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EMPLOYING FAHP TO DE-CODIFY THE DETERMINANTS OF TRADE AGREEMENTS: A CASE OF THE EU-INDIA TRADE TALKS

Sangeeta KHORANA[1], Jaemin CHO[2], Jaeho LEE[3*], Marta DISEGNA[4]

[1,4]The Business School, Faculty of Management, Bournemouth University, 89 Holdenhurst Road, Bournemouth BH8 8EB, United Kingdom
[2]College of Business Administration, University of Ulsan, 93 Daehak-ro, Mugeo-dong, Nam-gu, Ulsan, Republic of Korea
[3]Department of International Business and Trade, Kyung Hee University, 26 Kyunghee-daero, Dongdaemun-gu, Seoul, 02447, Republic of Korea

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Abstract. This paper employs an interdisciplinary approach that combines economics with Fuzzy Analytic Hierarchy Process (FAHP) approach to de-codify the anatomy of free trade agreements (FTA) determinants focusing, in particular, on the case of EU-India FTA. The novelty of this paper is the systematic empirical analysis of the FTA determinants using FAHP. More than a hundred businesses and trade practitioners were interviewed in the EU and India to understand the lack of momentum in FTA talks. Our findings indicate that economic and political criteria are predominant FTA determinants, with market access potential (economic) as important factors driving the EU-India FTA talks. Given that results suggest similar perceptions of both the EU and India interviewees to FTA determinants it is likely that the EU and India could find common ground and resume the languishing FTA negotiations.

Keywords: free trade agreement, negotiations, fuzzy AHP, fuzzy numbers.

JEL Classification: C44, F13, F14.

Introduction

This paper aims to explore the dynamics and determinants of the 21st century free trade agreement (FTA) negotiations. As of 1st January 2017, 635 notifications of trade agreements were received by the GATT/WTO, of which 423 are in force (World Trade Organization [WTO] 2016). Conventional economic theory and literature shows that trade liberalisation is a key driver for FTAs. However, as trade agreements have evolved over time, the economic rationale of lowering tariffs no longer holds. All recently negotiated trade agreements involve

*Corresponding author. E-mail: *jaeholee@khu.ac.kr*

more structured institutional arrangements that cover a wider number of issues beyond tariffs. The traditional trade agreements focused on tariff reduction and elimination. This has since changed and recent trade agreements extend their reach well beyond tariff reduction to include policy areas such as investment and competition policy as well as procurement and regulatory convergence. Literature shows that the analyses of trade agreements mainly examine the economic effects, with political economy experts providing insights into the determinants of FTAs (for an overview on EU-India FTA see Khorana & Garcia, 2013; Wouters, Goddeeris, Natens, & Coirtuz, 2013).

This paper, focusing on the determinants of FTAs, employs a quantitative interdisciplinary approach and bridges the domain of economics and political economy using FAHP technique to provide an informed research on the determinants of EU-India FTA. Talks between the EU and India were launched a decade ago (in 2007) but not much progress has been made until date. This paper examines the determinants of bilateral trade agreements and aims to support trade negotiators to find 'decisions' that are best suited to the goal of concluding a FTA from the understanding of on-ground issues in India and the EU. The Fuzzy Analytic Hierarchy Process (FAHP) approach is primarily used for multi-attribute analysis and structured hierarchy decision situations. This paper employs FAHP approach to rank FTA determinants that have been driving trade talks between the EU and India. The novelty of this paper is couched in its interdisciplinarity and the ability to combine economics, political economy with the FAHP approach to de-codify the anatomy of FTAs and its determinants. The underlying rationale to employ the fuzzy version of traditional AHP method is to overcome the uncertainty embedded in Likert-type variables and avoid subjective evaluations (see D'Urso, Disegna, Massari, & Osti, 2016 for details), which are also the strengths of this research.

Using the FAHP approach, the paper aims to examine FTA determinants and the underlying reasons for the gridlock of the EU-India FTA negotiations that have been ongoing for over a decade. The paper draws on interviews and meetings with over a hundred trade policy experts and businesses in the EU and India to highlight the rationale and identify a hierarchy of determinants that shape and determine the pace of FTA talks. The paper is structured as following: Section 1 provides the theoretical foundations of the rationale as to why countries negotiate FTAs and presents a critical review of the work by economists, political economy and social scientists on "traditional" and "non traditional" motives of FTAs. Section 2 describes the methodology and research framework; Section 3 analyses the determinants of EU-India FTA based on interviews and discussions in India and the EU; last section concludes.

1. FTA determinants: theoretical framework and underpinnings

Studies highlight the reasons for countries opting for FTAs with some mirroring pure "economic" motives (Baldwin & Jaimovich, 2012; Maggi, 2014), while others refer to "non-traditional" explanations that include, but are not limited to, increasing market size, increasing policy predictability, signalling openness to investors and achieving deeper commitments, fostering firm competitiveness and cross border trade. The analysis, however, remains incomplete without the political context that highlights political integration, domestic politics,

democracy, institutions, and diplomacy as determinants. Political economy determinants include the ease of negotiations with fewer partners and potential to liberalise sectors selectively (Ravenhill, 2003), and mitigate trade diversion fears of "losing out to neighbours" (Baldwin & Jaimovich, 2012). Strategic determinants emphasise conceptualising FTAs as a response to globalisation (Woolcock, 2013), to generate momentum at the multilateral level and foster geopolitical stability. Institutional determinants relate to achieving deep integration beyond traditional trade (i.e. border) measures, such as tariffs.

A comprehensive review of the literature suggests that economic, political, strategic and institutional factors play an important role in the decision of partner countries to negotiate a trade partnership and these eventually impact on the progress of negotiations. Within the context of EU-India FTA talks, a set of variables determining the rationale for and progress of trade negotiations were identified and tested. (See Table 1 for literature background of the 4 criteria and factors).

Table 1. Criteria and Factors determining FTA negotiations

Criteria	Factor	Definition	Related Literature
Economic	Market Access Potential	Depends on partners' economic size, GDP growth, GDP per capita (drawing on Building blocs theory)	Horn, Petros, and Mavroidis (2010); Baldwin and Jaimovich (2012)
	Pattern and Growth of Trade (attributed to differences in factor endowments)	Levels of trade dependence between trading partners in light of differences in factor endowments between partner countries	Baier and Bergstrand (2004); Baldwin and Jaimovich (2012); Khorana, Yeung, Kerr, and Perdikis (2012)
	Tariff Reduction/ Elimination	Full elimination of external duties on all goods and services i.e. trade complementarity effect	Bagwell and Staiger (2011)
	Firm competitiveness	Avenue for competitive firms to enter new markets and benefit from profit shifting externality, i.e. firm de-location externality	Antras and Staiger (2012)
Political	Political buy-in of government	Employ FTA as a means for fostering significant reforms in domestic laws, in one or more sectors	Limão and Tovar (2011); Limão and Maggi (2013); Khorana, Kerr, and Mishra (2014)
	Address horizontal fragmentation of power	Regulatory agencies or line ministries jurisdictions are fragmented horizontally and there are between branches of government (executive versus legislative) or within them (trade ministries versus other ministries or agencies). Also the problem is vertical fragmentation of power (national versus subnational units of government)	Trachtman (2011); Khorana et al. (2014)

Continue of Table 1

Criteria	Factor	Definition	Related Literature
	Strengthen bargaining power at international level	Trade agreements help to improve international competitiveness by exploiting economies of scale and strengthening their bargaining power through a collective voice on global trade issues. FTAs can help insure against the periodic difficulties of multilateral trade liberalization, such as the recent slow progress in the WTO Doha negotiations and a perceived loss of steam in the liberalisation process	Kawai and Wignaraja (2009)
	Political structures of partners i.e. democracy	FTAs have been driven by the aim to foster strong rule of law and sustain a country's democracy	Baldwin and Jaimovich (2012)
	Trade as a foreign policy instrument	Countries such as EU (and US) use trade agreements as policy instrument. In our case, Global Europe and EU 2020 strategy fill in the gap left by failure of Doha Round and EU's ambition to play a global role. Also EU specifically intends to set precedents for multilateral liberalization	Khorana and Garcia (2014)
Strategic	Credible commitment to reform	How a country perceives economic liberalisation and attempts made to codify legally binding rules and support de facto multilateralisation, i.e. FTA as an instrument to help lock in domestic reform	Maggi and Rodriguez-Clare (2007); Limão and Maggi (2013); Khorana et al. (2014)
	Liberalisation commitment for dispute settlement enforcement mechanism	The implementation of negotiated commitments is desirable from a national welfare perspective	Bown and Hoekman (2007)
	Lock in mechanism of liberalisation reforms	The "ratchet" effect of NAFTA-inspired agreements locks in the investment regime and includes as commitments under the RTA any new effort towards liberalisation. These agreements generally bring a higher degree of certainty and predictability for investors	Villareal and Ferguson (2015)

End of Table 1

Criteria	Factor	Definition	Related Literature
	Leverage to promote change in foreign direct investment policy	Trade agreements are a tool for promoting fair competition and encouraging foreign governments to adopt open and transparent rulemaking procedures as well as non-discriminatory laws and regulations. Trade agreements may include commitments on topics such as improving intellectual property right protection, enhancing labor rights, government procurement, opening service sectors to competition, enhancing rules on foreign investment, environmental standards, improving customs facilitation	Horn et al. (2010)
	Geographical location	Physical location of country	Baier and Bergstrand (2004); Baldwin and Jaimovich (2012)
Institutional	Address existing non-tariff barriers	Barriers other than tariffs which include standards and regulations, i.e. SPS, TBT issues	Limão (2007); WTO (2011)
	Deep Integration	To include issues such as: Government Procurement, Competition policy, Labour, Environment, and to ensure that any increased economic activity does not occur at the expense of labour and environmental protection	Bagwell and Staiger (2011); DeRemer (2013; Khorana and Garcia (2013)
	Enhance transparency	Enhance transparency in rules for trade	Khorana et al. (2014)
	Customs facilitation	Admin fees and formalities, Rules on Origin procedures	WTO (2011)
	Accountability mechanism	Of governance, i.e. design of commitments undertaken, dispute settlement procedures, how countries adopt legalistic mechanism for resolving disputes and enforcing compliance complemented with robust provisions on voluntary mediation	Bagwell and Staiger (2011); Khorana et al. (2014)

Economic determinants: The determinants tested include market access potential and size/growth of trade, tariff reduction/elimination, differences in factor endowments and firm competitiveness. If prospective partners of a trade bloc are important trading partners, in value terms, the FTA is likely to be trade creating and not diverting (Horn et al., 2010). While, if trade is complementary (i.e., when one country exports products that another country imports), the FTA increases cross-border trade. Firm competitiveness is another determinant, with research finding that FTAs lead to structural efficiency, higher productivity and

lower costs. National treatment is also listed as a determinant, but discussed mostly within regulatory liberalization context.

Political determinants: these include using FTAs as a foreign policy instrument to foster political buy-in, express diplomatic relationship, promote democracy, increase bargaining power of partners and address horizontal power fragmentation. The EU uses trade as a foreign policy tool, which is also analysed. FTA commitments signal governments' buy-in to initiate regulatory reforms for "deep integration" in one or more sectors (Limão & Maggi, 2013; Khorana et al., 2014). FTA commitments also communicate governments' buy-in to address resource misallocation and control rents (Maggi & Rodriguez-Clare, 2007). Trachtman (2011) highlights FTAs ability to address horizontal fragmentation of regulatory agencies and jurisdiction of line ministries between executive and legislative or within government (trade ministries versus other ministries or agencies). Meyer (2010) argues that relative bargaining power shifts lead countries to negotiate FTAs. FTA partnership is to foster rule of law and sustain democracy, though this may not always be the case (Liu & Ornelas, 2014). Democracy is yet another determinant, with evidence of a positive relationship between democracy and countries' participation in trade agreements (Mansfield & Milner, 2010).

Strategic factors: these include to initiate and signal credible commitment to regulatory reform (Liu & Ornelas, 2014), codify legally binding rules (Limão & Tovar, 2011), usher *de facto* multilateralisation by locking member countries into economic policies that insulate economic reform from domestic political interference. Other explanations include using FTAs for regional security, as leverage for foreign direct investment and to create effective dispute settlement system (OECD, 2005).[1] Scholars (see for instance Baetens, 2013) argue that FTA provide the basic framework to negotiate investment rules with market-access provisions that include intellectual property right protection, labor rights, government procurement, competition and foreign investment rules, environmental standards, and customs facilitation. Geographical distance is another FTA determinant, and the lesser the distance between partner countries the higher is the potential of trade creation (Wei & Frankel, 1996) and net welfare justifying countries choice to pursue FTAs for liberalisation (Baldwin & Jaimovich, 2012). Maggi and Staiger (2011) find that countries use FTA to include robust voluntary provisions for disputes mediation, resolution and compliance.

Institutional determinants: these have evolved and trade agreements are perceived as a vehicle to address "behind-the-border" non-tariff issues for deep integration, customs facilitation, transparency and accountability in partner countries. Studies (Plummer, 2007; WTO, 2011) point out the changing focus of FTA from conventional tariffs to technical barriers, services, intellectual property and trade-related investment measures to achieve "deep integration". The institutional aspects finds FTAs allow for concessions in non-trade areas, such as cooperation on drugs or labour standards. The argument goes that injecting "non-border" measures through FTAs enhances market orientation, microeconomic competition and reduces the power of domestic monopolies and rent seeking, enhancing transparency (DeRemer, 2013). Another FTA negotiations determinant is enhancing accountability via the design of commitments undertaken and for efficient, accountable and voluntary dispute settlement

[1] The OECD (2005) discusses NAFTA as an example under which commitments enhanced the openness of dispute settlement procedures.

procedures. Hoffman and Kim (2010) find that FTAs are more likely to yield a formal and accountable dispute settlement mechanism, which explains the importance of this set of determinants.

To assess whether and how these determinants were behind the decision of the EU and India to launch and continue pursuing talks for the FTA, the FAHP has been performed.

2. Fuzzy Analytic Hierarchy Process (FAHP)

The Analytic Hierarchy Process (AHP) and its fuzzy version, the Fuzzy AHP (FAHP), have been extensively used in many areas in order to determine an overall ranking among different alternatives (Aghdaie, 2017; Balin & Baraçli, 2017; Ecer, 2018; Ren & Lützen, 2017; Kahraman, Suder, & Bekar, 2016; Aggarwal & Singh, 2013; Aghdaie, Zolfani, & Zavadskas, 2013). Firstly, it is necessary to define an adequate hierarchy structure in which the goals are positioned in the top level, the criteria constitute the intermediate levels, and the lowest level consists of subcriteria or factors. Secondly, experts are asked to rank (or assign scores to) the set of factors influencing the goals generally using a 9-point scale (1 = equally preferred and 9 = absolutely preferred). Thirdly, individual pairwise comparison matrix for each criteria and factor are computed, normally using only integers 1, 3, 5, 7 and 9 (Aggarwal & Singh, 2013). Finally, on the basis of the pairwise comparison, local and global weights are computed in order to obtain the final ranking of objects.

The main drawback of the AHP is that it is not able to capture the uncertainty that characterise individual judgments that are, by definition, vague and ambiguous. In fact, 1) respondents must convert their personal opinions on a scale, and this create imprecision, on which 2) the items (linguistic or numeric) have potentially multiple meanings, and this further increase the uncertainty of the information (D'Urso et al., 2016). Furthermore, judgements depend on personal background and knowledge that increase the vagueness of the information provided. A way to overcome these drawbacks and deal with the vagueness and imprecision of subjective evaluations consists of considering both the judgments and the ranking decision problem in a fuzzy framework (D'Urso et al., 2016). Operationally, this involve the transformation of individual evaluations into fuzzy numbers and the adoption of a suitable modified AHP for fuzzy numbers, i.e. the FAHP. A number of different methods have been suggested in the literature to handle with fuzzy numbers and fuzzy pairwise comparison matrices (Krejčí, Pavlačka, & Talašová, 2017). In this study, the extent analysis method suggested by Chang (1992) (also see Aggarwal & Singh, 2013) has been adopted for its computational simplicity and popularity. The main steps necessary to conduct a FAHP using the extent analysis method are represented in Figure 1 and described in the following subsections.

2.1. Fuzzy numbers and fuzzy pairwise comparison matrix

The first task in AHP is the creation of the individual pairwise comparison matrix in which the elements represent the relative importance of each pair of objects in the same hierarchy. In this study, we transform the pairwise comparison matrix containing the information gathered from each respondent by means of triangular fuzzy numbers. A triangular fuzzy variable

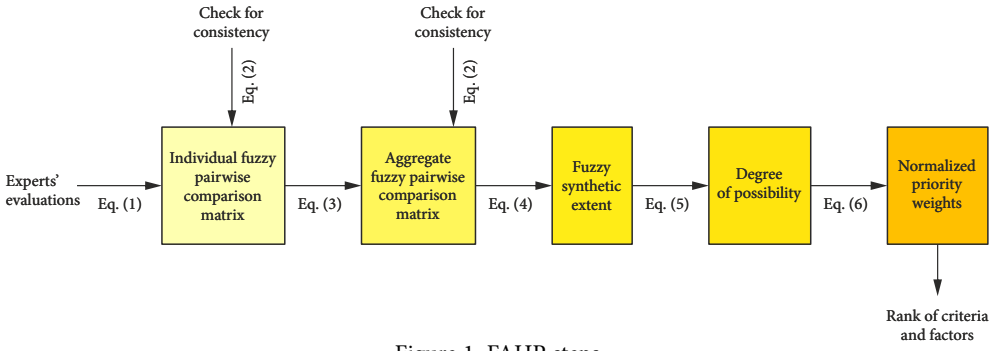

Figure 1. FAHP steps

is generally denoted by $\tilde{x} = (m, l, u)_T$ where m is the modal value, i.e. the value stated by the respondent, while l and u are the left and right spreads that express the uncertainty of data. Therefore, the fuzzy triangular data can be expressed also as $(m-l, m, m+u) = (L, m, U)$ where $(m-l) = L$ and $(m+u) = U$ are the lower and upper bounds of the fuzzy data, respectively. The original variable x is recoded into a triangular fuzzy variable by means of the following triangular membership function:

$$\mu_{\tilde{x}}(x) = \begin{cases} 1 - \dfrac{m-x}{l} & \text{for } x \le m \\ 1 - \dfrac{x-m}{u} & \text{for } x \ge m \end{cases},$$

where $\mu_{\tilde{x}}(x)$ is a convex, continuous and monotonic function that maps the interval $[L, U]$ into $[0,1]$ indicating how much x belongs to the interval $[L, U]$. The higher the membership degree, the greater the degree by which x belongs to the fuzzy set.

The fuzzy pairwise comparison matrix $\tilde{A} = [\tilde{a}_{ij}]_{n \times n}$ of n objects is similar to the pairwise comparison matrix and it is generally defined as follows:

$$\tilde{A} = \begin{bmatrix} 1 & \tilde{a}_{12} & \cdots & \tilde{a}_{1n} \\ \tilde{a}_{21} & 1 & \cdots & \tilde{a}_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ \tilde{a}_{n1} & \tilde{a}_{n2} & \cdots & 1 \end{bmatrix}, \quad (1)$$

where $\tilde{a}_{12} = (L_{12}, m_{12}, U_{12})$ and $\tilde{a}_{21} = 1/\tilde{a}_{12} = (1/U_{12}, 1/m_{12}, 1/L_{12})$.

2.2. Consistency of the fuzzy pairwise comparison matrix

In rating a set of attributes, respondents should be consistent in their judgements and, as a result, the individual (fuzzy) pairwise matrix should be consistent. A pairwise comparison matrix $A = [a_{ij}]_{n \times n}$ is perfectly consistent if $a_{ij} = a_{ik} \cdot a_{kj}$ for each $i, j, k = 1, \cdots, n$. Since it is unrealistic to obtain perfectly consistent pairwise matrices, the Consistency Ratio (CR) index has been introduced to measure the level of consistency and classify the pairwise matrices in consistent (acceptable consistent level) and inconsistent (unacceptable consistent level). The CR index is defined as follows:

$$CR = \frac{\lambda_{\max} - n}{RI(n-1)}, \tag{2}$$

where $\lambda_{\max}$ is the maximal eigenvalue of A and RI is a random index whose value depends on n. When $CR > 0.1$ the pairwise comparison matrix is considered inconsistent and the information gathered from the respondent should be done again or excluded from the decision process.

In the literature no agreement has been reached so far on the method that better allows to verify the consistency of a fuzzy pairwise comparison matrix (Krejčí et al., 2017). In this study, we verify the consistency of the sub-matrices obtained extracting the middle value of the triangular fuzzy numbers from the corresponding fuzzy pairwise comparison matrices, as suggested. In other words, we verified the consistency of crisp matrices obtained using only the values originally stated by respondents following the procedure originally suggested for pairwise comparison matrix explained above.

2.3. Aggregation of fuzzy pairwise comparison matrices

The individual fuzzy pairwise comparison matrices can be aggregated following the min-mean-max approach. In particular, the triangular fuzzy number $\tilde{a}_{ij} = \left(L_{ij}, m_{ij}, U_{ij}\right)$, that represents how many times more dominant object i is over object j in the overall sample of K experts interviewed, is obtained as follows:

$$L_{ij} = \min_k L_{ijk}, \; m_{ij} = \left(\prod_{k=1}^{K} m_{ijk}\right)^{1/K}, \; U_{ij} = \max_k U_{ijk}, \tag{3}$$

where $\tilde{a}_{ijk} = (L_{ijk}, m_{ijk}, U_{ijk})$ is the relative dominance of object i over j expressed in form of triangular fuzzy number observed for the k-th decision maker belonging to a group of K decision makers. The consistency of the aggregated fuzzy pairwise comparison matrices can be checked as explained in the previous subsection for the individual fuzzy pairwise comparison matrices.

2.4. Fuzzy weights

When the aggregated fuzzy pairwise comparison matrix of each object is computed, the fuzzy weight of the objects can be obtained using the so-called synthetic extent analysis. In particular, the fuzzy synthetic extent $\tilde{S}_i$ related to the i-th object is defined as:

$$\tilde{S}_i = \sum_{j=1}^{n} \tilde{a}_{ij} \otimes \left[\sum_{j=1}^{n}\sum_{i=1}^{n} \tilde{a}_{ij}\right]^{-1} = \left(\frac{\sum_{j=1}^{n} L_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{n} U_{ij}}, \frac{\sum_{j=1}^{n} m_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{n} m_{ij}}, \frac{\sum_{j=1}^{n} U_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{n} L_{ij}}\right), \tag{4}$$

where $\sum_{j=1}^{n} \tilde{a}_{ij} = \left(\sum_{j=1}^{n} L_{ij}, \sum_{j=1}^{n} m_{ij}, \sum_{j=1}^{n} U_{ij}\right)$ is the sum of each row of the fuzzy pairwise matrix $\tilde{A}$, $\otimes$ is the multiplication between fuzzy numbers, and $\tilde{S}_i$ is the normalized fuzzy weight related to the i-th object.

2.5. Rank of fuzzy weights

Finally, after the computation of the fuzzy synthetic extent for each object under interest, it is necessary to compare fuzzy numbers in order to obtain the final ranking of the alternatives. To this aim, the concept of degree of possibility V that $\tilde{S}_i \geq \tilde{S}_j$ has been defined as the ordinate of the highest intersection point between the membership degrees of $\tilde{S}_i$ and $\tilde{S}_j$. The degree of possibility can be easily obtained as follows:

$$V\left(\tilde{S}_i \geq \tilde{S}_j\right) = \begin{cases} 1 & \text{if } m_i \geq m_j \\ 0 & \text{if } L_j \geq U_i \\ \dfrac{L_j - U_i}{\left(m_i - U_i\right) - \left(m_j - L_j\right)} & \text{otherwise} \end{cases}. \tag{5}$$

To compare $\tilde{S}_i$ and $\tilde{S}_j$ the values of $V\left(\tilde{S}_i \geq \tilde{S}_j\right)$ and $V\left(\tilde{S}_j \geq \tilde{S}_i\right)$ are required.

In order to compute the degree of possibility that $\tilde{S}_i$ (a convex fuzzy number) is greater than all the other $(n-1)$ fuzzy numbers the following operation can be used:

$$V(\tilde{S}_i \geq \tilde{S}_j \mid j = 1,\ldots,n; i \neq j) = \min_{j \neq i} V(\tilde{S}_i \geq \tilde{S}_j) = w_i',$$

where w_i' is a non-fuzzy number that represents the relative weight of the i-th object over the remaining objects. The relative weights per each object under observation can be computed and the weight vector $W' = \left(w_1', \ldots, w_n'\right)$ can be easily obtained. In order to compare W' with the analogous weights obtained from the traditional AHP it is necessary to normalize W'. The following equation can be used for the normalization of W':

$$w_i = \frac{w_i'}{\sum_{i=1}^{n} w_i'} = \frac{V\left(\tilde{S}_i \geq \tilde{S}_j \mid j = 1,\ldots,n;\ i \neq j\right)}{\sum_{i}^{n} V\left(\tilde{S}_i \geq \tilde{S}_j \mid j = 1,\ldots,n;\ i \neq j\right)}, \tag{6}$$

and the final normalized priority vector is $W = \left(w_1, \ldots, w_n\right)$.

Once the normalized weights of each criteria and factor of the hierarchy structure are computed, it is possible to obtain the final (or global) rank of factors multiplying the normalized weight of each factor by the normalized weight of the criteria to whom it belongs.

3. Case study and data analysis

The most important FTA determinants in the negotiations between EU and India have been identified in the literature and organised into a 3-level hierarchy: the overall goal on the top; 4 criteria (economic, political, strategic and institutional) as intermediate level; and 20 factors in the bottom level. The FTA determinants are briefly described in Table 2. To assess the priority score for each pair of determinants belonging to the same level (i.e. intermediate and bottom levels) the 9-point scale (1 = equally preferred and 9 = absolutely preferred) has been adopted. A total of 118 interviews were held with businesses and policy makers in India and the EU to understand the factors and determinants driving the EU-India FTA. These meetings were held by the authors in New Delhi and other Indian regions as well as in Brussels and other European regions. The linguistic terms expressing the experts' judgments have been recoded into triangular fuzzy numbers adopting fix left and right spreads as described

in Table 3 and suggested by Cho and Lee (2013) and Im and Cho (2013). The individual fuzzy pairwise comparison matrix has been created for 118 experts interviewed to assess which FTA factors are more likely to play an important role in driving negotiations. Through the consistency analyses, 17 experts' judgments have been removed from the analyses and a final sample of 101 experts, practitioners and businesses located in EU (50.5%) and India (49.5%) have been considered. Approximately 25% of the sample has 20 or more years of working experience, 10% has more than 2 years but less than 6 years, while the majority (65%) has between 8 and 19 years of working experience. The experts are mainly middle management (65%), 25% are senior management and the remaining 10% are staff/lower management.

Table 2. Description of the FTA criteria and factors

Criteria	Factors	Code
Economic (E)	Market access potential	E_1
	Pattern and growth of trade	E_2
	Tariff reduction/elimination	E_3
	Firm competitiveness	E_4
	Cross-border trade	E_5
Political (P)	Political buy-in of government	P_1
	Addressing horizontal fragmentation of power	P_2
	Strengthen bargaining power at international level	P_3
	Political structures of partners i.e. democracy	P_4
	Trade as a foreign policy instrument	P_5
Strategic (S)	Credible commitment to reform	S_1
	Liberalisation commitment for dispute settlement enforcement mechanism	S_2
	Lock in mechanism of liberalisation reforms	S_3
	Leverage to promote change in foreign direct investment policy	S_4
	Geographical location	S_5
Institutional (I)	Address existing non tariff barriers	I_1
	Deep Integration	I_2
	Enhance transparency	I_3
	Customs facilitation	I_4
	Accountability mechanism	I_5

Table 3. Relationship between linguistic scale and triangular fuzzy numbers

Linguistic scale	Assigned numerical value	Triangular fuzzy numbers	Reciprocal triangular fuzzy numbers
Equally preferred	1	(1,1,3)	(1/3,1,1)
Weakly preferred	3	(1,3,5)	(1/5,1/3,1)
Fairly strongly preferred	5	(3,5,7)	(1/7,1/5,1/3)
Very strongly preferred	7	(5,7,9)	(1/9,1/7,1/5)
Absolutely preferred	9	(7,9,9)	(1/9,1/9,1/7)

The FAHP has been separately performed for the two groups of EU and Indian experts in order to identify differences in the final ranking of the FTA determinants. The aggregate fuzzy comparison matrices for both criteria (Table A1) and factors (Tables A2–A5) are reported in the Appendix. The CR values obtained for the aggregated fuzzy pairwise comparison matrices for each factor equal to 0.02 stating that the level of consistency is satisfactory. The normalized priority weights (W) for the four criteria analysed are reported in Table 4 along with the fuzzy synthetic extent ($\tilde{S}$) and the relative weights (W'). As we can observe, EU and Indian experts equally ranked the four criteria analysed positioning the economic and the political instruments as the two most important drivers in the FTA negotiations.

Table 4. Aggregate fuzzy pairwise comparison matrix for criteria

	EU				India			
Criteria	Fuzzy extent ($\tilde{S}$)	Weight (W')	Normalized weight (W)	Rank	Fuzzy extent ($\tilde{S}$)	Weight (W')	Normalized weight (W)	Rank
Economic	(0.180, 0.440, 0.909)	1.000	0.417	1	(0.192, 0.419, 0.846)	1.000	0.433	1
Political	(0.137, 0.281, 0.651)	0.747	0.311	2	(0.148, 0.318, 0.656)	0.821	0.356	2
Institutional	(0.068, 0.143, 0.328)	0.332	0.139	3	(0.074, 0.139, 0.294)	0.266	0.115	3
Strategic	(0.067, 0.136, 0.323)	0.319	0.133	4	(0.068, 0.124, 0.276)	0.220	0.095	4
	CR = 0.02				CR = 0.02			

3.1. Local normalized weights for factors

The normalized priority weights (W) of factors are reported in the last column of Tables A2-A5. Among the economic factors, E_1 (market access potential) has been considered the most important in both countries followed by E_2 (pattern and growth of trade) and E_3 (Tariff reduction). Firm competitiveness (E_4) is an unimportant factor for EU experts while Indian experts gave to this factor some importance positioning it at the bottom of the list of economic factors. Finally, E_5 (cross-border trade) can be removed from the list of EU-India FTA determinants since considered unimportant for both countries. The political factors have been equally ranked by EU and India experts who identified P_1 (political buy-in of government to reform) as the main FTA determinant followed by P_3 (strengthening bargaining power at international level), P_2 (addressing horizontal fragmentation of power), P_4 (trade as a foreign policy instrument). The political structures of partners (P_5) can be removed from the list of EU-India FTA determinants since unimportant for both countries. The factors belonging to the institutional criteria have been ranked differently by EU and India experts. EU experts identified the need of a deep integration (I_2) as the most important institutional factor followed by I_1 (addressing existing non-tariff barriers) and I_3 (enhancing transparency). Custom facilitation (I_4) and accountability mechanism (I_5) are not considered important factor by EU experts and can be removed from their list of FTA determinants. Conversely, Indian experts

didn't exclude any institutional factors from the FTA determinants list: custom facilitation (I_4) has been recognize as the most important factor followed, in descending order of importance, by I_1 (addressing existing non-tariff barriers), I_2 (deep integration), I_5 (accountability mechanism) and I_3 (enhancing transparency). Finally, among the strategic factors, EU experts classified as unimportant S_3 (leverage to promote change in foreign direct investment policy) and S_5 (geographical location) while Indian experts excluded from the list S_1 (credible commitment to reform regulatory regime), S_2 (lock in mechanism of liberalization reform) and S_4 (liberalization commitment for dispute settlement mechanism). The most important strategic factor in EU-India FTA for EU experts is S_4, followed by S_1, while Indian experts rated as first factor S_3.

3.2. Global normalized weights for factors

The analysis of the global normalized priority weighs returns the final classification of the 20 factors affecting the EU-India FTA negotiations per each observed country. For each country, the global normalized priority weight of each factor is obtained multiplying the normalized priority weight of the factor (Tables A2-A5) by the normalized priority weigh of the criteria (Table 4) to whom the factor belongs. The global normalized priority weighs for each factor in the two sample of experts, i.e. EU and India, are represented in Figure 2.

From the inspection of Figure 2 it is possible to confirm what has already been assessed in the previous subsection, i.e. the factors that belong to the two most important criteria (economic and political) have been equally ranked by the experts regardless the country observed.

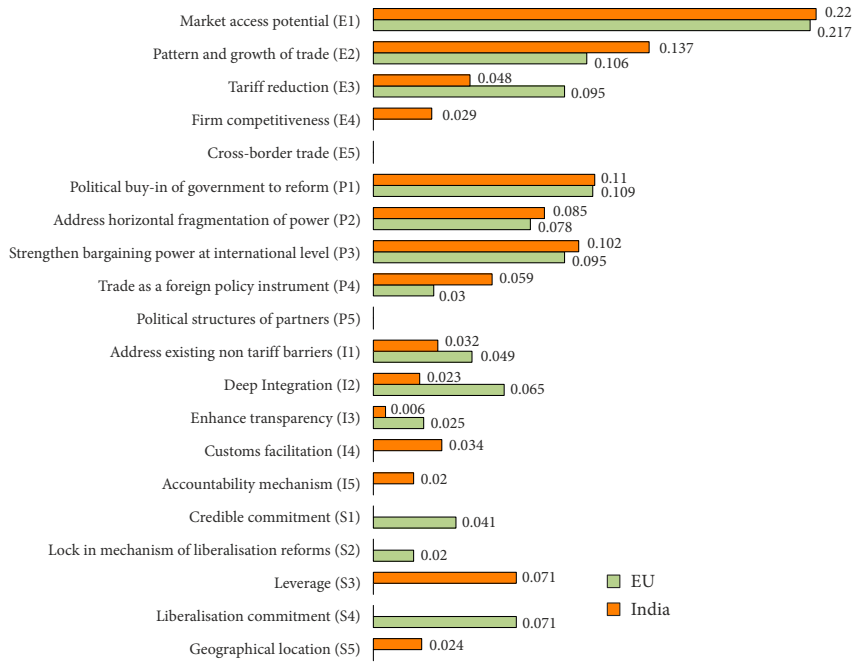

Figure 2. Global normalized priority weight of factors

More in detail, we can note that market access potential (E_1) is the most important determinant of FTA negotiations for both group of experts. Political buy-in of government to reform (P_1) and pattern and growth of trade (E_2) are respectively the second (third) and the third (second) most important determinants for EU (Indian) experts while the fourth determinant is the strengthening bargaining power at international level (P_3) regardless the country observed. For EU experts, the most important strategic factor (rank 7) is the liberalization commitment for dispute settlement mechanism (S_4) while among a deep integration (I_2) is the most important institutional driver in the EU-India FTA negotiations (rank 8). Whereas, for Indian experts the most important strategic factor (rank 5) is the leverage to promote change in foreign direct investment policy (S_3) while customs facilitation (I_4) is the most important institutional determinant (rank 8) in the FTA negotiations between the EU and India.

Conclusions

The FAHP approach has been adopted to evaluate the determinants of EU-India FTA, for which talks have been long drawn. We draw on the existing inventory of generic FTA determinants that are discussed widely in the academic domain and uncover what is holding up the progress of a FTA between EU and India. The rationale to use this novel FAHP approach for FTA determinants is that firstly, it adapts structured techniques employed in managerial decision-making to understand the complexity of trade negotiations and de-codifies the determinants of EU-India FTA. Secondly, it facilitates an informed understanding of the requirements and expectations of both partners, i.e. India and the EU, from the FTA. In line with this objective, the paper assesses the importance of a set of criteria and factors in the determination of the proposed EU-India FTA and obtains, as a result, the ranked (from the most to the less important) factors' list.

The findings of the FAHP show that both EU and Indian businesses and trade policy experts highlight the importance of economic and political criteria, compared to the strategic and institutional criteria, as the main determinants of the proposed FTA. The factors driving the determinants are country dependent – in that from the perspective of the EU, firstly, the proposed FTA will be the first of its kind with an emerging economy; and secondly, a successful conclusion is likely to enhance market access for EU firms and increase EU firms' global competitiveness. Thirdly, at a broader level the FTA could be employed as an instrument to strengthen the EU's role in global trade governance. From India's perspective, an agreement with the EU would provide potential market access to the EU services industries and attract foreign inflows into India, an aspiration closely linked with the Indian 'Make in India' policy.

Both the economic and political criteria are important for businesses and policy experts, and rightly so ranked high in the order of priority. Factors such as market access potential (economic) and political buy-in of government to reform (political) are important and cannot be ignored by both the partners. The rationale of high importance of the economic criteria hinges on the fact that the FTA will provide EU firms market access into an emerging economy in sectors, such as insurance and financial services, which remain protected. India has the largest middle class and over a billion people that reinforces the importance of the economic determinant for the FTA. For India, the FTA is envisaged to allow Indian

firms access to the EU services market and facilitate the movement and flow of technical services and professionals between the two countries. The opinion of EU and India experts, however, varies on institutional factors. Given the EU's emphasis on concluding "deep" FTAs, the proposed agreement will be an economic instrument to get India's commitments on non-traditional trade issues such as competition, government procurement and intellectual property and so on. This will also politically reiterate the commitment of the EU to use its foreign policy as a means to promote trade with India, which is the world's largest democracy. Further, FTA commitments would also represent an implicit buy-in of the Indian government to reform its domestic regulatory framework and business environment. Overall the results confirm that a FTA, if concluded between the EU and India, is likely to be mutually beneficial for both the countries. Given that both the EU and India have similar perceptions on the economic and political determinants, it is likely that despite having missed several deadlines the EU and India could likely revive the slow pace of ongoing FTA negotiations.

The results are obtained using Chang (1992)'s fuzzy extension of AHP. Future analyses will be carried to compare these results with the ones obtained using different fuzzy extension of AHP [such as (Buckley 1985)].

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APPENDIX

Table A1. Aggregate fuzzy pairwise comparison matrix for criteria

EU	Economic	Political	Strategic	Institutional
Economic	1.000, 1.000, 1.000	2.226, 4.121, 5.912	0.768, 1.567, 2.585	1.689, 2.504, 3.452
Political	0.169, 0.243, 0.488	1.000, 1.000, 1.000	1.790, 2.588, 3.550	1.356, 2.029, 4.237
Strategic	0.377, 0.638, 1.303	0.290, 0.386, 0.559	1.000, 1.000, 1.000	0.454, 0.824, 1.736
Institutional	0.287, 0.399, 0.635	0.240, 0.369, 0.839	0.603, 1.214, 2.205	1.000, 1.000, 1.000
India				
Economic	1.000, 1.000, 1.000	1.617, 2.847, 4.005	0.866, 1.863, 3.079	2.352, 3.310, 4.302
Political	0.245, 0.351, 0.747	1.000, 1.000, 1.000	2.170, 3.436, 4.758	1.060, 2.063, 3.098
Strategic	0.325, 0.537, 1.155	0.210, 0.291, 0.461	1.000, 1.000, 1.000	0.529, 0.830, 1.420
Institutional	0.232, 0.302, 0.425	0.323, 0.485, 0.982	0.704, 1.204, 1.891	1.000, 1.000, 1.000

Table A2. Aggregate fuzzy pairwise comparison matrix economic factors

EU	E_1	E_2	E_3	E_4	E_5	Normalized weight
E_1	1.000, 1.000, 1.000	4.227, 5.665, 6.615	2.590, 3.791, 5.108	3.846, 5.172, 6.262	6.863, 8.863, 9.000	0.520
E_2	0.140, 0.177, 0.235	1.000, 1.000, 1.000	3.097, 4.611, 6.203	4.908, 6.599, 8.147	1.807, 2.497, 3.126	0.254
E_3	0.196, 0.264, 0.386	0.161, 0.217, 0.323	1.000, 1.000, 1.000	4.307, 6.009, 7.752	5.077, 6.994, 8.191	0.227
E_4	0.152, 0.193, 0.259	0.120, 0.152, 0.202	0.129, 0.166, 0.232	1.000, 1.000, 1.000	4.959, 6.675, 7.625	0.000
E_5	0.092, 0.113, 0.146	0.320, 0.400, 0.554	0.112, 0.143, 0.197	0.119, 0.150, 0.201	1.000, 1.000, 1.000	0.000
India						
E_1	1.000, 1.000, 1.000	5.074, 6.759, 7.626	0.725, 1.933, 3.624	2.656, 4.396, 6.197	3.885, 5.102, 5.662	0.508
E_2	0.118, 0.148, 0.197	1.000, 1.000, 1.000	3.210, 4.844, 6.545	1.510, 3.405, 5.318	0.968, 1.552, 1.966	0.315
E_3	0.276, 0.517, 1.380	0.153, 0.206, 0.312	1.000, 1.000, 1.000	0.908, 1.810, 2.627	0.851, 2.065, 3.398	0.111
E_4	0.161, 0.227, 0.377	0.188, 0.294, 0.662	0.381, 0.553, 1.101	1.000, 1.000, 1.000	0.908, 2.629, 4.540	0.067
E_5	0.156, 0.196, 0.257	0.509, 0.644, 1.033	0.294, 0.484, 1.175	0.220, 0.380, 1.101	1.000, 1.000, 1.000	0.000

Table A3. Aggregate fuzzy pairwise comparison matrix political factors

EU	P_1	P_2	P_3	P_4	P_5	Normalized weight
P_1	1.000, 1.000, 1.000	4.468, 6.044, 7.112	3.769, 5.387, 7.013	0.997, 1.293, 1.567	3.820, 5.431, 7.020	0.350
P_2	0.130, 0.165, 0.223	1.000, 1.000, 1.000	2.662, 3.520, 4.131	1.826, 2.376, 2.783	5.895, 7.930, 8.982	0.249
P_3	0.142, 0.186, 0.265	0.224, 0.284, 0.367	1.000, 1.000, 1.000	6.596, 8.610, 9.324	5.075, 7.160, 8.475	0.306
P_4	0.604, 0.773, 0.934	0.332, 0.421, 0.526	0.094, 0.116, 0.152	1.000, 1.000, 1.000	6.510, 8.525, 9.035	0.096
P_5	0.141, 0.184, 0.262	0.101, 0.126, 0.183	0.109, 0.140, 0.197	0.095, 0.117, 0.154	1.000, 1.000, 1.000	0.000
India						
P_1	1.000,1.000,1.000	0.908,1.891,2.801	0.938,1.732,2.385	2.215,3.770,5.455	2.440,3.709,5.053	0.310
P_2	0.357,0.529,1.101	1.000,1.000,1.000	0.462,0.704,1.010	0.841,1.859,2.893	2.445,4.080,5.792	0.238
P_3	0.419,0.577,1.066	0.990,1.421,2.062	1.000,1.000,1.000	3.193,5.344,7.397	1.329,2.366,3.168	0.287
P_4	0.183,0.265,0.451	0.346,0.538,1.189	0.135,0.187,0.313	1.000,1.000,1.000	1.973,3.701,5.262	0.166
P_5	0.198,0.270,0.410	0.173,0.245,0.409	0.316,0.423,0.753	0.190,0.270,0.507	1.000,1.000,1.000	0.000

Table A4. Aggregate fuzzy pairwise comparison matrix institutional factors

EU	I_1	I_2	I_3	I_4	I_5	Normalized weight
I_1	1.000,1.000,1.000	0.378,0.777,1.341	0.110,0.142,0.210	3.792,5.542,7.200	4.707,6.428,7.714	0.353
I_2	0.746,1.286,2.644	1.000,1.000,1.000	6.640,8.652,9.000	4.052,6.094,8.115	0.655,0.679,0.709	0.467
I_3	4.939,7.054,8.196	0.094,0.116,0.151	1.000,1.000,1.000	0.738,0.966,1.211	1.086,1.295,1.381	0.180
I_4	0.137,0.180,0.264	0.123,0.164,0.247	0.761,1.035,1.133	1.000,1.000,1.000	1.032,1.000,1.000	0.000
I_5	0.122,0.156,0.212	1.410,1.474,1.474	0.672,0.772,0.848	1.000,1.000,1.000	1.000,1.000,1.000	0.000
India						
I_1	1.000,1.000,1.000	1.641,3.669,5.690	0.991,1.269,1.512	0.879,1.933,3.023	1.068,1.565,1.881	0.277
I_2	0.176,0.273,0.609	1.000,1.000,1.000	0.968,1.552,1.966	1.045,2.251,3.229	1.000,1.658,2.097	0.203
I_3	0.662,0.788,1.009	0.509,0.644,1.033	1.000,1.000,1.000	0.205,0.238,0.288	0.592,0.885,1.206	0.053
I_4	0.335,0.517,1.137	0.310,0.444,0.957	3.475,4.209,4.433	1.000,1.000,1.000	1.911,4.035,6.077	0.292
I_5	0.532,0.639,0.936	0.477,0.603,1.000	0.829,1.130,1.701	0.165,0.248,0.529	1.000,1.000,1.000	0.176

Table A5. Aggregate fuzzy pairwise comparison matrix strategic factors

EU	S_1	S_2	S_3	S_4	S_5	Normalized weight
S_1	1.000,1.000,1.000	0.786,0.931,1.159	6.340,8.359,9.000	1.558,2.064,2.482	3.783,5.112,6.085	0.312
S_2	0.829,1.074,1.297	1.000,1.000,1.000	5.973,8.009,8.912	0.098,0.122,0.162	3.201,4.104,4.361	0.151
S_3	0.096,0.120,0.158	0.100,0.125,0.167	1.000,1.000,1.000	0.101,0.126,0.165	0.098,0.123,0.163	0.000
S_4	0.378,0.484,0.612	6.154,8.182,8.956	6.072,7.951,8.437	1.000,1.000,1.000	4.689,6.236,7.081	0.537
S_5	0.154,0.196,0.262	0.197,0.244,0.303	6.135,8.155,9.000	0.128,0.160,0.211	1.000,1.000,1.000	0.000
India						
S_1	1.000,1.000,1.000	3.994,6.037,8.058	0.094,0.116,0.151	0.351,0.510,0.662	0.879,2.020,3.186	0.000
S_2	0.124,0.166,0.250	1.000,1.000,1.000	0.098,0.122,0.162	1.694,3.750,5.690	0.172,0.264,0.573	0.000
S_3	6.633,8.645,9.000	6.180,8.207,8.955	1.000,1.000,1.000	5.724,7.568,8.351	4.672,6.799,8.241	0.747
S_4	1.511,1.960,2.674	0.176,0.267,0.590	0.106,0.132,0.175	1.000,1.000,1.000	0.110,0.142,0.202	0.000
S_5	0.314,0.495,1.137	1.744,3.789,5.796	0.113,0.147,0.214	4.941,7.032,8.414	1.000,1.000,1.000	0.253