Document de travail IDP (EA 1384) n°2013-01

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MDD – Mobilités et développement durable
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INTRA-INDUSTRY TRADE AND VERTICAL DIFFERENTIATION IN TOURISM SERVICES

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Abstract. Most empirical studies on intra-industry trade (IIT) have been confined to trade in goods and little attention has been paid to the case of services. Moreover the few available studies on services have some serious methodological shortcomings. The purpose of this paper is to shed some light on intra-industry trade in services by providing a rigorous case study on international trade of tourism services for a sample of 14 countries of the European Union. International tourism has grown rapidly over the last decades to become one of the most export sectors worldwide. To the best of our knowledge, this paper constitutes the first empirical study that investigates IIT between many countries for some category of services on a strict bilateral basis and at the most detailed level for which bilateral data are available. It is also the first paper studying intra-industry trade for services to address the issue of vertical and horizontal IIT. Our results put into question the stereotyped image of one-way flows of international tourists, going from very few source countries to highly tourism-specialized host countries. They clearly show that tourism flows between EU-14 countries are mainly dominated by reciprocity more than univocity. They also indicate that intra-tourism trade within this region is essentially composed of the trade of vertically differentiated tourism products.

Keywords: Bilateral tourism flows, intra-tourism trade, two-way trade, vertical intra-industry, quality.

JEL: C82, F14, L83.

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I. INTRODUCTION

The discovery of simultaneous exports and imports within industries (defined as intra-industry trade, IIT) between countries of similar levels of development is one of the most important empirical findings in the field of international trade since the 1960s. Following the pioneering works of Verdoon (1960), Drèze (1961), Balassa (1966) and Grubel (1967) on West-European countries, a considerable number of studies have confirmed the predominance of IIT in high-income and middle-income countries’ trade and found IIT to be the most rapidly growing part of post-war trade between developed economies. However, this empirical finding also led to a renewal of the theory of international trade as the traditional theory (i.e., based on comparative advantage) was considered unable to explain trade within industries between similar countries. The seminal articles of Krugman (1979) and Lancaster (1980) laid the foundations of the “new international trade theory” one of whose main justifications was to explain two-way trade in varieties of similar products. The presumption was indeed that IIT was dominated by horizontally differentiated products with similar prices. An apparent consensus thus emerged on a synthetic model, the so-called Chamberlin-Heckscher-Ohlin model (Greenaway and Milner 2002), combining both old and new determinants of trade with, on one hand, factor endowment differences explaining traditional inter-industry trade in homogenous products and, on the other hand, internal economies of scale, monopolistic competition and “love of variety” (or “ideal variety”) explaining horizontal intra-industry trade (Helpman 1981, Krugman and Helpman 1985). However, large empirical evidence showed considerable variation in prices of traded products at the most detailed level of product nomenclature (e.g., Schott, 2004, on the US case), suggesting that IIT also includes two-way trade of qualitatively differentiated products which reflects specialisation along ranges of quality within industries (Greenaway et al. 1999; Fontagné et al. 2005; Fontagné et al. 2008). Note that this IIT in vertically differentiated products can be modelled as well in the traditional framework of comparative advantage (Falvey 1981; Falvey and Kierzkowski 1987; Flam and Helpman 1987) as with the new trade theory (Shaked and Sutton 1984).

Nevertheless, most empirical studies on IIT have been confined to trade in goods and little attention has been paid to IIT in services. Kierzkowski (1989) was the first to deal with this problem in services, studying the case of the transportation industry. Tang (1999, 2003) conducted an econometric analysis of the determinants of international telephone traffic imbalances between the United States and 148 foreign destinations. Lee and Lloyd (2002) carried out an empirical study for nine service industries on a large sample of countries using a database compiled under the OECD classification of trade in services. Li, Moshirian and Sim (2003), and Moshirian, Li and Sim (2005) studied intra-industry trade in insurance and financial services for seven OECD countries and performed econometric tests to assess the determinants of the US intra-industry trade with some of its trading partners. Webster and Hardwick (2005) also found evidence of significant volumes of intra-industry trade in financial services, as well as significant volumes of inter-industry trade for some OECD countries. Finally, in their study of the relevance of international trade theory for tourism, Webster et al. (2007) undertake an empirical evaluation of IIT for international tourism services for a sample of 44 countries using data from the UNWTO.

The aim of this paper is to contribute to our understanding of the empirics of intra-industry trade in services by providing a rigorous case study on international tourism trade in the EU-14. Our empirical investigation represents a progress relative to previous studies on intra-industry trade in services in two aspects. First it is the first empirical investigation that examines trade patterns in services on a strict bilateral basis and at the most detailed level for which bilateral data are available. For instance, authors, such as Lee and Lloyd (2002), Li, Moshirian and Sim (2003), Moshirian, Li and Sim (2005) and Webster et al. (2007) did not use bilateral data but multilateral ones, i.e. for any country they put together its different partners before doing their calculations of IIT indices. This "geographical bias" (Fontagné and Freudenberg 1997) leads to the measurement of a "multilateral" form of intra-industry trade which can overestimate the true value of overlapping in trade. For example, consider a country trading with two partners. This country exports towards only one of them (while not importing from it) and imports from only the other (while not exporting towards it). At the bilateral level, this country’s trade thus consists of two one-way flows (in opposite direction), one with each partner, which is the opposite of IIT. But considering trade between this country and both of its partners defined as a single trade bloc, and aggregating these two one-way flows would show up a “multilateral” form of intra-industry flow. Consequently, an important part of measured intra-industry trade may be due to an insufficient geographical disaggregation and may appear in this case as a pure artefact. Thus, empirical research on IIT ought to be done on a strict bilateral basis.

Second, to the best of our knowledge, our paper is the first to address the issue of vertical and horizontal IIT for services. None of the references cited below has dealt with the problem of the structure of IIT between two-way trade in horizontally differentiated products and two-way trade in vertically differentiated products. After solving the problem of consistency of the data and elaborating a proxy for export unit values adapted to the case of tourism services, we make an assessment of intra-tourism trade breaking down between horizontal and vertical IIT by using the three methods available in the literature: the Greenaway, Hine and Milner’s method (1994), the Fontagné and Freundenberg’s method (1997) and the Azhar and Elliott’s (2006) method2.

Beyond these methodological aspects, a better knowledge of the characteristics of international trade in tourism services proves to be an important empirical matter in itself (per se) as tourism is nowadays one of the most important exports in the world and a major economic activity in many countries. In 2007 tourism accounted for 4.8% of total world exports of goods and services (OECD 2009), ranking forth after fuels, chemicals and automotive products (UNWTO, 2009). It is the leading category of services being exported, representing a quarter (25.2% in 2007) of total exports of commercial services (OECD, 2009). This is the result of an impressive growth rate over the past sixty years. According to UNWTO (2009), the number of international tourists increased from a mere 25 million international arrivals in 1950 to 922 million in 2008, giving rise to a surge in export receipts. While decelerating tourism exports still grew at a rate of 7.4 per cent per annum on average from 1990 to 2007, only slightly less than the rate for exports of total services (8.8%) (CEPII 2009). Europe is by far the leading regional tourism destination in the world, accounting for 53% of international tourist arrivals in 2008. The majority of international tourists still travel to and within Europe. Together, they generated almost 490 million international tourists in 2008, accounting for 50% of international tourism receipts.

2 To our knowledge, our paper is one of the first applications of Azhar and Elliott’s (2006) method. For an application by these authors, see Azhar et al. (2008).
Despite of this importance in international trade, tourism trade has been neglected by empirical research and the current view is still dominated by stereotyped images like one-way flows of international tourists, going from very few source countries to highly tourism-specialized host countries. One results of this paper is to reveal that the reality of tourism trade may be more complex, at least in Europe.

The paper is structured as follows. Section two describes the empirical methods used in the literature to detect and measure intra-industry trade, and to distinguish between its horizontal and vertical components. Section three describes the database and our procedure to deliver a consistent data set for bilateral trade in tourism services. Section four is devoted to the empirical analysis of intra-tourism trade in the EU-14. The paper ends with concluding remarks.

II. EMPIRICAL MEASURE OF INTRA-INDUSTRY TRADE

By analogy with IIT in manufactured goods, we define intra-tourism trade (ITT) as the situation where two countries trade comparable amounts of international tourism services with each other. Country A exports international tourism services to country B and, at the same time, imports international tourism services from B. But these two-way flows have to be of comparable magnitude. This definition of course raises the problem of the choice of an adequate threshold of trade overlap beyond which trade in international tourism services can be described as ITT. We will now discuss how these problems have been dealt with in the literature on IIT in goods.

II.1 How to distinguish between inter-industry trade and intra-industry trade

Two main methods are nowadays used to detect the presence of intra-industry trade: the first has been developed by Grubel and Lloyd (1975) and the second by the CEPII (Fontagné and Freudenberg 1997; Fontagné, Freudenberg and Périddy 1997, 1998).

The most widely used indicator to measure intra-industry trade is the Grubel and Lloyd's indicator\(^3\). The GL indicator calculates the part of balanced trade (overlap between exports and imports) between two countries, \(i\) and \(j\), in total trade of a given industry \(k\):

\[
GL_{i,j}^k = \left[ \frac{(X_{i,j}^k + M_{i,j}^k) - (X_{i,j}^k - M_{i,j}^k)}{X_{i,j}^k + M_{i,j}^k} \right] = \left[ \frac{X_{i,j}^k - M_{i,j}^k}{X_{i,j}^k + M_{i,j}^k} \right]
\]

(1)

where \(X_{i,j}^k\) and \(M_{i,j}^k\) denote, respectively, exports of \(k\) by \(i\) to \(j\) and imports of \(k\) by \(i\) from \(j\) over one particular year. (Time subscripts are implied.) In this approach, intra-industry trade is thus interpreted as the balanced part of bilateral trade flows.

This indicator is contained between 0 and 1. The higher its value, the larger the share of balanced trade in total trade of \(k\) between the two countries. An index value of 0 indicates exclusive inter-industry trade (good \(k\) is

\(^3\) This indicator was elaborated on the basis of Balassa's (1965) and Finger's (1967) pioneering contributions.
only exported or only imported by country $i$ in exchange of a product belonging to a different industry) while an index value of 1 indicates exclusive intra-industry trade in sector $k$ ($X_{i,j}^k = M_{i,j}^k$).

There is no theoretical threshold for the GL indicator beyond which total trade between two countries could be categorically described as being dominated by its intra-industry trade component. However, according to a practice pioneered by Grubel and Lloyd (1975), intra-industry trade is usually said to be dominant in the empirical literature for a GL indicator larger than two-third ($GL > 66\%$). In that case, the minority flow represents at least 50% of the majority flow.

GL indices can be aggregated across industries (as a trade-weighted average of the industry indices) and/or across partners (as a traded-weighted average of the bilateral indices). Considering one industry only (as is the case in the present study), the geographic aggregate GL indicator for country $i$ is computed as follows:

$$GL_i^k = 1 - \frac{\sum_{j=1}^{N} |X_{i,j}^k - M_{i,j}^k|}{\sum_{j=1}^{N} (X_{i,j}^k + M_{i,j}^k)}$$

(2)

where $N$ denote the number of country $i$'s partners.

$GL_i^k$ describes the share of balanced trade (overlap between exports and imports) between country $i$ and all its $N$ partners in total trade of industry $k$.

But according to Fontagné and Freudenberg (1997), there is an analytical shortcoming in using the GL indicator as it gives two different explanations for the majority trade flow. This indicator is based on the decomposition of total bilateral trade in trade overlap (representing intra-industry trade and explained by the new theory of international trade) and the imbalance (representing inter-industry trade and explained by the traditional theory). So the majority flow receives two different explanations: one being under imperfect competition (for the overlapped part), the other under perfect competition (for the net part). To avoid this problem, they propose another method to study intra-industry trade, based on a methodology first developed by Abd-El-Rahman (1986a, 1986b) and refined by Freudenberg and Müller (1992). The key distinction is between "two-way" trade and "one-way" trade. Bilateral trade in an item is considered to be "two-way" when the minority flow represents at least $x\%$ (for example 10\%) of the majority flow. Below this (arbitrary) proportion, the minority flow is regarded as negligible so that bilateral trade can be considered as "one-way". More precisely, bilateral trade between two countries $i$ and $j$ for item $k$ is two-way if the following condition is fulfilled:

$$\frac{\text{Min}(X_{i,j}^k, M_{i,j}^k)}{\text{Max}(X_{i,j}^k, M_{i,j}^k)} \geq x\%$$

(3)

with $x\%$ being an arbitrary threshold. Otherwise, trade is one-way only. Note that this method avoids the aforementioned GL indicator's analytical drawback: as soon as a certain degree of overlap is fulfilled, both

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4 As pointed out by Grubel and Lloyd (1975) themselves, the economy-wide measure of intra-industry trade (trade-weighted average of the industry GL indices) is affected by the size of the country's overall trade imbalance: the larger the imbalance, the larger the share of net trade and the smaller the aggregate GL indicator. These authors suggested a way to correct for this problem and constructed a (trade imbalance) "adjusted" GL indicator. Aquino (1978) proposed another solution. However most economists prefer the unadjusted GL indicator to the GL or Aquino adjusted measures (see Fontagné and Freudenberg 1997 and Lloyd 2002).
exports and imports are considered as being part of two-way trade. Otherwise, both flows are considered as being part of one-way trade. In other words, bilateral trade is either inter-industry or intra-industry. There is no more decomposition of total bilateral trade between trade overlap and imbalance, and thus no more need of double explanation for the majority flow.

II.2 How to distinguish between horizontal and vertical intra-industry trade

Three methods have been proposed to disentangle horizontal and vertical intra-industry trade. But all three methods rely on the same two basic assumptions regarding prices, unit values and quality of traded products, pioneered by Abd-El-Raman (1986a, 1986b). First, it is assumed that differences in prices for an item mirror differences in quality (see also Stiglitz 1987). Second, average unit values (value/quantity) can reasonably be used as a proxy for prices as prices for traded products are too difficult to gather (there as many prices as transactions, each transaction having its own characteristics: time, place, special conditions...). This second hypothesis has been supported by authors such as Maddisson and Van Ark (1993), and Timmer (2000).

A) In the first method, Greenaway, Hine and Milner (1994, 1995) use a decomposition of the Grubel and Lloyd indicator. There are three steps. The first step is to characterize each bilateral trade flow as horizontally or vertically differentiated. The trade flows between two countries, i and j, for item k are considered to be horizontally differentiated (i.e. are of similar quality) if their unit values are similar, i.e.:

\[ 1 - \alpha \leq \frac{UV^X_{ik}}{UV^M_{ik}} \leq 1 + \alpha \] (4)

\( UV^X_{ik} \) is the unit value of export X or import M in industry k. i and j denote, respectively, the declaring country and its partner. (Time subscripts are still implied.) \( \alpha \) is an arbitrary threshold which can take any value between 0 and 1.7.

Otherwise, the two flows are considered as vertically differentiated (i.e. are of different quality). As we are only concerned with tourism in this paper, let us consider the next two steps of the method for a single industry. The second step is to divide the bilateral flows of country i in two groups according to the nature of product differentiation, as defined in the previous step. The first group (\( N_{\alpha} \)) contains all horizontally differentiated bilateral flows, the second group (\( N_{\alpha'} \)) all vertically differentiated bilateral flows (with \( N_{\alpha} + N_{\alpha'} = N \), N denoting the number of country i’s partners). The third step is to calculate the intra-industry (i.e. trade

\[ \text{Fontagné and Freudenberg (1997, 2002), Fontagné, Freudenberg and Gaulier (2005), and Fontagné, Freudenberg and Péridy (1997, 1998) usually chose } x=10\%. \] But many values can be used in order to perform sensitivity tests and thus assess the robustness of the results.

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\[ \text{The most frequently used thresholds by Greenaway, Hine and Milner (1994, 1995), as well as by Fontagné and Freudenberg (1997, 2002), are } \alpha=15\% \text{ and } 25\%. \] If \( \alpha=15\% \), then the ratio of unit values must lie between 0.85 and 1.15.

\[ \text{Greenaway et al. (1999) introduced a minimum cut-off point for imports and exports: they must be greater than } $50 \text{ million. This is to avoid possible issues of reliability associated with very small trade values. As underlined by Azhar and Elliott (2006), the choice of value will have implications for the number of products included in the analysis.} \]
overlap) trade’s share of each category of differentiated products in country \(i\)’s total (i.e. with all its \(N\) partners) trade of good \(k\). These shares are given by the following indicator:

\[
IIT^i_\lambda = \frac{\sum_{j=1}^{N} (X_{i,j}^{k} + M_{i,j}^{k}) - \sum_{j=1}^{N} |X_{i,j}^{k} - M_{i,j}^{k}|}{\sum_{j=1}^{N} (X_{i,j}^{k} + M_{i,j}^{k})}
\]  

(5)

where \(\lambda\) denotes the category of product differentiation: \(H\) for horizontal differentiation, \(V\) for vertical differentiation. The numerator gives us the value of balanced trade for the category of product differentiation \(\lambda\), whereas the denominator gives us the total trade (i.e. with all partners). These two shares sum up to the geographic-aggregate GL indicator as previously defined in (2): \(IIT_H^i + IIT_V^i = GL^i\).

Greenaway, Hine and Milner’s method thus leads to a splitting up of the global trade overlap into an overlap in similar products and an overlap in vertically differentiated products:

\[
\frac{\text{balanced trade in } H}{\text{total trade (in } H \text{ and } V)} + \frac{\text{balanced trade in } V}{\text{total trade (in } H \text{ and } V)} = \frac{\text{total balanced trade}}{\text{total trade (in } H \text{ and } V)}.
\]


B) The second method to disentangle horizontal and vertical intra-industry trade has been proposed by Fontagné and Freundenberg (1997). The first step of their method is not to characterize the nature of product differentiation of each bilateral flow, as Greenaway, Hine and Milner did, but to distinguish between two-way trade and one-way trade by using condition (3) described in the previous sub-section. The second step is now to further divide two-way trade in two categories: "two-way trade in similar products" and "two-way trade in vertically differentiated products", according to the following criterion:

\[
\frac{1}{1 + \alpha} \leq \frac{UV_{\text{similar}}^i}{UV_{\text{vertical}}^i} \leq 1 + \alpha
\]

(6)

with \(\alpha\) being an arbitrary threshold (generally 15% and 25% as in Greenaway, Hine and Milner, 1994)\(^{10}\). Two-way traded products are considered to be of similar quality (or horizontally differentiated) if the export and import unit values differ by less than \(\alpha\)%. Otherwise they are considered to be vertically differentiated.

To sum up, Fontagné and Freundenberg’s method allows total trade to be broken down into three different categories according to the overlap in trade [condition (3)] and to the similarity in unit values [condition (6)]: 1) two-way trade in similar products (significant overlap and low unit value differences); 2) two-way trade in vertically differentiated products (significant overlap and high unit value differences); 3) one-way trade (no or no significant overlap).

Moreover, flows of each category can be summed up over partner countries \(j\), over industries \(k\), or even over declaring countries \(i\) (to obtain the corresponding flow within a particular country group). Then shares can

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\(^{9}\) Note that each share is not a GL indicator but a mix of the intra-industry nature of trade in each category of differentiation and of the weight of each category of differentiation in total trade.

\(^{10}\) Pointing out an incoherence in condition (4), the authors substituted \(1/(1 + \alpha)\) to \(1 - \alpha\) in the left-hand side of this condition to ensure symmetry between the upper and lower bounds in terms of their relative distance from unity (Fontagné and Freundenberg 1997, p.29, footnote 11).
be calculated in order to measure the relative importance of each of the three trade types in total trade. For example, the share of category $z$ in country $i$’s total (i.e. with all its $N$ partners) trade of good $k$ is:

$$\text{share}_{i,z}^k = \frac{\sum_{j=1}^{N} (X_{i,j}^{k,z} + M_{i,j}^{k,z})}{\sum_{j=1}^{N} (X_{i,j}^{k} + M_{i,j}^{k})}$$  \hspace{1cm} (7)$$

with $z = TWHD$ (two-way trade horizontal differentiation), $TWVD$ (two-way trade vertical differentiation) or $OW$ (one-way trade).

C) The third method to disentangle horizontal and vertical intra-industry trade has been suggested by Azhar and Elliott (2006). Addressing the shortcomings of employing simple unit value ratios to define the boundary between product quality types, the authors proposed a method of measuring and comparing product quality differences based on the traditional $GL$ measure but applied to the unit value space. They define two related indexes of quality differentiation that have symmetrical limits and are projected or scaled equally on both lower and upper bounds, defining a "product quality space".

The first index of product quality is quite close to Grubel and Lloyd’s one and provides a measure of the dispersion of product quality in intra-industry trade flows:

$$PQH_{i,j}^k = 1 - \frac{UV_{i,j,k}^X - UV_{i,j,k}^H}{UV_{i,j,k}^X + UV_{i,j,k}^H}$$  \hspace{1cm} (8)$$

with $0 < PQH_{i,j}^k < 2$. The second index provides a measure of vertically differentiated quality dispersion in total intra-industry trade flows:

$$PQV_{i,j}^k = 1 + \frac{UV_{i,j,k}^X - UV_{i,j,k}^M}{UV_{i,j,k}^X + UV_{i,j,k}^M}$$  \hspace{1cm} (9)$$

with $0 < PQV_{i,j}^k < 2$. When all two-way trade flows are equal in quality (no vertical $IIT$), $PQV$ is equal to unity. Note that $PQH_{i,j}^k + PQV_{i,j}^k = 2$, which leads to $PQV_{i,j}^k = 2 - PQH_{i,j}^k$. To classify intra-industry trade as horizontally or vertically differentiated, the authors choose an arbitrary cut-off point of $\pm 0.15$ (“the 85% cost share rule”). If $0.85 < PQH_{i,j}^k$ (or $PQV_{i,j}^k$) $\leq 1.15$, then trade flows between countries $i$ and $j$ for product $k$ are considered to be of similar quality (horizontal differentiation). In other terms, imports and exports of a

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11 Their analysis reveals that unit value ratios exhibit disproportionate scaling with respect to changes in $UV_{i,j,k}^X$ or $UV_{i,j,k}^M$. These ratios have a non-symmetrical nature that Azhar and Elliott call the “proportionality” effect. Therefore using simple unit value ratios as previous authors do may lead to distortions in the measurement of product quality in intra-industry trade and hence inaccurate measures of the extent of horizontal and vertical product quality.

12 The interpretation of this index is similar to the $GL$ index’s one. If the sum of import and export unit values ($UV_{i,j,k}^X + UV_{i,j,k}^M$) is viewed as total costs or quality, then index $PQH_{i,j}^k$ gives the share of overlap between export unit value and import unit value in total cost.
product can be considered as horizontally differentiated two-way trade if they share at least 85% of their costs (reflected in the price per unit of output). Otherwise they are supposed to be vertically differentiated. In this case, more precisely, intra-industry trade is classified as high quality if $PQV^\alpha_{ij} > 1.15$ (or $PQH^\gamma_{ij} < 0.85$) and low quality if $PQV^\alpha_{ij} < 0.85$ (or $PQH^\gamma_{ij} > 1.15$)\textsuperscript{13}.

Once the distinction between horizontally and vertically differentiated products has been made, Azhar and Elliott's method to measure the shares of inter-industry trade, horizontal intra-industry trade and vertical intra-industry trade is the same as Greenaway, Hine and Milner's one.

### III. DATA SOURCES AND METHODOLOGY

#### III.1 Data presentation

The sources of information on international tourism flows are usually twofold. The first source is administrative controls at borders (customs and border crossings) and guest registers in accommodation establishments. They provide physical data on traveller arrivals and departures and nights (overnight stays). The second source is the balance of payments which provides monetary data, i.e. income and expenditure corresponding to the travel and passenger transport items but relating to international travelers. According to the fifth edition of the IMF Balance of Payments Manual (1993, Chapter XII, Travel: Paragraph 242), "travel covers primarily the goods and services acquired from an economy by travellers during visits of less than one year in that economy." (Balance of payments debits are treated as imports and balance of payments credits as exports.) In some countries, especially in European countries, these sources of information have been supplemented by surveys of tourists (visitor surveys carried out chiefly at borders and in accommodation establishments and households, and surveys of companies and establishments that supply goods and services to visitors, e.g. travel agencies, tour operators, means of accommodation and carriers). Some surveys are government operated, some by ETC (European Travel Commission) national tourist office members, some on a co-operative basis with industry. (See for example Quevedo 2001.)

The data used in this work are from reports of tourism services exports and imports, reported on a bilateral basis, i.e. divided by partner country, compiled by the OECD (2003, 2007) from several countries' trade statistics and from Eurostat. Our study covers the period 2000-2004. Among the 24 OECD nations initially encompassed by the database, only the EU-15 countries have been retained\textsuperscript{14}. These are the only ones (along with Canada) to have reported data for which it is possible to calculate export unit values\textsuperscript{15}. However, even with these countries, three problems with the reported statistics remain. Countries, such as Denmark and Spain provide bilateral data in international tourism services only with countries that are not part of the European

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\textsuperscript{13} By plotting these boundaries on a square box scaled by the maximum of either $UV^z_{ij,k}$ or $UV^u_{ij,k}$ and then transferring the values of $PQV$ for a range of products, a “product quality space” is obtained which provides a visual representation to the spectrum of vertically and horizontally differentiated IIT.

\textsuperscript{14} The data of Belgium and Luxembourg are combined in one entity and the data of Ireland are not included.

\textsuperscript{15} A definition of unit value adapted to tourism service exports is provided below.
Union. Others reported data on tourism service exports and imports only for certain years: Sweden (2001-2004), Belgium-Luxembourg (2002 and 2003), the Netherlands (no data for 2003). Finally, Germany did not declare its tourism service exports and imports with Finland and Sweden.

Given that certain countries did not declare their bilateral trade in international tourism services, we have two types of bilateral data. In the first case, which is the simplest to deal with, only one of a pair of countries reports its flow with the other country. This type of data has only one source, we will thus refer to them as "non mirrored data". This data has been maintained in its original state. In this case we rely exclusively on the import and export reports from the single source.\textsuperscript{16}

The second case is more complex as it concerns the pairs where each country reported its international tourism services flow with the other. For the same flow, there are thus two different sources. We will call this data "mirrored data". The difficulty is that, in general, the importer country and the exporter country report different values for the same flow. This problem is also the case for goods, but in services the differences in reporting seem to be larger.\textsuperscript{17}

\section*{III.2 Harmonization of tourism "mirrored data"}

There are several methods for harmonizing mirrored data. The first one is to calculate a pondering average of the two mirrored flows (Fontagné, Pajot and Pasteels 2002). The second is based on the assumption that one type of flows (exports or imports) is always less reliable than the other mirrored flow. We have chosen a third method, which was developed by Lejour and Paiva Verheijden (2004). This method has two advantages: it corrects the source of the problem (unlike the first one) and it is not based on a too strong assumption (like the second method). Our preliminary hypothesis is that some countries have a systematic tendency to overestimate or underestimate their import or export reports. The aim of this method is to identify these countries through econometric regressions. We run the following regression:

$$\ln(imp_i^j) = \alpha + \beta \ln(exp_j^i) + \sum_r \gamma_r D_r^k + \sum_r \delta_r D_r^l + \varepsilon_i$$ \hspace{1cm} [10]

Reported tourism services imports of country \(i\) to country \(j\), \(imp_i^j\), is the dependent variable. There are two sets of independent variables: the reported tourism services exports between these countries, \(exp_j^i\), and dummies for both reporting exporting countries, \(D_r^k\), and reporting importing countries, \(D_r^l\). \(\alpha\) is a constant representing the reference situation and \(\beta\) the coefficient for the log of reported tourism exports. In the ideal case, where both countries report the same values for the same flow, \(\beta\) is equal to 1 and the constant is 0. \(\gamma\) and \(\delta\) are the coefficients of the dummies for the tourism exporting and importing country respectively. If these coefficients are not statistically significant, then the country \(r\) does not have a tendency to overestimate or underestimate its tourism exports and imports.\textsuperscript{18}

\textsuperscript{16} For example, as indicated, Spain did not declare its tourism flows with the EU14. For this reason, when we study the pair France-Spain, we use only the data reported by France.

\textsuperscript{17} For example, in 2002, the United Kingdom estimated that its exports of tourism services to the Netherlands totaled 827 million dollars, while the Netherlands estimated their imports of tourism services from the United Kingdom at 1160 million dollars. This led us to remove certain pairs from the study because the differences between reports were too great for the data to be considered reliable: Austria/Belgium-Luxembourg, Austria/United Kingdom, France/Greece and France/Portugal.

\textsuperscript{18} As usual with dummies, the interpretation of these variables’ coefficients directly depends on the choice of the reference variable. It is necessary to select as reference a country whose reported flows values seem the most
The results from the econometric regressions are summarized in Table 1. Compared to the reference variable, certain countries systematically overestimate their reported flows. Austria, France, Germany, Italy, the Netherlands, Sweden and the United Kingdom systematically overestimate their imports of international tourism services while Belgium and Luxembourg, France, Germany, Greece, Italy, the Netherlands, Portugal, and the United Kingdom systematically overestimate their exports.

### Table 1

Reported trade data by exporting or importing country according to reported trade data reliability

<table>
<thead>
<tr>
<th>Exporter</th>
<th>Coefficient</th>
<th>$T$ of Student</th>
<th>Reliability Rank</th>
<th>Importer</th>
<th>Coefficient</th>
<th>$T$ of Student</th>
<th>Reliability Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>0.1089</td>
<td>1.18</td>
<td>5</td>
<td>Austria</td>
<td>0.2774 **</td>
<td>3.04</td>
<td>12</td>
</tr>
<tr>
<td>Belgium Luxembourg</td>
<td>0.3986 **</td>
<td>3.46</td>
<td>17</td>
<td>Belgium Luxembourg</td>
<td>0.2196</td>
<td>1.79</td>
<td>7</td>
</tr>
<tr>
<td>Finland</td>
<td>Reference</td>
<td></td>
<td>1</td>
<td>Finland</td>
<td>0.0242</td>
<td>0.31</td>
<td>4</td>
</tr>
<tr>
<td>France</td>
<td>0.3243 **</td>
<td>3.08</td>
<td>14</td>
<td>France</td>
<td>0.2473 *</td>
<td>2.48</td>
<td>11</td>
</tr>
<tr>
<td>Germany</td>
<td>0.4826 **</td>
<td>4.35</td>
<td>20</td>
<td>Germany</td>
<td>0.5523 **</td>
<td>4.34</td>
<td>22</td>
</tr>
<tr>
<td>Greece</td>
<td>0.3163 **</td>
<td>3.04</td>
<td>13</td>
<td>Greece</td>
<td>-0.0092</td>
<td>-0.10</td>
<td>3</td>
</tr>
<tr>
<td>Italy</td>
<td>0.2247 *</td>
<td>2.12</td>
<td>9</td>
<td>Italy</td>
<td>0.3967 **</td>
<td>4.07</td>
<td>18</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.3389 **</td>
<td>3.86</td>
<td>15</td>
<td>Netherlands</td>
<td>0.2334 *</td>
<td>2.29</td>
<td>10</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.1625 *</td>
<td>1.98</td>
<td>8</td>
<td>Portugal</td>
<td>Reference</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Sweden</td>
<td>-0.1467</td>
<td>-1.71</td>
<td>6</td>
<td>Sweden</td>
<td>0.5008 **</td>
<td>5.37</td>
<td>21</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.4377 **</td>
<td>4.34</td>
<td>19</td>
<td>United Kingdom</td>
<td>0.3634 **</td>
<td>3.15</td>
<td>16</td>
</tr>
<tr>
<td>Constant</td>
<td>0.1318</td>
<td>1.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\ln X_{ij}$</td>
<td>0.8801 **</td>
<td>37.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>96.54%</td>
</tr>
</tbody>
</table>

** indicates that the variable's coefficient is quite significantly different from 0 (the probability of incorrectly rejecting the hypothesis that the coefficient is 0 is less than 1%).

* indicates that the variable's coefficient is significantly different from 0 (the probability of incorrectly rejecting the hypothesis that the coefficient is 0 is less than 5%).

Source: OECD data (2003, 2007), authors' calculations.

In order to harmonize the mirrored data we used the data from the country which is higher placed in the ranking (i.e. having the lower number). For example, for the pair France-Italy, we used the reports of exports from France to Italy (rather than the reports of imports by Italy from France) and the reports of exports from Italy towards France (rather than the reports of imports by France from Italy).

### III.3 Definition and calculation of export unit values for tourism

reliable. Three criteria have to be fulfilled. First the country must have declared its bilateral tourism flows for the whole period and with all other countries in the sample. Second, the average of the differences in its reported tourism trade flows with its partner countries must be as small as possible. Third the differences between its reported flows and those of its partners must not be too scattered. Two countries fulfill these criteria satisfactorily: Finland for tourism exports and Portugal for tourism imports. We thus chose these two countries as references to interpret the coefficients.
As described in section III, there are three methods for distinguishing vertical intra-industry trade from horizontal intra-industry trade. But regardless of the method, it is first necessary to choose a proxy for tourism prices in order to be able to assess differences in quality. The best candidate for this role seems to be the tourism services export unit value. But two problems present themselves.

1) The first issue is related to the definition of export unit value in the case of tourism services. What unit should be used to define this value? In fact reasoning only on the export value per tourist comes down to disregard the length of stay and can lead to spurious conclusions. Therefore we decided to define tourism export unit value as the average spending per day of a foreign tourist. Concretely, we defined the unit value of tourism exports from country $A$ to country $B$ as the ratio of the tourism export receipts from $A$ to $B$ by the number of total nights spent by $B$'s travellers in country $A$. Tourism service exports (from the more reliable reporting country in the case of mirrored data) have thus been divided by the number of reported nights spent. Some aberrant figures, 32 in total (6% of the initial sample), were detected and removed from the sample. The period studied is from 2000 (the first period available in the UNWTO data) to 2004 (the last period available in the OECD database).

2) The second problem in determining tourism services export unit values comes from differences in price levels between countries. According to the "Penn effect" (Kravis, Heston and Summers 1978, 1982, Heston and Summers 1996), the wealthier a country is, the higher its price level. The real per capita GDP of low-income countries relative to that of high-income countries is then greater than is indicated by comparisons based on exchange rate conversions of GDPs to a common currency. The most commonly presented explanation of this phenomenon is the Balassa (1964) - Samuelson (1964) mechanism, based on the differences in productivity between the countries' traded sectors. As the value of tourism exports is strongly dependent on the cost of living, this productivity differential between traded sectors in the two countries risks resulting in a difference in their tourism export unit values even if their tourism services are of identical quality. A higher price in tourism would thus not necessarily be a reflection of superior quality, but of higher productivity in non tourism-related traded sectors. To neutralize this effect of the difference in cost of living, we have deflated the export unit values by the purchasing power parity index (PPP) of CHELEM database. We would thus be in a situation of two-way trade in vertically differentiated products.

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19 Let us take an example. Assume that two countries, $A$ and $B$, exchange a total of 200 dollars of tourism services per year with each other. $A$ receives 18 tourists from $B$, and $B$ receives 20 tourists from $A$. Let us also assume that $A$ and $B$ have the same local price levels. If we define the export unit values of tourism services simply as the average spending per tourist, we find 11.11 dollars and 10 dollars for $A$ and $B$ respectively. Since their unit values differ by less than 15%, these tourism flows should be considered, according to Fontagné and Freudenberg's criterion, as similar (two-way trade in horizontally differentiated products). But taking into account the tourists' length of stay can lead to the opposite conclusion. Let us assume that the tourists coming from $B$ spend on average ten days in country $A$ and that the tourists coming from $A$ spend two days on average in country $B$. The export unit value calculated as the average spending per tourist and per day is then respectively 1.11 dollars and 5 dollars for $A$ and $B$ respectively. This time, applying Fontagné and Freudenberg's criterion brings us to the conclusion that tourism services exported by $A$ to $B$ are of a lower quality than those exported by $B$ to $A$ (vertical differentiation). We would thus be in a situation of two-way trade in vertically differentiated products.

20 International tourism services data are the same as in the previous section (corrected OECD data). Nights spent by tourists according to their nationality are published by the World Tourism Organization. We chose the rubric "Overnight stays of non-resident tourists in all types of accommodation establishments, by country of residence" in WTO (2006).

21 For another study of quality in tourism based on the use of unit values (with an application to Israel domestic tourism), see Fleischer and Rivlin (2009).
To sum up, country i’s unit value of international tourism services exported to country j has been calculated in the following manner. The total value of international tourism services exported to j has been divided by the number of nights spent in i by foreign tourists from j. The result is then divided by the PPP index of the host country i (with France taken as the reference country). One country (Ireland) has been excluded from our analysis because of lack of data with regards to overnight stays.

**IV. RESULTS**

*IV.1 A high quantitative reciprocity of tourism service flows in the EU-14...*

We first calculated the Grubel and Lloyd indexes for each country in the sample (mirrored and non-mirrored pairs) for the period studied (2000-04). On average, this index falls between 58% and 60% depending on the year. This first result shows that two-way tourism trade is of considerable importance in the EU-14. If we consider, as is customary in the empirical literature, that intra-industry trade is predominant if the Grubel and Lloyd indicator is higher than 66%, then almost one out of two country pairs (44%) has tourism trade which is predominantly intra-tourism.

The importance of intra-tourism trade is also apparent when considering the distribution of these indexes (pooling 2000-2004; see Graph A1 in the appendix). This distribution, of a distinctly dissymmetrical shape, clearly indicates the existence of a large proportion of country pairs which are characterized by a very high level of intra-tourism trade: more than a third (35%) of pairs studied have an index higher than 80%. Conversely, only a small fraction of pairs have highly imbalanced tourism trade: less than 9.5% of pairs studied have an index below 20%. It thus seems that in the European tourism trade, a relative symmetry at the bilateral level is much more common than a pronounced dissymmetry. On the whole, our examination shows the reciprocity of tourism trade between two countries to be a phenomenon of great significance in the EU-14.

Fontagné and Freudenberg’s method leads to even more striking results. By using the same threshold of overlap in trade they usually do (10%) to distinguish between two-way trade and one-way trade\(^\text{22}\), nearly 94% of bilateral tourism trade turns out to be two-way. Furthermore, this two-way trade represents over 91% of the value of total intra-EU14 tourism flows. For the sake of comparison, let us recall that this percentage for material goods was only 61% in the EU-14 in 1999 (Fontagné and Freudenberg, 2002). Moreover, sensitivity tests show that these conclusions are robust to the choice of higher thresholds (see Table A1 in the appendix): with a threshold of 20%, two-way trade in tourism accounts for 75% of total intra-EU-14 tourism trade, and remains predominant (51.9%) with a threshold of 40%.

After having examined intra-tourism trade by country pairs, let us now consider its significance for each country in the EU-14\(^\text{23}\). In other words, what is the proportion of intra-tourism trade in total intra-European tourism trade for each country? To determine this, we calculated for each country the geographic aggregate

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\(^{22}\) According to Fontagné and Freudenberg’s (1997) criterion (see section II), trade in tourism services is thus considered to be “two-way” when the value of the minority flow represents at least 10% of the majority flow. It is considered to be “one-way” when the value of the minority flow represents less than 10% of the majority flow.

\(^{23}\) Ireland could not be taken into account due to a too limited number of reports.
Grubel and Lloyd indicator (see equation 2 in section II), with an aggregation across its thirteen European partners. These indicators are given in the table below.

| TABLE 2 | Share of intra-tourism trade for each country of the EU-14 (in %) (geographic-aggregate Grubel and Lloyd indicator) |
|-----------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| Germany         | 49.7    | 50.9    | 51.7    | 51.0    | 55.8    | 51.8     |
| Austria         | 53.5    | 53.5    | 54.4    | 58.1    | 69.0    | 57.7     |
| Belgium-Luxembourg | 56.7    | 56.9    | 54.5    | 54.9    | 56.6    | 55.9     |
| Denmark         | 79.1    | 79.1    | 75.1    | 61.9    | 64.4    | 71.9     |
| Spain           | 30.0    | 30.4    | 32.9    | 32.4    | 34.6    | 32.1     |
| Finland         | 76.8    | 78.9    | 77.6    | 80.6    | 79.3    | 78.6     |
| France          | 58.0    | 58.9    | 58.6    | 54.6    | 58.3    | 57.7     |
| Greece          | 37.4    | 36.9    | 34.2    | 33.8    | 30.7    | 34.6     |
| Italy           | 59.3    | 57.5    | 57.7    | 59.1    | 60.7    | 58.9     |
| Netherlands     | 74.9    | 73.4    | 75.4    | 62.7    | 65.3    | 70.3     |
| Portugal        | 58.3    | 56.8    | 56.6    | 55.6    | 56.0    | 56.7     |
| United Kingdom  | 48.5    | 44.3    | 46.4    | 43.7    | 44.3    | 45.4     |
| Sweden          | 69.7    | 61.8    | 69.3    | 63.5    | 65.2    | 65.9     |

Source: OECD (2003, 2007); authors' calculations

The average GL indicators for countries over the entire period range from 30.0% (Spain) to 80.6% (Finland). Three groups of countries can be identified.

1) Three countries have only a small share of intra-tourism trade (GL<50%): Spain, Greece, and the United Kingdom. Within the EU-14, these countries either have a pronounced comparative advantage in the tourism industry (Spain and Greece) or a pronounced comparative disadvantage (the United Kingdom) (for further details, see Nowak et al. 2010). These three countries are responsible for 30% of the tourism exports in our sample. They fit in perfectly with the traditional image of international tourism service trade, with a clear polarization between host countries and source countries.

2) Seven countries, which represent more than half the sample, have a large amount of intra-tourism trade: Germany, Austria, Belgium-Luxembourg, France, Italy, the Netherlands and Portugal. This group generates nearly 62% of the EU-14’s tourism exports. We note that three of the five biggest exporters of tourism services worldwide belong to this group and are thus characterized by a high proportion of intra-tourism trade.

3) Finally, three other countries have trade in international tourism services that are markedly dominated by intra-industry trade, since their geographic aggregate GL is greater than 66%: Denmark, Finland and Sweden. All three are located in the North of the EU-14 and are limited exporters of tourism services (they make up only 10% of the EU-14’s exports). For these countries, a relative equilibrium of their tourism balance is the rule.

At the level of the EU-14 as a whole, the aggregated Grubel and Lloyd indicator (trade-weighted average of the previous 13 national GL indicators) totals to 53%. Once again, this proportion is markedly higher than for the trade of goods, since Brülhart (2008) estimates the weighted intra-EU14 GL indicator for goods at

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24 Their aggregated GL indicator falls between 50% and 66%. For this interval, we consider that intra-tourism trade is significant, but does not predominate.
merely 46.6% for 2006\textsuperscript{25}. And even when we compare these indexes to those for manufactured goods, which empirical studies have shown to display top levels of intra-industry trade, international tourism services still rank very high. In fact, according to the GL indicators by industry calculated for the EU-14 by Fontagné, Freudenberg and Péridy (1997), only the sector "other transport equipment" has a higher rate of intra-industry trade than tourism (about 65% over 1990-94), the following sectors having indicators of around 45% ("non electrical machinery", "professional goods", "motor vehicles")\textsuperscript{26}.

To conclude, this sub-section reveals that intra-tourism trade is far from being a marginal phenomenon in intra-EU14 relationships. Depending on the method used, reciprocity in tourism flows appears to be at least as significant as univocity, if not overwhelmingly predominant. In any case, the observed level of intra-industry trade in tourism services seems on average to be much higher than that in goods trade. Only a very few countries are characterized by genuinely low intra-tourism trade.

\textbf{IV.2 ...concealing a marked qualitative asymmetry.}

In this section we sought to assess within intra-tourism trade the proportions of, respectively, trade of horizontally differentiated products and trade of vertically differentiated products using the three methods presented in section II. The tables below (numbers 3, 4 and 5) show the share of each type of trade in bilateral intra-EU14 tourism trade by year for each method.

We chose a threshold of 10% for trade overlap with Fontagné and Freundenberg’s (1997) method, a threshold of 25% for unit value differences with Greenaway, Hine and Milner (1994) and Fontagné and Freundenberg’s methods, and a threshold of 15% ("the 85% cost share rule") with Azhar and Elliot’s (2006) method\textsuperscript{27}.

\begin{table}[h]
\centering
\caption{Decomposition of bilateral tourism flows in the EU-14 (in %), according to Greenaway, Hine and Milner's (1994) method.}
\begin{tabular}{lcccc}
\hline
\hline
Horizontal intra-tourism trade & 9.3 & 8.2 & 8.8 & 12.4 & 14.1 \\
Vertical intra-tourism trade & 43.1 & 43.6 & 44.0 & 38.3 & 38.4 \\
Inter-industry trade & 47.6 & 48.3 & 47.3 & 49.3 & 47.5 \\
\hline
\end{tabular}
\end{table}

Source: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculations

Note: a threshold of 25% for unit value differences has been used.

\textsuperscript{25} Brühlhart (2008) computed this index from items at the 5-digit level of the World Integrated Trade Solution (WITS) database, jointly developed by the World Bank and UNCTAD.

\textsuperscript{26} These figures concern a period that predates our own and are thus perhaps not directly comparable to our data. The study by Fontagné, Freudenberg and Péridy (1997) however is the only one, to our knowledge, which describes intra-industry intra-EU14 by industry.

\textsuperscript{27} The choice of 25% for unit value differences in the two first methods has been made in order to take into account the large differences in the unit values of our sample and to make the results with Azhar and Elliot’s comparable. As pointed out by Azhar et al. (2008), these authors’ method seems to classify more IIT trade as horizontal IIT than the two other methods: in their sample, using the 85% cost share rule resulted in a much higher number of products classified as horizontally differentiated than using a threshold of 25% in Fontagné and Freudenberg’s method and in Greenaway, Hine and Milner’s method. But to check the robustness of our results and their sensitivity to changes in the choices of the threshold, we then tested a large range of values for the thresholds in all three methods (see below and tables in the appendix).
TABLE 4
Decomposition of bilateral tourism flows in the EU-14 (in %), according to Fontagné and Freudenberg’s (1997) method

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-way trade in similar products</td>
<td>15.9</td>
<td>14.9</td>
<td>15.3</td>
<td>19.7</td>
<td>19.3</td>
</tr>
<tr>
<td>Two-way trade in vertically differentiated products</td>
<td>63.0</td>
<td>65.0</td>
<td>75.7</td>
<td>70.5</td>
<td>80.0</td>
</tr>
<tr>
<td>One-way trade</td>
<td>20.7</td>
<td>20.1</td>
<td>9.0</td>
<td>9.9</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Source: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculations

Note: thresholds of 10% for trade overlap and of 25% for unit value differences have been used.

TABLE 5
Decomposition of bilateral tourism flows in the EU-14 (in %), according to Azhar and Elliott’s (2006) method

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal intra-tourism trade</td>
<td>9.7</td>
<td>8.2</td>
<td>9.5</td>
<td>13.3</td>
<td>16.30</td>
</tr>
<tr>
<td>Vertical intra-tourism trade</td>
<td>42.7</td>
<td>43.5</td>
<td>43.2</td>
<td>37.4</td>
<td>36.2</td>
</tr>
<tr>
<td>Inter-industry trade</td>
<td>47.6</td>
<td>48.3</td>
<td>47.3</td>
<td>49.3</td>
<td>47.5</td>
</tr>
</tbody>
</table>


Note: a threshold of 15% for unit value differences has been used (“the 85% cost share rule”).

Regardless of the method used or the year studied, vertical intra-tourism trade always results as the dominant category in bilateral trade. Horizontal intra-tourism trade appears to be very limited, with often less than 10% of bilateral tourism trade in the EU-14. Intra-tourism trade in Europe is thus essentially composed of trade in international tourism services that are differentiated by their level of quality.

Note that in accordance with Azhar and Elliott’s (2006) numerical simulations and Azhar et al.’s (2008) empirical study, their method seems to capture more horizontal IIT (though slightly here) than the two other methods (at least for the usual thresholds), especially than the Fontagné and Freudenberg’s method which usually gives the highest rates of vertical IIT.

Moreover, the distribution between horizontal IIT and vertical IIT appears to be stable over time: the data show that there has been no significant evolution during the period studied. Finally, let us point out that all these results are resistant to major changes to thresholds for unit value differences and for overlap in trade (with Fontagné and Freudenberg’s method) (see Tables A2 to A5 in the appendix).

These results put into question the stereotyped image of one-way flows of international tourists, going from very few source countries to highly tourism-specialized host countries. They show that, in Europe at least, we can no longer consider trade in international tourism services to be of a univocal or unidirectional nature, with a polarization between exclusively host countries on the one hand and exclusively source countries on the other. Given the importance of intra-tourism flows in total intra-EU14 tourism flows, trade in tourism services appears to be less unbalanced than usually believed. Moreover as most part of these intra-tourism flows consists of vertically differentiated services, this view is quite consistent with the concepts of comparative advantage and specialization, operating at the level of quality within the tourism sector.

Let us now examine whether the predominance of vertical intra-tourism trade is confirmed for all EU-14 countries. The tables below (Tables 6, 7 and 8) show, for each country, the geographic aggregated shares of
the three types of trade according to the three methods over the four-year period studied. They allow us to more clearly identify countries that are part of this phenomenon of vertical intra-tourism trade.

<table>
<thead>
<tr>
<th>TABLE 6</th>
<th>Decomposition of bilateral tourism flows by country (in %), according to Greenaway, Hine and Milner’s (1994) method (2000-2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIT H</td>
<td>IIT V</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Germany</td>
<td>12.0</td>
</tr>
<tr>
<td>Austria</td>
<td>15.1</td>
</tr>
<tr>
<td>Belgium-Luxembourg</td>
<td>22.5</td>
</tr>
<tr>
<td>Denmark</td>
<td>6.8</td>
</tr>
<tr>
<td>Spain</td>
<td>7.2</td>
</tr>
<tr>
<td>Finland</td>
<td>15.1</td>
</tr>
<tr>
<td>France</td>
<td>10.8</td>
</tr>
<tr>
<td>Greece</td>
<td>3.8</td>
</tr>
<tr>
<td>Italy</td>
<td>7.7</td>
</tr>
<tr>
<td>Netherlands</td>
<td>32.2</td>
</tr>
<tr>
<td>Portugal</td>
<td>3.6</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>8.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Source: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculations

<table>
<thead>
<tr>
<th>TABLE 7</th>
<th>Decomposition of bilateral tourism flows by country (in %), according to Fontagné and Freudenberg’s (1997) method (2000-2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWHD</td>
<td>TWVD</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td>Germany</td>
<td>12.5</td>
</tr>
<tr>
<td>Austria</td>
<td>22.1</td>
</tr>
<tr>
<td>Belgium-Luxembourg</td>
<td>33.2</td>
</tr>
<tr>
<td>Denmark</td>
<td>11.5</td>
</tr>
<tr>
<td>Spain</td>
<td>2.6</td>
</tr>
<tr>
<td>Finland</td>
<td>7.9</td>
</tr>
<tr>
<td>France</td>
<td>27.7</td>
</tr>
<tr>
<td>Greece</td>
<td>8.2</td>
</tr>
<tr>
<td>Italy</td>
<td>12.5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>43.8</td>
</tr>
<tr>
<td>Portugal</td>
<td>4.5</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>20.2</td>
</tr>
<tr>
<td>Sweden</td>
<td>12.6</td>
</tr>
</tbody>
</table>

Source: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculations
TABLE 8

<table>
<thead>
<tr>
<th>Country</th>
<th>IIT H</th>
<th>IIT V</th>
<th>Inter-industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>12.2</td>
<td>40.4</td>
<td>47.4</td>
</tr>
<tr>
<td>Austria</td>
<td>15.4</td>
<td>43.1</td>
<td>41.5</td>
</tr>
<tr>
<td>Belgium-Luxembourg</td>
<td>24.6</td>
<td>32.2</td>
<td>43.2</td>
</tr>
<tr>
<td>Denmark</td>
<td>7.5</td>
<td>63.9</td>
<td>28.6</td>
</tr>
<tr>
<td>Spain</td>
<td>7.5</td>
<td>26.2</td>
<td>66.3</td>
</tr>
<tr>
<td>Finland</td>
<td>17.7</td>
<td>60.5</td>
<td>21.8</td>
</tr>
<tr>
<td>France</td>
<td>10.8</td>
<td>47.3</td>
<td>41.9</td>
</tr>
<tr>
<td>Greece</td>
<td>6.6</td>
<td>27.6</td>
<td>65.8</td>
</tr>
<tr>
<td>Italy</td>
<td>11.9</td>
<td>47.9</td>
<td>40.2</td>
</tr>
<tr>
<td>Netherlands</td>
<td>32.2</td>
<td>36.5</td>
<td>31.3</td>
</tr>
<tr>
<td>Portugal</td>
<td>16.2</td>
<td>40.7</td>
<td>43.1</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10.6</td>
<td>35.5</td>
<td>53.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>9.2</td>
<td>57.1</td>
<td>33.7</td>
</tr>
</tbody>
</table>

Source: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculation

These tables show that, whatever the method, trade in vertically differentiated products strongly dominates intra-tourism trade in all EU-14 countries. Its share often represents several times the share of trade in horizontally differentiated products, with the noteworthy exception of the Netherlands whose bilateral intra-tourism trade is quite balanced among the three types of flows. As is always the case (at least with usual thresholds), Fontagné and Freudenberg’s method gives the highest shares of vertical IIT: two-way trade in vertically differentiated products always goes well beyond 50% of any country’s total bilateral tourism trade. The two other methods both establish that vertical intra-tourism trade is the most important component of total bilateral tourism trade for 7 countries: Austria, Denmark, Finland, France, Italy, Netherlands and Sweden. However, it should be noted that Netherlands, Belgium-Luxembourg and, to a lesser extent, Finland and Austria, hold a significant share of horizontal intra-industry trade.

The comparison of the three methods also confirms that the Azhar and Elliott method classifies more intra-industry trade as horizontal than the two other methods (though sometimes only slightly), as suggested by Azhar et al. (2008).

Finally, there does not appear to be a clear link between the intensity of intra-tourism trade and the intensity of vertical intra-tourism trade.

Note that all results should be interpreted with some caution because international tourism services are a relatively broad category whose heterogeneity is not really reflected in the aggregated data available. However, this study went the farthest one can go, given the available data on bilateral flows in tourism trade. And even if data should ideally be more disaggregated by tourism products, the fact that the results obtained are so strong suggests that intra-tourism trade, especially of services differentiated by quality, must have some reality.
V. CONCLUSION

The purpose of this paper was to shed some light on intra-industry trade in services by providing a rigorous case study on international trade of tourism services in the EU-14. One of the most striking features of contemporary international trade in goods is the important share of symmetric flows between any two countries within the same sector, i.e. the presence of intra-industry trade. However there is very little information on trade in services. And the few available studies have some serious methodological shortcomings; for example they often rely on multilateral data which creates a “geographical bias” (Fontagné and Freudenberg 1997) because of an insufficient geographical disaggregation. The present work is the first empirical study that investigates IIT between many countries for some category of services on a strict bilateral basis and at the most detailed level for which bilateral data are available.

Another purpose of this paper was to provide a new way of looking at trade in international tourism. Tourism is nowadays one of the most important exports in the world but has been neglected by empirical research. The stereotyped image of international tourism is largely dominated by the idea of two groups of countries and one-way flows of international tourists, going from very few source countries to highly tourism-specialized host countries. One of the most important results that this paper shows is that this idea is incorrect, at least for the EU-14.

Using a database from the OECD and after some work to solve the problem of consistency, we clearly show that tourism flows between any pair of EU-14 countries are dominated by reciprocity more than by univocity. The splitting of countries into two dichotomic groups is thus not valid. Whatever the approach used (Grubel and Lloyd’s indicator or Fontagné and Freundenberg’s degree of overlap), intra-tourism trade appears to be a phenomenon of great significance in the EU-14, apparently more than for material goods as suggested by available evidence.

However, a quantitative symmetry can hide a qualitative asymmetry. This paper is also the first paper studying intra-industry trade for services to address the issue of vertical and horizontal IIT. An indicator of quality adapted to the case of international tourism services has been proposed to assess the importance of horizontal and vertical intra-tourism trade by applying the three methods available in the literature: the Greenaway, Hine and Milner’s method (1994), the Fontagné and Freundenberg’s method (1997) and the Azhar and Elliott’s (2006) method. All three methods deliver the same strong conclusion: intra-tourism trade within the EU-14 is essentially composed of the trade of services differentiated by their level of quality. Horizontal intra-tourism trade appears to be extremely limited. Moreover, sensitivity tests show that these conclusions are robust to the choice of higher thresholds.

A large amount of empirical evidence shows that international specialization for goods is taking place within products across qualities, rather than across products or industries (Greenaway et al. 1999; Fontagné et al. 2005; Fontagné et al. 2008). Our results suggest that, if there is some specialization in tourism by country, this specialization must also probably occur along ranges of quality, in a similar way as for goods.

Finally one extension to this work is to use the results as part of a series of econometric investigations in order to test various hypotheses about the determinants of intra-tourism trade, especially for vertically differentiated tourism services. One of the challenging questions is whether the factors influencing IIT in tourism are similar to those influencing IIT in goods.
Appendix

Graph A1
Distribution of the Grubel and Lloyd’s indexes for the tourism sector in the EU-14 (2000-2004)

Source: OECD (2003, 2007); authors’ calculation

TABLE A1
Share of one-way trade in the UE-14 (in %), according to Fontagné and Freudenberg’s (1997) method (2000-2004)

<table>
<thead>
<tr>
<th>Threshold for the trade overlap</th>
<th>Share of One-Way Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 10</td>
<td>5.90</td>
</tr>
<tr>
<td>≤ 20</td>
<td>24.36</td>
</tr>
<tr>
<td>≤ 30</td>
<td>34.91</td>
</tr>
<tr>
<td>≤ 40</td>
<td>47.11</td>
</tr>
<tr>
<td>≤ 50</td>
<td>56.13</td>
</tr>
</tbody>
</table>

Source: OECD (2003, 2007); authors’ calculation
Note: if we fixe the threshold of trade overlap at 30%, i.e if we consider that the minority flows represents at least 30% of the majority flow, the share of one-way trade is 34.91%

TABLE A2
Decomposition of bilateral tourism flows in the EU-14 (in %), according to Greenaway, Hine and Milner’s (1994) method and the criterion of similarity applied (2000-2004)

<table>
<thead>
<tr>
<th>Threshold of quality similarity</th>
<th>≤0.15</th>
<th>≤0.20</th>
<th>≤0.25</th>
<th>≤0.35</th>
<th>≤0.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>IITH</td>
<td>6.4</td>
<td>8.2</td>
<td>10.2</td>
<td>11.6</td>
<td>19.2</td>
</tr>
<tr>
<td>IITV</td>
<td>46.2</td>
<td>44.5</td>
<td>42.4</td>
<td>41.1</td>
<td>33.5</td>
</tr>
</tbody>
</table>

Sources: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculation
Note: if we choose a threshold of similarity of 0.35, the shares of IITH and IITV are 11.6% and 41.1%.
### TABLE A3
Share of vertical two-way trade in the EU-14 (in %), according to Fontagné and Freudenberg’s (1997) method and the criteria of overlap in trade and similarity of quality applied (2000-2004)

<table>
<thead>
<tr>
<th>Threshold of quality similarity</th>
<th>≤ 0.15</th>
<th>≤ 0.20</th>
<th>≤ 0.25</th>
<th>≤ 0.35</th>
<th>≤ 0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold for the trade overlap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 0.1</td>
<td>81.9</td>
<td>79.1</td>
<td>75.6</td>
<td>73.8</td>
<td>68.6</td>
</tr>
<tr>
<td>≥ 0.2</td>
<td>58.0</td>
<td>56.2</td>
<td>52.7</td>
<td>51.0</td>
<td>46.1</td>
</tr>
<tr>
<td>≥ 0.3</td>
<td>48.5</td>
<td>47.5</td>
<td>44.0</td>
<td>43.5</td>
<td>39.3</td>
</tr>
<tr>
<td>≥ 0.4</td>
<td>34.1</td>
<td>33.3</td>
<td>31.9</td>
<td>31.4</td>
<td>27.4</td>
</tr>
<tr>
<td>≥ 0.5</td>
<td>28.2</td>
<td>27.5</td>
<td>26.5</td>
<td>26.0</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Sources: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculation
Note: if we choose a threshold of similarity of 0.35 and a threshold of trade overlap of 0.1, the share of vertical two-way trade is 73.8%.

### TABLE A4
Share of horizontal two-way trade in the EU-14 (in %), according to Fontagné and Freudenberg method’s (1997) and the criteria of overlap in trade and similarity of quality applied (2000-2004)

<table>
<thead>
<tr>
<th>Threshold of quality similarity</th>
<th>≤ 0.15</th>
<th>≤ 0.20</th>
<th>≤ 0.25</th>
<th>≤ 0.35</th>
<th>≤ 0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold for the trade overlap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 0.1</td>
<td>9.1</td>
<td>11.9</td>
<td>15.4</td>
<td>17.1</td>
<td>22.4</td>
</tr>
<tr>
<td>≥ 0.2</td>
<td>8.8</td>
<td>10.7</td>
<td>14.2</td>
<td>15.9</td>
<td>20.8</td>
</tr>
<tr>
<td>≥ 0.3</td>
<td>7.0</td>
<td>7.9</td>
<td>11.4</td>
<td>11.9</td>
<td>16.1</td>
</tr>
<tr>
<td>≥ 0.4</td>
<td>4.3</td>
<td>5.1</td>
<td>6.4</td>
<td>7.0</td>
<td>11.0</td>
</tr>
<tr>
<td>≥ 0.5</td>
<td>3.4</td>
<td>4.2</td>
<td>5.1</td>
<td>5.7</td>
<td>9.7</td>
</tr>
</tbody>
</table>

Sources: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculation
Note: if we fix the threshold of similarity at 0.35 and the threshold of trade in overlap at 0.1, the share of horizontal two-way trade is 17.1%.

### TABLE A5
Decomposition of bilateral tourism flows in the EU-14 (in %), according to the Azhar and Elliott method and the criterion of similarity applied (2000-2004)

<table>
<thead>
<tr>
<th>Threshold of quality similarity</th>
<th>≤0.15</th>
<th>≤0.20</th>
<th>≤0.25</th>
<th>≤0.35</th>
<th>≤0.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>IITH</td>
<td>11.6</td>
<td>14.1</td>
<td>18.9</td>
<td>25.5</td>
<td>30.3</td>
</tr>
<tr>
<td>IITV</td>
<td>41.1</td>
<td>38.6</td>
<td>33.8</td>
<td>27.2</td>
<td>22.4</td>
</tr>
</tbody>
</table>

Sources: OECD (2003, 2007), UNWTO (2006), CEPII (2006); authors’ calculation
Note: if we fix the threshold of similarity at 0.35, the shares of IITH and IITV are 25.5% and 27.2%.

### References


ITIS – Innovation, territoires et inclusion sociale

MDD – Mobilités et développement durable

RIO – Risque, information, organisation

DOBIM – Droit des obligations et activités bancaires et immobilières

THEMOS – Théorie, Modèles, Systèmes

**Documents de travail récents**

✓ Jean-Jacques Nowak, Sylvain Petit et Mondher Sahli, « Intra-industry trade and vertical differentiation in tourism services », [2013-01].

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