequent period (GoI, 2017). It has been noted that, ‘currently India has more than 70% safety regulations which are either partially or fully aligned with GTRs and UN Regulations while keeping in view the Indian specific driving and environmental conditions’ (GoI, 2018).

When India is weighing the option of joining the EU-India FTA more seriously in the recent period, the sectoral implications for the automotive sector needs to be considered in light of the UNECE provisions. Over the last one and half decades, India has been approached by the EU members several times for joining UNECE 1958 Agreement (Sen, 2009), on the ground of the perceived benefits arising from improved safety for both car occupants and pedestrians (OECD-UNECE, 2016). Attempts to engage with India through various activities under the UNECE 1958 agreement has also been pursued by EU countries (Philippe, 2012). Presently it seems unlikely that India would move ahead to join UNECE 1958, particularly owing to several concerns: e.g., strong reciprocity requirements embedded within the framework (GoI, 2018), potential labour and capital related adjustment problems for Tier III and Tier IV component manufacturers (Barnes, 2018) and incomplete legal reforms for preparing the domestic set-up for the procedural requirements (Marathe, 2008).

India’s Trade Trends in Automobile Sector

The evolving presence of India (in terms of percent share) in global automotive product and transport equipment (HS 87) trade over 2001-19 has been shown with the help of Table 1. In order to perceive the intertemporal dimension of India’s trade performance, the period has been divided in four ranges, namely: 2001-05 (before formally joining UNECE forums), 2006-10 (after joining UNECE 1998), 2011-15 (RTA participation phase) and 2016-19 (cautious outlook to trade). India continues to remain a modest player in the global canvas, as in 2019 it was ranked 22nd and 46th respectively in world export and import order. It is worth mention that while India’s share in global export and imports increased shortly after joining UNECE 1998 in April 2006, it has remained relatively stable in the recent period.

The country’s trade shares with top thirty export and import partners are reported in Table 2. Interestingly, several of India’s export partners generally have common membership in both UNECE 1958 and 1998 Agreements and are defined as Common CP countries. In addition, the country also exports to several countries without membership in any UNECE forums (i.e., countries located in Africa and Latin America). A similar pattern emerges in imports as well, with considerable presence of these two groups among India’s partners. While Thailand and Belgium are observed among the major export and import partners of India respectively, UNECE 1958 member countries are generally not frequently noted in the list.

Table 1: Presence in World Automotive Products and Transport Equipment (HS 87) Trade – India and Top Players

Global Exports (Average Share %)						Global Imports (Average Share %)					
Rank in 2019	Countries	2001-05	2006-10	2011-15	2016-19	Rank in 2019	Countries	2001-05	2006-10	2011-15	2016-19
1	Germany	18.59	18.83	18.45	17.30	1	United States of America	25.11	17.76	18.91	20.26
2	Japan	14.49	13.41	11.08	10.14	2	Germany	7.60	7.84	7.45	8.47
3	United States of America	9.61	9.00	9.78	8.90	3	China	1.27	2.72	5.57	5.21
4	Mexico	4.06	3.93	5.80	7.29	4	United Kingdom	7.85	6.15	5.29	5.05
5	China	1.23	2.98	4.35	4.74	5	Canada	6.37	5.32	5.20	4.94
6	Korea, Republic of	3.35	4.30	5.30	4.27	6	France	5.59	5.62	4.42	4.61
7	Canada	8.14	4.88	4.42	4.27	7	Belgium	3.97	3.93	3.37	3.64
8	Belgium	4.88	4.00	3.34	3.45	8	Mexico	2.58	2.26	2.53	2.91
9	Spain	4.85	4.40	3.65	3.77	9	Italy	4.91	4.52	2.76	3.24
10	France	7.00	5.12	3.61	3.52	10	Spain	4.70	4.00	2.64	3.00
11	United Kingdom	4.19	3.64	3.75	3.61	11	Netherlands	2.01	1.92	1.91	2.22
12	Italy	3.47	3.36	2.81	2.91	12	Australia	1.65	1.98	2.10	1.90
13	Czech Republic	1.18	1.92	2.23	2.63	13	Poland	0.89	1.41	1.22	1.55
14	Netherlands	1.49	1.41	1.48	1.92	14	Japan	1.62	1.32	1.52	1.55
15	Poland	0.87	1.87	1.66	1.88	15	Russian Federation	0.68	2.46	2.56	1.42
22	India	0.23	0.55	0.97	1.14	22	Saudi Arabia	0.94	1.26	1.67	0.98
23	Romania	0.08	0.39	0.65	0.82	23	United Arab Emirates	0.15	0.48	1.13	1.22
24	South Africa	0.41	0.56	0.66	0.71	24	Brazil	0.46	0.00	1.51	0.80
25	Taipei, Chinese	0.69	0.65	0.74	0.67	25	Hungary	0.54	0.64	0.61	0.77
26	Portugal	0.60	0.54	0.49	0.56	26	Portugal	0.84	0.83	0.54	0.69

27	Brazil	0.93	1.13	0.90	0.82	27	Thailand	0.41	0.50	0.74	0.66
28	Slovenia	0.23	0.34	0.28	0.51	28	Norway	0.58	0.68	0.68	0.66
29	Indonesia	0.10	0.21	0.35	0.49	29	Turkey	0.76	1.10	1.24	1.01
30	Argentina	0.28	0.55	0.66	0.40	30	Romania	0.24	0.57	0.42	0.58
31	Finland	0.31	0.34	0.21	0.33	31	Taipei, Chinese	0.39	0.34	0.49	0.56
32	Morocco	0.01	0.02	0.12	0.24	32	Philippines	0.16	0.19	0.28	0.57
33	Russian Federation	0.21	0.26	0.28	0.22	33	Denmark	0.60	0.62	0.48	0.53
34	Singapore	0.23	0.34	0.35	0.24	34	Viet Nam	0.18	0.19	0.22	0.37
35	Viet Nam	0.03	0.05	0.11	0.17	35	Finland	0.50	0.54	0.38	0.47
36	Denmark	0.25	0.24	0.20	0.20	36	Slovenia	0.22	0.30	0.25	0.44
37	Switzerland	0.18	0.20	0.19	0.18	37	Chile	0.29	0.50	0.64	0.50
38	Malaysia	0.07	0.11	0.13	0.13	38	Indonesia	0.30	0.40	0.56	0.46
39	Belarus	0.17	0.22	0.26	0.15	39	South Africa	0.40	0.61	0.65	0.46
40	Lithuania	0.07	0.12	0.12	0.10	40	Israel	0.30	0.35	0.37	0.44
41	Hong Kong, China	0.24	0.16	0.12	0.09	41	Malaysia	0.32	0.38	0.50	0.41
42	Australia	0.38	0.28	0.21	0.12	42	New Zealand	0.38	0.29	0.36	0.40
43	Luxembourg	0.07	0.09	0.07	0.08	43	Argentina	0.30	0.70	0.85	0.67
44	Bulgaria	0.01	0.02	0.05	0.07	44	Nigeria	0.08	0.50	0.37	0.18
45	Estonia	0.04	0.08	0.06	0.06	45	Singapore	0.40	0.43	0.42	0.36
46	Philippines	0.15	0.17	0.13	0.08	46	India	0.07	0.25	0.37	0.37
47	Norway	0.09	0.08	0.06	0.06	47	Morocco	0.11	0.23	0.24	0.33
48	Croatia	0.02	0.02	0.02	0.05	48	Ukraine	0.22	0.52	0.32	0.26
49	Serbia	0.00	0.02	0.10	0.09	49	Egypt	0.06	0.22	0.32	0.30
50	Latvia	0.01	0.04	0.04	0.05	50	Colombia	0.16	0.32	0.44	0.28

Source: Computed from Trade Map data, ITC (undated)

Table 2: India's Trade in Automotive Products and Transport Equipment (HS 87) – Top Partners

Sl. No.	Country	Export				UNECE Membership	Sl. No.	Country	Import				UNECE Membership
		Average Share (%)							Average Share (%)				
		2001-05	2006-10	2011-15	2016-19				2001-05	2006-10	2011-15	2016-19	
1	United States of America	12.95	10.14	8.73	12.53	1998	1	China	2.56	15.01	21.75	24.26	1998
2	Mexico	3.76	1.86	5.15	10.94	None	2	South Korea	23.17	23.05	14.58	13.88	Common CP
3	South Africa	3.07	5.20	6.81	4.95	Common CP	3	Germany	10.78	12.95	16.99	15.16	Common CP
4	Bangladesh	4.53	2.92	3.44	5.44	None	4	Japan	19.27	16.43	11.37	10.00	Common CP
5	Nepal	3.38	1.82	1.88	4.18	None	5	Thailand	3.65	3.39	6.67	8.31	1958
6	Saudi Arabia	0.83	0.91	1.12	2.29	None	6	United States of America	5.13	2.79	4.24	5.48	1998
7	Nigeria	2.93	1.95	3.30	2.20	Common CP	7	Singapore	0.86	0.74	0.22	1.93	None
8	United Arab Emirates	3.01	2.79	2.54	2.25	None	8	Sweden	1.55	2.68	1.75	2.21	Common CP
9	Germany	3.73	4.43	2.44	2.65	Common CP	9	Mexico	0.15	0.58	0.83	1.59	None
10	Indonesia	1.13	1.79	1.70	2.51	None	10	United Kingdom	4.55	1.90	2.56	2.41	Common CP
11	Sri Lanka	8.00	6.24	5.55	3.10	None	11	Italy	4.86	2.74	2.65	2.15	Common CP
12	Italy	5.54	6.49	3.04	2.69	Common CP	12	Indonesia	1.04	0.58	1.14	1.82	None
13	Colombia	1.62	2.54	3.05	1.80	None	13	Belgium	1.02	0.38	0.51	0.79	1958
14	United Kingdom	6.01	4.90	4.95	2.89	Common CP	14	France	1.11	1.12	1.57	1.03	Common CP
15	Brazil	0.53	0.69	1.45	1.52	None	15	Viet Nam	0.00	0.16	0.67	0.82	None
16	Turkey	1.40	1.93	3.51	2.83	Common CP	16	Spain	0.78	0.79	2.08	1.14	Common CP
17	Philippines	0.75	0.95	1.49	1.57	None	17	Brazil	3.77	0.73	0.54	0.52	None
18	Thailand	0.79	1.48	1.97	1.51	1958	18	Turkey	0.66	0.49	0.60	0.46	Common CP
19	Viet Nam	0.12	0.12	0.70	1.15	None	19	Netherlands	0.76	0.37	0.43	0.48	Common CP

20						Common CP	20	United Arab Emirates					None
	Japan	0.52	0.41	0.90	1.27				0.36	0.06	0.11	0.18	
21	France	1.02	1.74	1.15	1.78	Common CP	21	Malaysia	0.26	0.15	0.41	0.36	1958
22	Chile	0.34	1.02	1.37	1.57	None	22	Hong Kong, China	0.03	0.04	0.17	0.23	Common CP
23	Algeria	2.73	3.50	3.06	1.41	None	23	Czech Republic	8.33	7.29	2.14	1.40	1958
24	Peru	0.58	0.56	1.15	1.17	None	24	Romania	0.03	0.71	1.72	0.43	Common CP
25	Canada	0.39	0.35	0.21	0.81	1998	25	Sri Lanka	0.04	0.12	0.14	0.29	None
26	Egypt	1.36	2.21	2.19	1.17	None	26	Finland	0.11	0.19	0.25	0.34	None
27	Kenya	0.94	0.85	0.84	0.73	None	27	Taipei, Chinese	1.41	0.56	0.50	0.34	None
28	Belgium	0.97	1.54	0.84	0.82	1958	28	Australia	0.38	0.23	0.07	0.12	1958
29	Kuwait	0.52	0.31	0.33	0.38	None	29	Bangladesh	0.00	0.00	0.07	0.09	None
30	Russian Federation	0.26	0.40	0.52	0.60	Common CP	30	Bahrain	0.00	0.00	0.01	0.01	None

Source: Computed from Trade Map data, ITC (undated)

The auto-related products are scattered within nine HS chapters, namely: Plastic Products (HS 39), Rubber Products (HS 40), Glass and glassware (HS 70), Articles of Iron and Steel (HS 73), Miscellaneous articles of base metal (HS 83), Machinery and Equipment (HS 84), Electrical Equipment (HS 85), Vehicle and parts and accessories thereof (HS 87) and Sign, Cushion etc. (HS 94) (IIFT, 2017). Chakraborty et al (2020) noted India's trade in these product categories with partner countries cutting across UNECE membership, which is presented in Table 3. The results are reported for two time periods, namely: 2009-13 and 2014-18. The observations are as follows. First, during the latter period, India's relative exports to the UNECE 1998 member countries have increased, with a consequent decline in the shares for other three group of countries. Second, the export orientation towards UNECE 1998 members as well as non-member countries has increased. The underlying reason is the emergence of several developing countries and LDCs among India's export destinations, who have not adopted any UNECE standards yet. Third, the contributions from both UNECE 1998 members as well as non-member countries has intensified in India's imports. Finally, the relative decline in importance of Common CPs countries is an interesting phenomenon.

Table 3: India's Trade Direction in Automobile-related Products by UNECE Membership

Country Groups by UNECE Membership	Trade in Auto-Components (Across Chapters)				Trade in Automotive Products and Transport Equipment (HS 87)			
	Average Share (%)				Average Share (%)			
	Export		Import		Export		Import	
	2009-13	2014-18	2009-13	2014-18	2009-13	2014-18	2009-13	2014-18
UNECE 1958	9.16	8.62	12.01	10.76	8.71	5.81	10.00	11.54
UNECE 1998	22.78	25.20	24.26	32.60	8.95	11.88	22.92	28.87
Membership in both UNECE 1958 and 1998 (Common CP)	35.92	34.96	57.14	49.55	37.14	28.64	61.80	52.79
Countries with no UNECE affiliation	32.24	31.25	6.67	7.14	45.19	53.67	5.29	6.79

Source: Chakraborty et al (2020)

The increasing presence of the UNECE 1998 member countries both in India's export and import baskets indicate the growing importance of two-way trade in the automotive products category. The trade overlap can be measured through bilateral 'intra-industry trade' (IIT) index, computed by following *Grubel and Lloyd* measure (Grubel and Lloyd, 1975). The Grubel-Lloyd Uncorrected (GLU) and Grubel-Lloyd Corrected (GLC) indices of IIT, at a HS 2-digit level of classification, can be calculated by using the following formula:

$$GLU = \frac{\sum_i (X_{ij} + M_{ij}) - \sum_i |X_{ij} - M_{ij}|}{\sum_i (X_{ij} + M_{ij})} \times 100$$

$$GLC = \frac{\sum_i (X_{ij} + M_{ij}) - \sum_i |X_{ij} - M_{ij}|}{\sum_i (X_{ij} + M_{ij}) - |\sum_i X_{ij} - \sum_i M_{ij}|} \times 100$$

Where, X_{ij} and M_{ij} represent the value of export and imports of the i -th country (here, India) with the j -th partner (say, Japan) at HS 4-digit level, respectively. The IIT index calculated in this manner could vary between 0 and 100. If the overlapping exports and imports exactly match at each HS 4-digit classification (e.g., within HS 87), the IIT value would be 100. Conversely, when either of export or import for each HS 4-digit classification is zero, this signifies non-overlapping specialization pattern in the two partners and the IIT index would be zero. The GLC index, a modification over GLU, corrects for aggregate trade imbalances. It may be noted that even when the trade being of IIT-type, the GLC index can take the value of 100 if the numerical value of either exports or imports are higher than the corresponding series for all the HS 4-digit headings within the HS 2-digit chapters. Generally, enforcement of any trade facilitating arrangements, e.g., entry into FTAs, quality harmonization (like both partners having common UNECE membership), enhance the IIT-type trade among partners (Gamberoni et al, 2010).

The rising trend in India's bilateral IIT in automobile sector has been noted in the literature (Agarwal and Chakraborty, 2019; Chakraborty and Nag, 2021; Srivastava and Sen, 2015; Veermani, 2003). The current analysis computes the IIT index involving ten countries, namely: Germany, Japan, Italy, and South Korea (UNECE 1958 and 1998 common membership), Thailand (UNECE 1958 membership), USA and China (UNECE 1998 membership) and Indonesia, Brazil, and Mexico (without alliance to any UNECE convention), so as to compare the country's relative performance with each group. Moreover, while the Asian countries, i.e., Japan, Indonesia, South Korea, and Thailand are engaged in RTA partnership with India; Germany and Italy (as EU member states) and USA have recently resumed negotiations to conclude preferential trade relations with India (BS, 2020). In other words, the ten countries collectively represent a diversified group.

India's IIT figures with the selected countries are reported in Table 4. The top and the middle panels show that IIT indices computed by GLU and GLC methods, respectively. From the top panel, a few observations emerge. First, a general rise in the IIT index over the period had been noticed for several countries (e.g., Japan), indicating deepening production integration with them. Second, the fluctuations in the IIT index for some countries (e.g., Germany, Italy, Thailand) signifies growing divergence between the export and import data during these years. Third, the decline in the IIT index for China shows the diverging levels of trade in bilateral levels. Finally, the IIT with Brazil and Mexico have remained at a low level, implying complementary specialization and trade across different HS headings with them.

The bottom panel on trade deficit scenario indicates that India's trade performance in the automobile sector has been mixed against the partners belonging to different groups. Among the common CP countries, India suffers from trade deficits against Japan and South Korea, despite having preferential trade agreements with them from 2010-11 onwards. The experiences with respect to Germany (deficit) and Italy (surplus), other two Common CP countries belonging to the EU on the other hand has been quite dissimilar. The trade deficit has widened for Thailand, a UNECE 1958-member country. On the other hand, the experience involving US and China, the UNECE 1958 member countries have been opposite. While against the US India has been able to improve the trade balance consistently, the corresponding figure against China has displayed a declining trend. While the IIT trend underline a generally deepening production integration of India with the several partner countries, the trade deficits in both RTA partners (Japan, South Korea) and non-RTA partner markets (China, Germany) indicate a major concern.

Table 4: India Intra-Industry Trade Index with Select Trade Partners in Automotive Products and Transport Equipment (HS 87)

Trade Partner	UNECE Membership	2001	2005	2010	2015	2019
Grubel-Lloyd Uncorrected Index						
Germany	Common CP	78.80	74.25	56.69	47.09	62.81
Japan	Common CP	12.91	13.70	11.55	40.96	50.43
Italy	Common CP	55.12	24.54	33.94	41.81	43.94
South Korea	Common CP	20.22	29.32	3.62	8.63	18.38
Thailand	1958	56.10	75.74	91.70	63.55	69.14
USA	1998	17.21	16.60	21.96	26.92	20.14
China	1998	47.34	36.17	10.62	13.07	12.06
Indonesia	None	34.04	55.04	5.95	56.83	33.63
Brazil	None	10.69	35.33	23.27	20.14	8.83
Mexico	None	0.08	0.56	2.36	3.07	0.54
Grubel-Lloyd Corrected Index						
Germany	Common CP	83.42	76.74	97.91	97.32	83.10
Japan	Common CP	100.00	95.90	100.00	94.90	73.80
Italy	Common CP	96.61	96.27	97.84	93.46	95.94
South Korea	Common CP	99.59	99.22	65.44	95.50	95.52
Thailand	1958	92.16	89.34	94.70	92.34	90.10
USA	1998	73.75	78.60	57.58	93.25	92.80
China	1998	95.63	96.01	98.59	98.81	96.93
Indonesia	None	99.97	99.85	65.18	97.03	94.65
Brazil	None	18.64	40.69	75.43	99.77	41.45
Mexico	None	22.22	30.82	3.38	30.95	4.30
Sectoral Trade Balance (Indian Perspective)						
Germany	Common CP	Positive	Negative	Negative	Negative	Negative
Japan	Common CP	Negative	Negative	Negative	Negative	Negative
Italy	Common CP	Positive	Positive	Positive	Positive	Positive
South Korea	Common CP	Negative	Negative	Negative	Negative	Negative
Thailand	1958	Positive	Negative	Negative	Negative	Negative
USA	1998	Positive	Positive	Positive	Positive	Positive
China	1998	Negative	Negative	Negative	Negative	Negative
Indonesia	None	Positive	Positive	Positive	Positive	Positive
Brazil	None	Negative	Negative	Positive	Positive	Positive
Mexico	None	Positive	Positive	Positive	Positive	Positive

Source: Computed from Trade Map data, ITC (undated)

Tariff Reforms: SMART Simulation Results

As discussed in the introduction section, India has recently re-launched discussions with the EU on establishing a bilateral trade agreement. Given the impending tariff reduction in the aftermath of the RTA formation and the product harmonization related complexities involved in the UNECE membership, there is a need to understand how Indian exports and imports of various auto-components and final products may change in the EU market, vis-à-vis the reverse scenario. There exists a rich empirical literature on the potential impact of a bilateral trade agreement between the EU and India, underlining the benefits (Khorana and Perdakis, 2010). The analysis has been conducted both in partial equilibrium as well as general equilibrium frameworks. While a section of the GTAP analysis literature has noted the potential benefits for India in the EU market (Raihan, undated; Roy and Mathur, 2016), the possible failure of

the arrangement to boost India's trade has also been shown under possible scenarios (Achterbosch et al, 2008). On the other hand, the partial equilibrium modelling results, by using the WITS-SMART database, indicated modest gains for the country (Chakraborty and Nag, 2021; Nag and Chaturvedi, 2019).

The WITS-SMART partial equilibrium model results provide the simulated effects of preferential reforms (i.e., reduction of the import tariff by a proposed level, say - fifty percent / hundred percent) in the importer (i.e., EU / India) country (World Bank, 2011). The supply-side of the WITS-SMART framework is based on the assumption that export performance of a particular HS 6-digit product is linked to its price in the export market. Moreover, world prices are considered exogenous (i.e., flat export supply curves). It may be noted that a default assumption in the SMART model is that the export supply elasticity of each foreign country is infinite, enabling them to export as much of the good as possible at a certain price. Hence, if a product is competitive, a reduction of import duty in the target (importing) country (as per simulation) enhances exports from the country of interest (exporter). On demand front, the Armington assumption on consumer behaviour holds good, by dint of which quality variation between products originating from different import sources is acknowledged (i.e., assumption of imperfect substitutes, and in turn, the positive substitution elasticity). By Armington assumption, any bilateral tariff reduction would not result in total switch in import pattern in favour of any one country (World Bank, 2011).

The current analysis selects all the major final automobile products and auto-products for the analysis and explores the possible effects of tariff reforms (to zero percent) on their trade. The list of products considered in the current analysis have been outlined in Annex 2. First, the effect is considered in the EU market (i.e., analyzing effects on Indian exports to EU), followed by the same exercise for India (i.e., on EU exports to India). The obtained results from WITS-SMART simulations include the value of rise in imports, trade creation and trade diversion, total welfare effect and revenue change. Trade creation is defined as the direct increase in imports, following a reduction of the tariff imposed on the i-th good from exporting country. However, in the current analysis only the export change for India (as exporter) in the EU market (as importer) and vice versa has been reported.

The summarized zero tariff simulation results on Indian exports in the EU market, as obtained from WITS-SMART, are presented in Table 5. Based on the simulated growth rate of exports in case of an FTA (i.e., post tariff reform), the results are segregated under three categories: high (above 10 percent), medium (between 5-10 percent) and low (below 5 percent) growth, respectively. The distribution of the 77 products (at HS 6-digit level) selected under these three groups shows an interesting result. A total of 7, 48 and 22 products fall under high, medium, and low growth categories respectively. It becomes amply clear from the analysis that for several automotive products spanning over rubber products (HS 40), machineries (HS 84), electrical machineries (HS 85), auto-components and vehicles (HS 87) etc., India is expected to gain only moderately in the EU market, even when the tariff barriers would have been set to zero in the post-bloc period.

This simulated export growth for India in the EU market might have been caused by four distinct possibilities. First, if the import tariff in most of the automotive-related product categories in the EU are already zero or near zero, then tariff reforms would not provide any further price competitiveness for Indian exports. But the analysis has been conducted only for the products, where during 2019 the import tariff imposed by the EU on India had been non-zero. Moreover, as the last two columns of Table 5 illustrates, for 10 products at HS-6-digit

level, the average tariff imposed by the EU during 2015-19 had been higher vis-à-vis the corresponding figure during 2010-14 period. This in a way underlines a protectionist intent of the EU, although mild, in these categories. Second, India might face a challenge from competitor countries in the EU market, particularly from the UNECE 1958 members (e.g., various EU partners, CIS countries, Malaysia, South Africa, Common CP countries), who have already aligned their production and safety standards with the EU import regulations. Just to understand the real opportunities for India, the share of the EU players in Indian export baskets are compared. It is observed that among the 77 products considered in the analysis, the share of the EU in Indian exports has increased only for 28 products. This in a way underlines the country's modest sectoral export inclination towards the EU. Third, many mid-sized Indian auto-component units may not be able to capture the global market, given the stringent quality requirements (Agusin and Schröder, 2013; IIFT, 2017). Finally, the Indian auto-product exports to the EU are restricted not only by the tariff barriers but by the non-tariff barriers (NTBs) related to quality standards as well (Chakraborty et al., 2019b; Chakraborty et al., 2020; EC, 2014; Exim Bank, 2019). There has been a long-standing demand from the Indian automakers to improve the mutual recognition of standards and quality harmonization scenario (Sen, 2009).

The tariff reform simulation results on Indian imports are summarized in Table 6. The difference with the results obtained in Table 5 regarding Indian exports is quite stark. It is observed that among the 74 products considered for the analysis, a total of 69, 4 and 1 falls under high, medium, and low export growth categories respectively. The observation can be explained by the following underlying factors. First, as the EU member countries have adopted a higher standard for a longer period, their products are arguably on a superior quality plane as compared to India. Second, as the EU specializes in high-end finished automobiles (e.g., Ferrari in Italy; Volkswagen in Germany) as well as crucial auto-components, for which there might be limited competition in the Indian market; with lowering down of tariff barriers to zero percent, import demand for these products are likely to get a sharp boost. Third, the average tariff rates in India are quite high for several auto-product categories, with for 48 products the average tariffs increasing during 2015-19 vis-à-vis the corresponding 2010-14 period. It is further observed that among the 74 products considered for the analysis, the share of the EU in Indian imports has increased only for 31 products, which can be part explained by tariff barriers. As a result, a possible tariff reform in the auto-segment through the proposed RTA would significantly augment the price competitiveness of EU imports in the Indian market.

The simulation results indicate that tariff reforms in the EU market would not improve the market access significantly for Indian exports, resulting in modest benefits. To understand the results in comparative perspective, the aggregate Indian exports are going to increase from USD 2.87 billion to 3.07 billion, displaying an export growth of 7.17 percent. Conversely, the corresponding figures for the EU are USD 2.53 billion and 3.47 billion respectively, registering an export growth of 37.28 percent. This anticipated modest performance of India in the EU market can be explained by the existing presence of countries already complying with the UNECE 1958 standards (e.g., EU members) and quality harmonization with Common CP countries (e.g., Japan, South Korea) on one hand and stiff competition from UNECE 1998 countries enjoying strong price competitiveness (e.g., China) on the other. Conversely, the EU exporters are expected to gain significantly in the Indian market given the presence of higher tariff barriers in the country as well as issues pertaining to automobile standard harmonization. The policymakers negotiating the proposed RTA with the EU therefore need to tread cautiously, keeping these considerations in mind.

Table 5: Effect of Reduction in Tariff for Select Indian Automobile Exports in European Union Market

Sl. No.	Product Codes	Exports Before (Million USD)	Exports After (Million USD)	Export growth (%)	EU Average Percentage share in Indian exports (%)		Average Tariff Barrier (%)	
					2010-14	2015-19	2010-14	2015-19
High Export Growth								
1	870600	0.17	0.23	34.35	0.36	0.22	9.88	9.88
2	840820	84.65	97.02	14.61	62.15	25.93	4.01	4.01
3	392690	117.98	134.20	13.75	13.35	8.66	4.86	5.43
4	840790	0.61	0.70	13.20	36.72	9.02	3.54	3.64
5	850220	2.26	2.56	12.96	3.88	7.06	1.35	1.35
6	401140	0.22	0.25	11.20	2.31	1.56	4.50	4.50
7	840733	0.82	0.91	10.27	13.10	0.03	2.70	2.70
Medium Export Growth								
8	401310	0.17	0.19	9.98	0.73	0.54	4.00	4.00
9	870829	77.93	85.67	9.94	29.89	17.93	3.75	3.85
10	870840	131.02	143.90	9.83	8.43	13.34	3.88	3.83
11	870893	14.99	16.41	9.52	8.16	9.96	3.75	3.75
12	870894	26.15	28.58	9.32	23.32	10.76	3.88	3.91
13	840991	101.38	110.78	9.26	33.14	32.81	2.70	2.70
14	870870	32.48	35.45	9.13	37.34	17.44	3.75	3.75
15	401219	0.01	0.01	8.82	14.93	11.94	4.50	4.50
16	870810	8.32	9.04	8.73	19.63	12.27	3.75	3.75
17	401211	0.00	0.00	8.70	21.39	0.00	4.50	4.50
18	870830	177.06	192.33	8.62	30.03	25.73	4.10	4.01
19	870821	2.99	3.25	8.61	37.66	7.78	3.75	3.75
20	840734	2.86	3.11	8.54	0.50	0.53	3.83	3.83
21	401212	0.13	0.14	8.52	15.73	23.63	4.50	4.50
22	401120	15.07	16.35	8.47	2.37	2.03	4.50	4.50
23	401110	33.58	36.38	8.35	14.81	24.76	4.50	4.50

24	870850	195.18	211.42	8.32	23.56	18.87	4.00	3.87
25	851190	15.64	16.91	8.14	50.56	26.98	3.20	3.20
26	870892	58.92	63.68	8.09	52.45	39.30	3.88	3.88
27	870891	20.20	21.82	8.02	35.57	31.99	3.86	3.74
28	871410	39.19	42.25	7.82	9.51	6.58	3.70	3.70
29	870880	76.16	82.09	7.79	25.38	13.48	3.79	3.88
30	731100	7.48	8.06	7.69	5.84	7.30	2.70	2.70
31	870895	0.80	0.86	7.44	4.15	0.57	3.67	3.47
32	851240	0.15	0.17	7.33	12.38	16.09	2.70	2.70
33	870990	0.55	0.58	7.20	28.34	15.75	3.50	3.50
34	870899	202.61	216.90	7.05	21.54	20.50	3.62	3.46
35	871500	0.06	0.07	6.75	10.08	13.42	2.70	2.70
36	400941	4.80	5.12	6.67	27.41	31.76	3.00	3.00
37	830230	10.20	10.88	6.66	22.47	12.87	2.70	2.70
38	853929	0.77	0.82	6.60	5.25	2.04	2.70	2.70
39	853931	1.04	1.11	6.48	48.57	18.73	2.70	2.70
40	853990	0.61	0.65	6.39	12.76	16.86	2.70	2.70
41	853921	10.08	10.71	6.30	64.75	66.69	2.70	2.70
42	851220	53.36	56.70	6.27	28.40	32.82	2.70	2.70
43	840999	362.74	385.22	6.20	25.57	30.85	2.70	2.70
44	853922	0.25	0.26	6.13	3.79	0.00	2.70	2.70
45	851230	3.39	3.59	5.96	39.57	21.85	2.45	2.56
46	840731	0.01	0.01	5.89	8.37	1.35	2.70	2.70
47	851290	10.02	10.59	5.69	14.63	40.48	2.45	2.45
48	840732	0.26	0.27	5.68	0.76	0.01	2.70	2.70
49	848180	100.92	106.62	5.65	9.53	11.27	2.20	2.20
50	848340	128.62	135.81	5.59	16.19	20.93	2.19	2.34
51	831000	1.13	1.19	5.31	12.27	11.66	2.70	2.70
52	850520	1.24	1.30	5.21	55.26	47.42	2.20	2.20
53	851130	14.92	15.67	5.03	16.79	37.95	1.60	2.29

54	700721	5.64	5.92	5.02	41.27	52.19	2.00	2.00
55	848190	254.10	266.86	5.02	21.98	23.65	2.20	2.20
Low Export Growth								
56	851180	3.81	4.00	4.87	48.31	43.97	1.60	1.92
57	840890	73.80	77.33	4.78	6.33	4.14	2.44	2.56
58	853939	0.21	0.22	4.59	29.06	12.92	2.70	2.40
59	401213	0.01	0.01	4.55	0.59	0.00	2.25	2.25
60	830120	18.73	19.55	4.40	39.73	5.61	2.70	2.70
61	401220	0.17	0.17	4.32	8.51	0.70	2.25	2.25
62	853910	0.79	0.82	4.23	2.14	2.50	1.35	1.35
63	940560	0.20	0.21	4.03	28.21	45.08	2.02	2.02
64	871690	96.31	100.14	3.98	24.99	44.67	1.70	1.70
65	851150	30.73	31.94	3.93	52.38	55.48	1.60	1.60
66	851140	92.79	96.41	3.91	54.78	37.74	1.60	1.60
67	851120	0.60	0.62	3.73	38.61	15.00	1.60	1.60
68	851110	2.32	2.41	3.65	48.40	13.81	1.60	1.60
69	830210	20.77	21.51	3.52	16.89	12.72	1.35	1.35
70	853110	1.52	1.58	3.51	15.87	16.51	1.47	1.47
71	842123	28.30	28.98	2.37	53.04	44.63	0.85	0.85
72	848360	22.83	23.37	2.35	41.49	32.40	1.35	1.35
73	842131	6.01	6.13	1.99	35.76	19.82	0.85	0.85
74	853180	6.84	6.97	1.91	10.48	28.34	0.88	0.69
75	842129	45.46	46.02	1.22	33.57	29.65	0.85	0.68
76	853120	0.94	0.94	0.00	15.76	20.52	0.00	0.00
77	853190	5.50	5.50	0.00	5.50	14.31	1.51	0.33
Total Export Growth								
All auto-Products		2870.54	3076.36	7.17	-	-	-	-

Source: Own Estimation

Table 6: Effect of Reduction in Tariff for Select European Union Automobile Exports in Indian Market

Sl. No.	Product Codes	Sum of Exports Before (Million USD)	Sum of Exports After (Million USD)	Export Growth (%)	EU Average Percentage Share in Indian imports (%)		Average Tariff Barrier (%)	
					2010-14	2015-19	2010-14	2015-19
High Export Growth								
1	870600	0.42	4.72	1032.76	61.27	79.99	10.00	11.00
2	840820	31.75	142.99	350.35	29.71	17.50	7.50	9.00
3	850220	2.87	8.12	182.75	36.95	34.88	8.75	9.00
4	851240	1.86	5.07	172.25	13.90	23.89	10.00	11.00
5	700721	3.88	9.77	152.19	31.31	27.07	10.00	10.00
6	870840	134.19	294.33	119.33	33.41	18.59	10.00	11.00
7	840790	1.35	2.80	107.83	21.04	14.35	7.50	7.50
8	870830	43.49	90.33	107.72	36.02	30.81	10.00	11.00
9	840991	44.86	90.09	100.81	18.60	10.27	7.50	9.00
10	853910	0.26	0.51	94.59	5.61	27.48	10.00	11.00
11	871500	0.03	0.06	90.54	1.78	0.75	10.00	10.00
12	853190	6.81	11.50	68.94	9.62	9.48	10.00	10.00
13	870870	17.37	29.14	67.73	17.28	14.12	10.00	11.00
14	851150	32.03	53.47	66.92	13.64	36.01	7.50	9.00
15	401140	0.69	1.14	65.81	8.94	4.18	10.00	10.00
16	870829	100.78	167.08	65.79	49.56	36.99	10.00	11.00
17	842123	19.92	32.43	62.81	34.45	31.36	7.50	8.00
18	840733	5.28	8.22	55.79	2.18	46.78	7.50	9.00
19	830210	26.10	40.39	54.73	35.28	32.10	10.00	11.00
20	870894	43.63	67.47	54.65	19.57	22.88	7.50	9.00
21	870893	42.92	65.73	53.13	37.28	43.39	10.00	11.00
22	851140	8.50	12.78	50.28	17.33	17.62	7.50	9.00
23	401310	0.01	0.01	47.75	36.48	51.66	10.00	10.00
24	830230	9.43	13.58	44.04	30.15	33.31	10.00	11.00
25	392690	133.44	188.14	40.99	18.16	18.46	10.00	11.13
26	871690	2.93	4.01	37.04	11.37	7.71	10.00	10.00
27	853180	10.61	14.52	36.89	13.25	18.36	10.00	10.00

28	851190	9.38	12.74	35.74	16.88	13.37	7.50	9.00
29	940560	0.62	0.82	33.51	30.42	18.00	10.00	12.00
30	871410	10.38	13.48	29.90	0.76	1.28	10.00	11.00
31	851130	3.23	4.10	26.96	15.02	10.95	7.50	9.00
32	851110	2.15	2.72	26.64	24.44	14.54	7.50	9.00
33	851220	39.94	50.42	26.25	48.07	33.62	9.17	10.34
34	731100	5.50	6.94	26.09	24.69	23.26	10.00	10.00
35	840732	0.01	0.01	25.73	3.41	5.36	7.50	9.00
36	851180	2.69	3.37	25.13	35.53	23.02	7.50	9.00
37	870850	57.55	71.87	24.88	28.18	40.95	10.00	11.00
38	401120	2.55	3.18	24.71	24.35	6.83	10.00	11.00
39	840734	104.22	129.08	23.85	23.70	20.84	7.50	9.00
40	851120	0.31	0.39	23.40	8.72	2.43	7.50	9.00
41	853929	6.21	7.61	22.42	20.59	24.41	10.00	10.20
42	870810	20.24	24.72	22.10	27.22	48.57	10.00	11.00
43	840890	40.07	48.79	21.75	34.81	40.58	7.50	9.00
44	853990	5.54	6.74	21.61	13.84	9.12	10.00	10.00
45	401213	0.00	0.00	20.87	0.89	0.64	8.25	8.50
46	853922	0.01	0.02	20.69	11.41	17.24	10.00	10.00
47	401110	20.15	24.31	20.67	8.69	13.23	10.00	10.50
48	840999	253.71	305.83	20.54	40.26	35.22	7.50	8.55
49	401220	0.01	0.02	20.47	0.36	3.13	10.00	10.00
50	851230	1.55	1.86	19.98	17.44	11.07	8.75	10.00
51	851290	9.00	10.77	19.57	21.42	9.13	7.50	8.00
52	830120	10.29	12.31	19.55	40.39	28.89	10.00	11.00
53	853931	0.61	0.73	19.38	6.68	10.37	10.00	10.00
54	853110	7.65	9.13	19.29	9.77	9.90	10.00	10.00
55	870891	7.71	9.18	19.04	28.97	23.23	10.00	11.00
56	831000	1.26	1.49	18.52	15.41	13.59	10.00	10.00
57	870880	24.68	29.22	18.43	30.97	37.56	7.50	9.00
58	870821	9.23	10.91	18.21	47.82	49.87	10.00	11.00
59	853939	1.89	2.22	17.79	20.18	21.47	10.00	10.00
60	870895	29.55	34.59	17.06	26.97	20.84	10.00	11.00
61	848180	328.36	382.70	16.55	39.98	29.00	7.50	7.50

62	853921	10.56	12.27	16.21	40.57	35.29	10.00	10.33
63	870892	17.33	19.97	15.26	36.73	33.81	10.00	11.00
64	870899	404.75	465.15	14.92	28.63	28.44	10.00	11.00
65	848340	126.69	143.76	13.47	43.43	35.33	7.50	7.50
66	848190	101.51	115.01	13.30	37.01	33.81	7.50	7.50
67	400941	6.43	7.27	13.03	12.05	27.25	10.00	10.00
68	870990	1.02	1.14	11.50	36.80	66.52	10.00	10.00
69	842131	5.46	6.07	11.14	53.21	42.99	7.50	8.00
Medium Export Growth								
70	850520	7.81	8.52	9.13	55.39	57.08	7.50	7.50
71	842129	53.67	58.20	8.44	44.13	40.32	7.50	7.50
72	401219	0.01	0.01	7.49	0.44	52.86	10.00	10.00
73	848360	51.78	54.59	5.42	50.17	50.50	7.50	7.50
Low Export Growth								
74	853120	2.95	2.95	0.00	8.32	7.06	0.00	0.00
Total Export Growth								
All auto-Products		2531.65	3475.56	37.28	-	-	-	-

Source: Own Estimation

Conclusion

As India is showing an active interest to enter into an FTA with the EU in recent period, one key question that emerges from the current analysis is that whether India should embrace the UNECE 1958 standard to prepare the domestic players in the automotive sector better for the impending agreement. Enhancing competitiveness level of the sector would be of prime importance in this context. Keeping the high-value export opportunities and employment potential of the auto sector, it has already been included in the 'Make in India' programme (2014), in addition to being a key segment in the 'Atmanirbhar Bharat Abhiyan' (2020) context. Moreover, several policies have recently been introduced for strengthening the competitiveness of this sector (Chakraborty et al., 2019b). First, to secure technology transfer to Indian entities, the country has permitted 100 percent FDI inflows under automatic routes. In addition, for providing the Indian players a price competitiveness, duty-free import of auto-components has been allowed (GoI, 2015). Second, no minimum investment criteria are imposed on this sector, which is likely to facilitate entry of even mid-level players in the country (IBEF, 2017). Third, a series of fiscal support measures have been provided to the sector, e.g., reduction in export obligation of 16 products under the EPCG scheme, reduction of excise duty on chassis for ambulance from 24 per cent to 12.5 per cent, an increase in basic customs duty on commercial vehicles from 10 per cent to 20 per cent etc. (IBEF, 2016). Moreover, in the 2021 budget, the proposed duty hikes are likely to help the domestic auto-component producers (Khan, 2021). Fourth, to incentivize Indian players to comply with the emerging global demand for hybrid and electric vehicles, the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme has been introduced, under which, 'hybrid Vehicles now attract excise duty at 12.5 percent and electric vehicles attract excise duty at 6 percent, against the excise duty of 30 per cent, 27 per cent, 24 per cent and 12.5 per cent applicable on vehicles with conventional fuel' (IBEF, 2016). Fifth, for enhancing the competitiveness of Indian automobile firms through innovation, devolution of funds under the National Automotive Testing and R&D Infrastructure Project (NATRiP) has been increased to INR 3,727 crore. Multiple centres under the scheme, e.g., Mileage Accumulation Chassis Dynamometer (MACD) for two wheelers, three wheelers, four wheelers at Automotive Research Association of India (ARAI), Pune; Engine Test Cell (ETC) for Heavy Duty and Light Duty Engines at ARAI, Pune; the International Centre for Automotive Technology (ICAT), Manesar; Sealed Housing Evaporation Determination (SHED) facility for two wheelers, three wheelers, four wheelers at ARAI, Pune; and Vehicle Test Cell (VTC) for four wheelers at ARAI, Pune, have been developed (IBEF, 2016).

While the cumulative effect of these crucial policy interventions has been reflected in rising exports from the country in UNECE 1998 member countries (e.g., USA) and the non-members to any UNECE arrangements (e.g., Mexico, Bangladesh), the question of future market access to the UNECE 1958 member countries remain unresolved. The empirical results of the current simulation analysis indicates that as far as the automotive sector is concerned, the proposed bloc might help EU players more vis-à-vis their Indian counterparts. Therefore, in short run a greater export focus towards African and Latin American countries, presently not member of any UNECE agreement, may present a prudent opportunity for India. In the long run however, at least three reasons are there to consider the UNECE 1958 membership question. First, given the low expected trade benefits from the proposed EU-India FTA, the UNECE 1958 membership question needs to be re-visited. Second, it may be noted that the ASEAN member

countries recently agreed in 2015 to base their sectoral mutual recognition agreement (MRA) standards on UNECE 1958 norms, even though only Malaysia and Thailand are members in the forum at present. However, as the other eight ASEAN members are not CPs in any UNECE forum, to facilitate a smooth transition the bloc has decided to deviate from strict conformity with UNECE 1958 standards in the short run by introducing certain flexibilities during implementation phases (Lottig, 2015). It has been observed that the pace at which the ASEAN countries are embracing the UNECE 1958 technical standards is quite fast (Scoles, 2016), which can be a long run concern for India's auto-product exports through the existing ASEAN-India FTA. It may be noted that India is not as deeply integrated in the Asian automotive production network as other developing countries, e.g., China (Chakraborty et al, 2019a; Nag, 2011). Third, the other comprehensive trade partners of India, i.e., Japan and South Korea, happen to be Common CP countries, thereby implementing standard harmonization with both UNECE 1958 and 1998 countries. Once the ASEAN countries fully integrate with UNECE 1958 standards, therefore the intra-RCEP trade following a harmonized standard pattern might pose a long-term challenge for India. The Indian policymakers therefore need to assess all these potential concerns and challenges before coming to a decision on whether to join the UNECE 1958 forum.

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Annex 1: Membership in Various UNECE Agreements on Vehicle and Road Safety

Sl. No.	UNECE Agreement	Number of Members	Member Countries by Continent				
			Asia and Pacific	CIS	Europe	North America	Africa
1	UNECE 1958	53	Australia, Japan, Malaysia, New Zealand, Republic of Korea, Thailand	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Republic of Moldova, Russian Federation, Ukraine	Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Denmark, Estonia, European Union, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom of Great Britain and Northern Ireland	-	Egypt, Nigeria, South Africa, Tunisia
2	UNECE 1997	15	-	Belarus, Georgia, Kazakhstan, Republic of Moldova, Russian Federation, Ukraine	Albania, Bulgaria, Estonia, Finland, Hungary, Netherlands, Romania, San Marino	-	Nigeria
3	UNECE 1998	38	Australia, China, India, Japan, Malaysia, New Zealand, Republic of Korea	Azerbaijan, Belarus, Kazakhstan, Republic of Moldova, Tajikistan, Russian Federation, Uzbekistan	Cyprus, European Union, Finland, France, Germany, Hungary, Italy, Lithuania, Luxembourg, Netherlands, Norway, Romania, San Marino, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom of Great Britain and Northern Ireland	Canada, United States of America	Nigeria, South Africa, Tunisia
4	Common Membership in 1958 and 1998 Agreements	31	Australia, Japan, Malaysia, New Zealand, Republic of Korea	Azerbaijan, Belarus, Kazakhstan, Republic of Moldova, Russian Federation,	European Union, Finland, France, Germany, Hungary, Italy, Lithuania, Luxembourg, Netherlands, Norway, Romania, San Marino, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom of Great Britain and Northern Ireland	-	Nigeria, South Africa, Tunisia.

Source: Obtained from <http://www.unece.org/transport/international-agreements/contracting-parties.html> (accessed January 3, 2021)

Annex 2: Description of Product Codes used in the analysis

Sl. No.	Commodity Group	Product code	Description
1	Plastics & articles thereof	392690	Articles of plastics and articles of other materials of heading 3901 to 3914
2	Rubber and articles thereof	400941	Tubes, pipes and hoses, of vulcanised rubber (excluding hard rubber)
3		401110	New rubber pneumatic tyres used for motor cars, station wagons and racing cars
4		401120	New rubber pneumatic tyres used for buses and lorries (excluding tyres with lug, corner or similar treads)
5		401140	New rubber pneumatic tyres used for motorcycles
6		401161	rubber Pneumatic tyres used on agricultural or forestry vehicles and machines
7		401162	rubber Pneumatic tyres used on construction or industrial handling vehicles and machines and having a rim size <= 61 cm
8		401163	rubber Pneumatic tyres used on construction or industrial handling vehicles and machines and having a rim size > 61 cm
9		401169	rubber Pneumatic tyres (excluding those used on agricultural or forestry and construction or industrial handling vehicles and machines)
10		401190	New rubber pneumatic tyres (excl. those used on agricultural, construction, mining or industrial handling vehicles & machines, for motor cars, station wagons, racing cars, buses, lorries, aircraft)
11		401192	rubber Pneumatic tyres used on agricultural vehicles and machines (excluding having a "herring-bone" or similar tread)
12		401193	rubber Pneumatic tyres used on industrial handling vehicles & machines and having a rim size <= 61 cm (excl. having a "herring-bone" or similar tread)
13		401194	rubber Pneumatic tyres used on industrial handling vehicles & machines & having a rim size > 61 cm (excl. having a "herring-bone" or similar tread)
14		401199	rubber Pneumatic tyres (excl. having a "herring-bone" or similar tread)
15		401211	rubber Re-treaded pneumatic tyres used on motor cars "incl. station wagons and racing cars"
16		401212	rubber Re-treaded pneumatic tyres used on buses or lorries
17		401213	rubber Re-treaded pneumatic tyres used on aircraft
18		401219	rubber Re-treaded pneumatic tyres (excl. those used on motor cars, station wagons, racing cars, buses, lorries & aircraft)
19		401220	Used pneumatic tyres of rubber
20		401310	rubber Inner tubes used on motor cars, incl. station wagons and racing cars, buses and lorries
21		Glass and glassware	700721
22	Articles of iron or steel	731100	Containers of iron or steel, for compressed or liquefied gas (excl. containers constructed one or more types of transport)

23	miscellaneous articles of base material	830120	Locks used for motor vehicles, of base metal	
24		830210	Hinges of all kinds, of base metal	
25		830230	Base metal mountings, fittings & similar articles suitable for motor vehicles (excl. hinges & castors)	
26		831000	Sign-plates, nameplates, address-plates and similar plates, numbers, letters and other symbols, of base metal, incl. traffic signs (excl. those of heading 9405 & 8608)	
27	machinery, mechanical appliances, nuclear reactors, boilers and parts thereof	840731	Spark-ignition reciprocating piston engine used for the propulsion of vehicles of chapter 87 & cylinder capacity ≤ 50 cm ³	
28		840732	Spark-ignition reciprocating piston engine used for the propulsion of vehicles of chapter 87 & cylinder capacity > 50 cm ³ but ≤ 250 cm ³	
29		840733	Spark-ignition reciprocating piston engine used for vehicles of chapter 87 & cylinder capacity > 250 cm ³ but ≤ 1.000 cm ³	
30		840734	Spark-ignition reciprocating piston engine used for vehicles of chapter 87 & cylinder capacity > 1.000 cm ³	
31		840790	Spark-ignition reciprocating or rotary internal combustion piston engine (excl. those for aircraft or marine propulsion and reciprocating piston engine used for vehicles of chapter 87)	
32		840820	Compression-ignition internal combustion piston engine "diesel or semi-diesel engine"	
33		840890	Compression-ignition internal combustion piston engine "diesel or semi-diesel engine" (excl. engines for marine propulsion & engines for vehicles of chapter 87)	
34		840991	Parts suitable for use solely with spark-ignition internal combustion piston engine	
35		840999	Parts suitable for use solely with compression-ignition internal combustion piston engine "diesel or semi-diesel engine"	
36		842123	Oil or petrol-filters for internal combustion engines	
37		842129	Machinery & apparatus for filtering or purifying liquids (excl. machinery & apparatus for water, oil or petrol-filters for internal combustion engines and artificial kidneys)	
38		842131	Intake air filters for internal combustion engines	
39		848180	Appliances for pipes, boiler shells, tanks, vats or the like (excl. pressure-reducing valves, pneumatic power transmission valves, check "non-return" valves and safety or relief valves)	
40		848190	Parts of valves and similar articles for pipes, boiler shells, tanks, vats or the like	
41		848340	Gears & gearing for machinery (excl. toothed wheels, chain sprockets and other transmission elements presented separately); ball or roller screws; gear boxes & other speed changers	
42		848360	Clutches and shaft couplings, incl. universal joints, for machinery	
43		Electrical machinery & equipment and parts thereof	850220	Generating sets with spark-ignition internal combustion piston engine
44			850520	Electromagnetic couplings, clutches and brakes
45			851110	Sparking plugs of a kind used for spark-ignition or compression-ignition internal combustion engines

46		851120	Ignition magnetos, magneto-dynamos & magnetic flywheels, for spark-ignition or compression-ignition internal combustion engines
47		851130	Distributors & ignition coils of a kind used for spark-ignition or compression-ignition internal combustion engines
48		851140	Starter motors & dual-purpose starter-generators of a kind used for spark-ignition or compression-ignition internal combustion engines
49		851150	Generators used for internal combustion engines (excl. magneto dynamos & dual-purpose starter-generators)
50		851180	Electrical ignition or starting equipment, incl. cut-outs, of a kind used for spark-ignition or compression-ignition internal combustion engines
51		851190	Parts of electrical ignition or starting equipment, generators, etc. of heading 8511, n.e.s.
52		851220	Electrical lighting or visual signalling equipment for motor vehicles (excluding lamps of heading 8539)
53		851230	Electrical sound signalling equipment for cycles or motor vehicles
54		851240	Electrical windscreen wipers, defrosters and demisters, for motor vehicles
55		851290	Parts of electrical lighting or signalling equipment, windscreen wipers, defrosters & demisters of a kind used for cycles and motor vehicles, n.e.s.
56		853110	Burglar or fire alarms and similar apparatus
57		853120	Indicator panels with liquid crystal devices "LCD" or light emitting diodes "LED" (excl. those for cycles, motor vehicles & traffic signalling)
58		853180	Electric sound or visual signalling apparatus (excl. indicator panels with liquid crystal devices or light emitting diodes, burglar or fire alarms)
59		853190	Parts of electric sound or visual signalling apparatus, n.e.s.
60		853910	Sealed beam lamp units
61		853921	Tungsten halogen filament lamps (excluding sealed beam lamp units)
62		853922	Filament lamps of a power ≤ 200 W & for a voltage > 100 V (excl. tungsten halogen filament lamps & ultraviolet or infra-red lamps)
63		853929	Filament lamps, electric (excl. tungsten halogen lamps, lamps of a power ≤ 200 W & for a voltage > 100 V & ultraviolet or infra-red lamps)
64		853931	Discharge lamps, fluorescent, hot cathode
65		853939	Discharge lamps (excl. fluorescent, hot cathode lamps, mercury or sodium vapour lamps, metal halide lamps & ultraviolet lamps)
66		853990	Parts of electric filament or discharge lamps, sealed beam lamp units, ultraviolet or infra-red lamps & arc lamps, n.e.s.
67	Vehicles other than railway or tramway rolling stock, & parts & accessories thereof	870600	Chassis fitted with engines, for tractors, motor vehicles for the transport of 10 or more persons, motor vehicles designed for the transport of person & special purpose motor vehicles of heading 8701 to 8705 (excluding those with engines and cabs)

68	870810	Bumpers & parts thereof for tractors, motor vehicles for the transport of 10 or more persons, motor vehicles designed for the transport of persons & special purpose motor vehicles, n.e.s.
69	870821	Safety seat belts for motor vehicles
70	870829	Parts & accessories of bodies for tractors, motor vehicles for the transport of 10 or more persons motor vehicles designed for the transport of persons & special purpose motor vehicles (excl. bumpers & parts thereof & safety seat belts)
71	870830	Brakes & servo-brakes & their parts, for tractors, transport motor vehicles of 10 or more persons motor vehicles designed for the transport of person & special purpose motor vehicles, n.e.s.
72	870840	Gear boxes & parts thereof, for tractors, transport motor vehicles 10 or more persons, motor vehicles designed for the transport of persons & special purpose motor vehicles, n.e.s.
73	870850	Drive-axles with differential, whether or not provided with other transmission components, & non-driving axles, & parts thereof
74	870870	Road wheels & parts & accessories thereof, for tractors, motor vehicles for the transport of 10 or more persons, motor vehicles designed for the transport of persons & special purpose motor vehicles, n.e.s.
75	870880	Suspension systems & parts thereof, incl. shock-absorbers, for tractors, motor vehicles for the transport of 10 or more persons motor vehicles designed for the transport of persons & special purpose motor vehicles
76	870891	Radiators & parts thereof, for tractors, motor vehicles for the transport of 10 or more persons, motor vehicles designed for the transport of persons, motor vehicles for the transport of goods & special purpose motor vehicles, n.e.s.
77	870892	Silencers "mufflers" & exhaust pipes, & parts thereof, for tractors, motor vehicles for the transport of ten or more persons, motor cars & other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods & special purpose motor vehicles, n.e.s.
78	870893	Clutches & parts thereof, for tractors, motor vehicles for the transport of 10 or more persons, motor cars & other motor vehicles designed for the transport of persons & special purpose motor vehicles, n.e.s.
79	870894	Steering wheels, steering columns & steering boxes, & parts thereof, for tractors, motor vehicles for the transport of 10 or more persons, motor cars & other motor vehicles designed for the transport of persons & special purpose motor vehicles, n.e.s.
80	870895	Safety airbags with inflator system & parts thereof, for tractors, motor vehicles for the transport of 10 or more persons, motor cars & other motor vehicles designed for the transport of persons & special purpose motor vehicles, n.e.s.
81	870899	Parts & accessories, for tractors, motor vehicles for the transport of 10 or more persons, motor cars & other motor vehicles principally designed for the transport of persons, & special purpose motor vehicles, n.e.s.

82		870990	Parts of self-propelled works trucks, not fitted with lifting or handling equipment, of the type used in factories, warehouses, dock areas or airports for short distance transport of goods, incl. tractors for railways station platforms, n.e.s.
83		871410	Parts and accessories of motorcycles, incl. mopeds, n.e.s.
84		871411	Saddles for motorcycles, incl. mopeds
85		871419	Parts and accessories for motorcycles, incl. mopeds, n.e.s.
86		871500	Baby carriages & parts thereof, n.e.s.
87		871690	Parts of trailers & semi-trailers & other vehicles not mechanically propelled, n.e.s.
88	lamps and lighting fittings	940560	Illuminated signs, illuminated nameplates & the like, with a permanently fixed light source