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The influence of formal trade agreements and informal economic co-operation on international tourism flows

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Abstract

This paper aims to contribute to the literature on the effects of trade bloc formation and plurilateral economic co-operation on international tourism flows. This research expands previous findings in the number of countries (58) and types of agreements (formal and informal, global and regional) under investigation in order to: (i) capture the effect of both formal trade agreements and plurilateral economic integration on bilateral tourism flows; (ii) test the robustness of previous findings through the use of alternative econometric specifications, estimation techniques and measurement of tourism flows. In this respect, an important feature of this research is the introduction of "total tourism", corresponding to the "total trade" variable in trade studies, as alternative dependent variable in the specification of the gravity model used throughout the paper.

Keywords: *Tourism demand, Currency Unions, Trade Agreements, Regional co-operation, Gravity model, Panel data, Heckman estimator, Poisson pseudo-maximum likelihood estimator*

Introduction

In economic theory the advantages of economic integration are well known and widely discussed. In general, the focus falls on formal trade agreements, most notably Preferential Trade Agreements and Free Trade Areas (PTAs and FTAs), Customs Unions, Common markets and Monetary Unions, as a way to eliminate barriers to international trade (Van Marrewijk, 2012). Examples are the World Trade Organization (WTO), the European Union (EU), the European Monetary Union (EMU), the North American Free-Trade Agreement (NAFTA). While these agreements are designed to foster economic integration and liberalize trade between the countries involved, covering a large number of sectors, plurilateral agreements are typically issue-based agreements between countries, covering specific areas or topics (Nakatomi, 2013). Issues covered by these agreements include, among others, government procurement, information technology and trade in environmental goods (Helble and Wignaraja, 2015). Plurilateral co-operation agreements in the context of this paper refer to the broad-based co-operation and economic integration processes unfolding within a group of countries. They are therefore more informal than trade agreements, but also more broad-based. They encompass structured organizations such as the Organization for Economic Co-operation and Development (OECD), regional clusters of co-operating countries sharing geographical and/or cultural contiguity such as the Middle East and North Africa (MENA) region and the Asian-Pacific countries (Australia, New Zealand, China, Japan, Korea), to the tighter economic co-operation between important emerging countries, as in the case of Brazil, Russia, India and China (BRIC).

Among the many types of partnerships eluded to above, formal trade agreements are the ones often promoted for their supposed positive effects on international trade flows. The positive effects of formal trade agreements on international trade has been studied by amongst others, Carrére (2006), Baier and Bergstrand (2009), Gil-Pareja et al (2014) and Yang and Martinez-Zarzoso (2014). The most comprehensive form of formal integration occurs when an economic union adopts a single currency to form a monetary or currency union. The most relevant experience is the EMU which, in 1999, introduced the Euro as a common currency shared by 11 European Union countries (they are currently 19). The main reasons for the success of a currency union in promoting trade between members are to be found in the reduction of transaction costs and the elimination of uncertainty caused by exchange rate volatility (Rose and Stanley, 2005). Rose (2000) was among the early authors to empirically test whether this positive relationship between currency unions and trade flows holds for the European Monetary Union (EMU), by applying the gravity model to the European case. The literature on the influence of formal trade agreements on international trade flows flourished following the publication of Rose.

While most of the initial research following the creation of the EMU have focused on the influence thereof on trade (Frankel and Rose, 2002; Rose and Stanley, 2005 for a meta-analysis), no authors have tried to capture the effect of currency unions on international tourism flows until the work of Gil-Pareja *et al* (2007). Similar to Rose, they applied the gravity model to tourism arrivals in Europe from 20 OECD countries in the 1995-2002 period. They showed that the currency union between countries belonging to the Eurozone had a statistically significant and positive effect on intra-European tourism flows, estimating the increase to be around 6.3%. The arguments why a currency union should lead to increased tourism flows are similar to that for trade.

Following the link between migration and trade, Santana-Gallego *et al* (2016) argue that tourism is more likely to lead to trade due to increased information exchange, reduction in transaction cost and increased market size. Alternatively, it may be argued that an environment conducive to trade also stimulates tourism. The availability of transport infrastructure as well as business tourism to maintain international trade contracts serve as examples.

While these arguments are valid for various forms of formal trade contracts (i.e. preferential trade areas to currency unions), the research in tourism mainly focussed on the impact of currency unions in comparison to other exchange rate regimes. The most important works on the impact of currency unions on tourism are that by Santana-Gallego *et al* (2010b; 2015). She and her colleagues used the same method of Gil-Pareja *et al* (2007) but extended the analysis in both the number of countries and years under scrutiny. Similarly to Gil-Pareja *et al* they also found positive effects stemming from the EMU (and in general from fixed exchange rate regimes, Santana-Gallego *et al*, 2010b) on international tourism flows, both from within (intra) and from outside (inter) the Eurozone. Using data from 37 countries spanning the years 1995-2012, Santana-Gallego *et al* (2015) show that the Euro promotes intra-Eurozone tourism by almost 45%. The greatest winners were the early joiners of the euro area, although strong positive effects are also found for late comers. They also found no evidence of *tourism diversion effect* but rather strong evidence of *tourism creation* i.e. non-EMU *tourists* are more likely to choose EMU destinations after the introduction of the Euro. Results about the positive effect played by EMU on tourism are also generalized by De Vita (2014), who found a long-run impact of exchange rate regimes on international tourism flows: the less flexible the exchange rate regime, the bigger the positive impact on tourism, with the greatest effect experienced by currency unions.

While the effect of FTAs and PTAs have received attention in the trade literature, it is evident from the above that the literature on trade agreements and tourism mainly focuses on the effect of the European Monetary Union. This paper fills this gap in the literature, advancing knowledge about the effect of different types of trade agreements and economic co-operation on international tourism. In particular, the novelty of the paper lies in four different aspects. Firstly, we attempt to generalise results by expanding the size of the dataset in the number of countries under investigation (58 in total), also including emerging economies and countries not previously considered (within the region of Middle East and North Africa, Australia, Brazil, Chile, China, Russia, India and Israel).

Secondly, this paper also tests a wider variety of trade agreements, not only including the European Union and European Monetary Union (EMU). Pivoting on the two dimensions of geography and formality, we can jointly test the impact on international tourism of (semi)formal and global organizations (e.g. OECD), informal and global economic integration agreements (e.g. BRIC), informal and regional agreements (e.g. MENA, ASIA) and formal and regional agreements (e.g. NAFTA, EU, EMU). Through the analysis of results we can test whether formal trade agreements create more significant benefits than plurilateral co-operation agreements or trade blocs: in other words, is it the improvement in information availability stemming from formal trade contracts that improve tourism flows between countries, or does this also extend to other forms of economic and political co-operation and tighter integration? Similarly, we can test whether geographical proximity is more conducive to international tourism flows than economic and political co-operation: in other words, is geography more important than politics for tourism development?

In this regard four informal co-operation agreements and trade blocs are tested; the first involves tourism amongst the OECD countries, the so-called global “club of rich countries”. The second considers tourism among the so-called BRIC countries, as emerging economies with more than 40% of world population and more than 20% of world GDP, but geographically distant. The third involves tourism between the MENA countries, which are middle and low-income countries in the Middle East and North Africa, but mainly sharing cultural and geographical affinity, and working to promote regional development through tighter economic co-operation. Lastly, tourism between the Asian-Pacific nations, which consist of the Asian countries as well as Australia and New Zealand, which are geographically clustered together and which recently have been signing several bilateral and plurilateral agreements. Theoretically, the reasons why these arrangements should lead to increased tourism between participating countries may not be as apparent as that of formal trade agreements. However, it can be argued that an increase in awareness of the destinations caused by increased media coverage and tighter business and political links may alter the perception and the image of a destination. A more positive perception and image will encourage tourism flows to a destination (Tasci and Gartner, 2007).

Thirdly, from the methodological point of view, we apply a full range of model specifications to test the robustness of our findings. In particular, we introduce in the literature the use of “total tourism” (i.e. the sum of arrivals from country i to country j and arrivals from country j to country i, in any country pair) alongside with the standard measure of tourism arrivals from country i to country j as alternative dependent variable in the econometric analysis. The standard specification using arrivals corresponds to the trade specification of exports from country i to country j, while the "total tourism" dependent variable mimics the role played by total trade between two countries (i.e. exports from country i to country j and exports from country j to country i) in standard gravity models of international trade. While the standard specification tests the influence of a trade agreement between countries i and j on arrivals from country j in country i, the second specification tests the influence of agreements between countries i and j on total tourism between the two countries. This second view is especially compatible with the effects of trade creation and trade diversion due to agreements, and more coherent with the trade context, whereas Cipollina and Savatici (2010) explain that trade agreements are designed to increase *total trade* between partner countries, with cheaper imports that replaces domestic production (trade creation) in both countries or crowds out more expensive imports from non-member countries (trade diversion) – again for both countries.

Fourthly, we also check the robustness of the results to the use of alternative estimation techniques which have been demonstrated to be more effective in tackling problems of sample selection bias and heteroskedasticity (stemming from zero observations) to be encountered in gravity models. These estimation techniques can explain irregularities found in tourism and trade data, namely asymmetry in bilateral tourism flows (Santana-Gallego *et al*, 2016), and have not been applied in the tourism demand literature to date. In addition, not only do we use destination and origin dummies (i.e. country fixed effects) to control for country differences and partly address omitted variable bias, but also country pair dummies (country pair fixed effects), which control for common bilateral characteristics (Gómez-Herrera and Milgram-Baleix, 2012), as well as a multilateral resistance term (MRT) which is both country- and year-specific.

The remainder of the paper is structured as follows: the next section provides an overview of the theoretical foundation of this research, namely the gravity model, especially highlighting its application in tourism studies. This will be followed by the methodology and the data used in the econometric analysis, before the results are discussed. Finally, the paper draws conclusions based on the results found.

The gravity model and its application to tourism flows

The theoretical foundation of this paper is the application of the *gravity model,* which has its origin in physics, to international trade. Newton's theory of gravitation explains the phenomena of attraction between two bodies, and the gravity equation mathematically explains that the force is directly proportional to the product of the two masses, and inversely proportional to the square of their distance.

Since 1962, when Tinbergen (1962) adopted it for the first time, the gravity model has become one of the most popular models within international economics studies. Despite the fact that the gravity model was initially not well received by academics, it has recently grown in popularity because of its empirical success. The key concept is to consider bilateral or total trade between two countries as an attraction force, and to relate it to some concept of mass (the size of the economy) as well as the distance between the two countries. Total trade is usually measured as the sum of imports and exports between the two countries, while economic size is assimilated to the countries' total GDP or per-capita GDP (in this last case jointly considered with total population). Hence, in its simplest form, the gravity model is:

$$X_{ij} = B_0 \frac{Y_i Y_j}{D_{ij}}, \qquad (1)$$

where X_{ij} represents trade flows between countries i and j; B_0 is a constant, Y_i and Y_j the economic size of countries i and j, and D_{ij} is a measure of distance between countries i and j.

The great majority of researchers have found that trade flows between two countries are positively related to economic size and negatively to distance, as predicted by the gravity equation. The Gravity model's popularity is enhanced by its ability to capture and explain bilateral trade flows between two countries against a variety of independent variables that can be added to the model, besides the countries' economic sizes and distance. Although the scepticism surrounding the gravity model in economics was stemming from the lack of a sound theoretical background, nowadays the model has been demonstrated to be coherent with many mainstream theories, from classical Ricardian theory and Heckscher-Ohlin model (Anderson, 1979; Bergstrand, 1985) to increasing returns with product differentiation (Deardorff, 1998), monopolistic competition (Bergstrand, 1990) and models of multilateral and bilateral trade resistances (Anderson and van Wincoop, 2003). Using the words of Deardorff (1998), "I suspect that just about any plausible model of trade would yield something very like the gravity equation".

Together with applications on international trade (Anderson and van Wincoop, 2003; McCallum, 1995; Rose, 2000) the gravity model has also been applied to other topics, for example, to explain international migration (Karemera *et al*, 2000) and multinational investment (Bergstrand and Egger, 2007, Head and Ries, 2008) so that, according to Baldwin and Taglioni (2006) "the emergency of the new trade theory in the late 1970s and early 1980s started a trend where the gravity model passed from having too few theoretical foundations to having too many".

As a particular type of trade in services, tourism has also being subject to the scrutiny of the gravity model since its early days (Durden and Silberman, 1975; Gordon, 1973; Malamud, 1973). However, according to Morley *et al* (2014), theoretical support for gravity models is not valid for international tourism flows since it is very uncommon that tourism flows from country x to country y are the same as those from country y to country x, as predicted by the general model. However, they easily show that the specification of the gravity model is consistent with the typical consumer-based demand function of mainstream tourism demand models (see also Song et al, 2003; Song and Li, 2008).

The application of gravity equation has recently surged (Kimura and Lee, 2006; Keum, 2010) showing that the gravity model applies to trade in services, particularly tourism, better than trade in goods. Witt and Witt (1995) conclude that "the degree of interaction between two geographical areas varies directly with the degrees of concentration of persons in the two areas and inversely with the distance separating them". As surveyed by Morley *et al* (2014), the factors that are known to affect international tourism flows are also included in the typical gravity model applied to tourism. These factors range from price elasticity, exchange rate, common borders and languages (Eilat and Einav, 2004) to currency unions and exchange rate regimes (Gil-Pareja *et al*, 2007, Santana-Gallego *et al*, 2010a, 2010b, De Vita, 2014; Santana-Gallego *et al*, 2015); from cultural and religious affinity (Fourie and Santana-Gallego, 2013; Vietze, 2012) to visa restrictions and tax implications (Neumayr, 2010; Durbarry, 2008).

In particular, using data from 1995 to 2004, Santana-Gallego *et al* (2010a) found that currency unions increase tourism flows by 12%. Even more pronounced results are found if the countries which share a common currency are middle-income countries (Santana-Gallego *et al*, 2010b). De Vita (2014) also found common currencies to increase tourism between 19.7% and 29.7%. In an update on the 2010 paper using data until 2012, Santana-Gallego *et al* (2015) found an even more pronounced effect, with tourism between EMU countries increasing by 44.63%.

While we refer to Morley *et al* (2014) for a comprehensive discussion on recent empirical and theoretical advancements in the field of gravity models applied to tourism, as indicated above the literature on the effect of trade agreements on tourism flows is skewed towards common currency areas, with no or little research on the effect of other types of trade agreements. However, in trade literature ample evidence of the positive effect of FTAs on trade flows can be found (see for example Baier and Bergstrand, 2009 and Gil-Pareja *et al*, 2014) and hence, in what follows, we contribute to this strand of literature by assessing how formal trade agreements and informal plurilateral co-operation and trade blocs impact on international tourism.

Methodology and data

One of the main aims of this research is to investigate the effect of various forms of formal trade agreements, which include NAFTA, EU and EMU, co-operation organizations (OECD) and informal pluri-lateral economic co-operation and integration at the regional level (MENA, Asian-Pacific countries) or at the global level (BRIC) on international tourism flows. Compared to the studies of Santana-Gallego *et al* (2010a, 2010b, 2015, 2016) and De Vita (2014), our dataset includes a wider variety of countries and various forms of integration. We consider a panel of 58 countries monitored over the period 1995-2010. Table 1 describes the countries included in the dataset as well as their membership to specific formal trade agreements and informal plurilateral co-operation organisations.

[INSERT TABLE 1 AROUND HERE]

The baseline specification

The research closely follows previous studies by Gil-Pareja *et al* (2007) and Santana-Gallego *et al* (2010a, 2010b, 2015, 2016) by applying the standard baseline econometric specification of the gravity model, which is recalled in (2):

$$\ln TOURARR_{ijt} = \beta_o + \beta_1 \ln TRADE_{ijt-1} + \beta_2 \ln GDPPC_{it} + \beta_3 \ln GDPPC_{jt} + \beta_4 POP_{it} + \beta_5 POP_{jt} + \beta_6 \ln DIST_{ij} + \beta_7 \ln RELPRICE_{ijt} + \beta_8 COLONY_{ij} + \beta_9 COMLANG_{ij} + \beta_{10} CONTIG_{ij} + \gamma_i + \delta_j + \lambda_t + \upsilon_{ijt} \quad (2)$$

where *ln* indicates natural logarithms of the considered variables to ensure a linear estimate of βs; *i* stands for the destination country, *j* for the origin country, *t* for the year. In the basic specification of the model, the dependent variable *TOURARR* is the number of tourist arrivals to country *i* from country *j* in year *t*.

Concerning the independent variables, *TRADE* represents total bilateral trade flows between countries *i* and *j* at time *t* (i.e., the sum of their exports and imports in that particular year). This variable is expected to be positively associated with the dependent variable, the intuition stemming from likely complementarity between trade and tourism: on one hand, if two countries are economically integrated both trade and tourism are positively affected; on the other hand, a relevant segment of tourism, business travel, grows with trade, this aspect being particular important for developed economies. To control for possible endogeneity, trade entered the equation as a lagged variable (Santana-Gallego *et al*, 2016).

GDPPC is real GDP per capita of destination and origin countries respectively; *POP* is total population of destination and origin countries respectively. These variables measure the “mass” of the economies, their inclusion being central to the gravity model. The expected signs are all positive. The bigger and the richer the economies, the stronger the international tourism flows between them. The denominator of gravity equation (1), *DIST*, is proxied by the distance between capital cities of countries *i* and *j*; the expected sign is therefore negative, the economic rationality stemming from the intuition that distance is a proxy for transport costs.

RELPRICE represents the relative price between country *i* to country *j* at year *t.* It is calculated using the standard formulae found in tourism demand studies (see Wong *et al*, 2006):

$$RELPRICE_{ijt} = \frac{CPI_i/ER_i}{CPI_j/ER_j}$$

where *CPI* represents the destination and origin countries’ consumer price indices and *ER* is exchange rate index (2010=100) for the two countries. Hence it represents the cost of living within the destination and therefore serves as a proxy the competitiveness of destination country for tourists of the origin country.

The dummy variables included in the baseline specification are: *COLONY*, a dummy taking the value of 1 when one country of the pair have colonised the other one, zero otherwise; *COMLANG*, a dummy taking the value of 1 when the two countries share the same language, zero otherwise; *CONTIG*, a dummy taking the value of 1 when countries share the same land border, zero otherwise. The expected sign for all these dummy variables is positive, since they all denote stronger social, economic (and tourism) ties.

To account for country-specific and year-specific (or business cycle) effects, fixed effects are included. γi and δi are specific effects for the destination and origin country respectively (country fixed effects – CFE); λt represents year fixed effects (YFE); υijt is the well-behaved disturbance term. As it will be outlined below, this model is a special case of the panel fixed effect model, given that it has a unique value for each intercept of trading pairs, with the implication that the fixed effect for a country as origin or destination is the same for all of its trading partners (Santana-Gallego *et al*, 2010b). By including fixed effects one controls for unobserved heterogeneity that are constant for a given destination or origin.

Unbalanced tourism flows

As dependent variable, we firstly use the standard measure of unidirectional tourism flows that has always been considered in previous tourism research: tourism arrivals. This specification differs from standard gravity models where the value of total bilateral trade flows (i.e., the sum of imports and exports) is the relevant dependent variable. Since tourism arrivals is unidirectional, the proxies for economic mass (GDP per capita and population) are introduced separately in the regression rather than as their product. The use of tourism arrivals in gravity models has grown spontaneously, since it is the main index of traveller flows between countries. It has later been justified on the grounds that, since standard gravity models predict that trade flows from country *i* to country *j* are the same as those from country *j* to country *i*, a circumstance that is not common for international tourism, unidirectional measures of tourism flows should be used instead (Morley *et al*, 2014).

However, the use of tourism arrivals in gravity equations raises two major concerns. First, the time series “arrivals” is a measure of physical quantity and, although it is (slightly) proportional to tourism expenditure, it is an imprecise proxy for it. Second, international trade flows are unbalanced in other sectors too. It is quite rare that the current account balance between two countries is in equilibrium: usually, trade flows from region *i* to region *j* are *not* the same as those from region *j* to region *i*. What is important for gravity models is the total sum of trade flows between countries.

Hence, in order to tackle the second of these caveats (not availing of complete and reliable data on bilateral tourism expenditure), we test the robustness of the results by estimating the model with “total tourism” as dependent variable, where total tourism represents the sum of bilateral tourism flows between each pair of countries in the dataset: arrivals from country *j* to country *i* plus arrivals from country *i* to country *j*, i.e., the equivalent of the sum of imports and exports in trade.

The use of a measure of bilateral tourism flow such as total tourism would require a change in the gravity equation (2), with the introduction of GDP per capita and population as a multiplication of the two values for the two countries, as in equation (3) (Santana-Gallego *et al*, 2010b).

$$\ln TOTALTOUR_{ijt} = \beta_o + \beta_1 \ln TRADE_{ijt-1} + \beta_2 \ln(GDPPC_{it} * GDPPC_{jt}) + \beta_3 \ln(POP_{it} * POP_{jt}) + \beta_4 \ln RELPRICE_{ijt} + \gamma_i + \delta_j + \lambda_t + \upsilon_{ijt} \quad (3)$$

Since there is complete symmetry in the dataset, the dataset is halved and time-invariant common controls between two countries (i.e. distance, common language, common colony and border) are correlated with the constant and therefore not included. Similar to the baseline tourism flow specification, bias is however controlled using fixed effects.

Controlling for bias

However, if origin and destination dummy variables are included separately, one does not control for factors that are common in both countries (i.e. bilateral factors), which is referred to as omitted variable bias. In general three alternative ways have been proposed to deal with this issue, namely (i) including country-pair fixed effects, (ii) including country-year fixed effects, and (iii) including a multilateral resistance term in the specification (Gil-Pareja et al, 2014). These are all considered in this paper.

To control for political, cultural and other historical relationships that bind countries together and may influence the magnitude of tourism flows between the countries, we also include country-pair fixed effects (CPFE) (i.e. $\phi ij = \phi ji$) together with year-specific fixed effects in the total tourism specification (Yang and Martinez-Zarzoso, 2014). The estimation of the gravity model specified with country-pair fixed effects lead to perfect collinearity with the regressors which are time-invariant in country-pairs (e.g. distance, language and colony) which subsequently have to be omitted from the estimation. Cheng and Wall (2005) show that the country-pair and year-specific fixed effects eliminate bias due to omitted or misspecified variables in gravity models.

More recently, country-year fixed effects have become popular in gravity model estimations, which lead to an ANOVA-type estimation of gravity models (Egger and Nigai, 2015). However, Hornok (2011) shows that the effect of trade policy cannot be determined in such cases, because of perfect collinearity between the country-year dummy and policy dummies. Even if estimations are obtained, the country-time dummy absorbs too much of the variation in the data, making the interpretation of the estimated coefficient not meaningful. Country-year dummies are therefore included in this paper for completeness, but with the above caveat.

The multilateral resistance term (MRT) was introduced by Anderson and van Wincoop (2003) and captures the average trade barriers that a specific country faces. It is therefore a bilateral trade cost measure that is unique to each country, but which varies over time. The MRT for each country and each year was compiled based on the remoteness of the destination, similarly to what is done in trade literature (Head and Mayer, 200; Gomez-Herrera, 2013):

$$MRT_{it} = \sum \frac{distance_{ij}}{\frac{GDP_{jt}}{GDP_{world,t}}}$$

The effect of different forms of integration and co-operation

To determine the effect of the various formal trade agreements as well as informal plurilateral co-operation and economic integration, the following dummy variables are coded and used in the econometric analysis: *EU* is a dummy variable that takes the value of 1 when both countries are member of EU at year *t*, zero otherwise. *EMU* is a dummy variable that takes the value of 1 when both countries are member of EMU at year *t*, zero otherwise. NAFTA is a dummy variable that takes the value of 1 when both countries are members of NAFTA at year *t*, zero otherwise. *OECD* is also a dichotomous variable that takes the value of 1 if both countries are members of the OECD at year *t*, zero otherwise. *BRIC* is a dummy variable that takes the value 1 if both origin and destination countries are BRICs (Brazil, Russia, India and China), zero otherwise. Similarly *MENA* and *ASIA* are dummy variables that take the value 1 if both origin and destination countries are MENA countries and Asian-Pacific countries respectively, zero otherwise.[i]

The introduction of the common currency in 1999, the introduction of Euro notes and coins in 2002 and the enlargement of the Eurozone in the later years (Slovenia in 2007, Cyprus and Malta in 2008 and Slovakia in 2009) is also tested with other specific dummy variables in order to determine whether the benefits of the EMU is diluted over time. To this aim we coded dummies of interaction between EMU country-pairs and years, EMU_XX, where XX = [1999 – 2010] and taking the value of 1 if both countries shared the Euro in year XX, zero otherwise.

Data

The dataset was compiled from the following sources:

- Tourism arrivals by country of residence from UNWTO specific dataset.
- GDP, GDP per capita, Population, GDP 2005 deflator and CPI's from World Bank *World Development Indicators* dataset.
- Exchange rates from the IMF's *International Financial Statistics* database.
- Merchandise exports and imports volumes for each country from *OECD's dataset* according to Standard International Trade Classification Rev.3[ii]. For the non-OECD countries, trade data

were obtained from *Comtrade* database.

- Distance measurement and dummy variables (i.e. colonial ties, common language and common border) from *Centre d'Etudes Prospectives et d'Informations Internationales* (CEPII)[iii] dataset.

The dataset includes 58 countries (listed in Table 1), and 16 years (from 1995 to 2010), providing a panel of 52,896 (= 58 x 57 x 16) observations. However, data on arrivals are non missing in only 30,956 observations, due to the lack of data in many non-OECD countries (mainly Djibouti, Iraq, Libya, Oman, Palestine, Qatar, United Arab Emirates) which operatively reduced the sample to 51 countries for estimation techniques that do not control for missing values (i.e. normal fixed effects).

Estimation methods and caveats

According to Cheng and Wall (2005) and Santana-Gallego *et al* (2010a) the gravity equation is estimated by OLS (Ordinary Least Square) with country and year specific-effects, commonly referred to as Fixed Effects-OLS (FE-OLS). However, to determine whether fixed effects are the correct specification, we also estimate the gravity model using random effects and then conduct the Hausman test. The null hypothesis of the Hausman test is that the random effects are uncorrelated with the explanatory variables. Using the basic model specification (equation 2), we reject the null hypothesis and find in favour of fixed effects ($\chi^2 = 12717.60(p < 0.001)$.The FE-OLS remains our baseline model and, as suggested by the United Nations Economic and Social Commission for Asia and the Pacific, (Shepherd, 2012) we use robust standard errors and the *cluster(distance)* option, which adjust the standard error further to allow for correlation in the error terms of countries that are clustered together based on distance.

Two additional problems are commonly found in panel gravity models, namely that of zero flows and heteroskedasticity in the error term. The first problem is that of sample selection bias, since zero data may be either because of non-existing bilateral tourism (or below a relevant threshold, and hence not recorded in official statistics) or simply lack of data capturing. To solve the problem of zeros the sample selection model introduced by Heckman is used (Heckman, 1979). Gil-Pareja *et al* (2014) indicate that the Heckman model controls for both selection bias as well as bias stemming from asymmetries in tourism flows between a pair of countries.

The traditional Heckman procedure involves the estimation of two equations, namely a selection equation and a response equation in two steps. The first equation is a probit type estimation where the following equation is estimated (Gil-Pareja *et al*, 2014):

$$Prob\left(T_{ij} = 1/observed\right) = \Phi\left(\gamma_i, \delta_j, X_{ij}, Z_{ij}, \varepsilon_{ij}\right) \qquad (4)$$

where T_{ij} is a binary variable, taking the value of 1 when there is observed tourism flows, and zero when there is not; X_{ij} are variables that influence both the probability and the volume of tourism flows, while Z_{ij} are variables that only influence the probability of observed tourism flows, but not the magnitude of the flows. The selection equation is therefore an extension of the original gravity equation shown in equations (2) and (3).

The response equation is subsequently estimated for country-pairs where there are observed tourism flows. The response equation has a non-linear specification that includes both the original gravity specification as well as two variables that are estimated in stage one, namely the inverse Mills ratio and an expression that controls for heterogeneity in size. The error terms, ε_i and u_i, follow a bivariate normal distribution:

$$\begin{bmatrix} \upsilon_i \\ \varepsilon_i \end{bmatrix} N \begin{bmatrix} \sigma^2 & \rho\sigma \\ \rho\sigma & 1 \end{bmatrix}$$

where ρ is the correlation coefficient and $\sigma$the scale parameter.

Helpman *et al* (2008) applied the Heckman model to international trade using a gravity equation, where the response equation follows the normal gravity specification (i.e. eq. 2) while the selection equation (eq. 4) estimates the probability that a data point is included in the estimation sample. This probit estimation can be used to calculate the inverse Mills ratio, which represents the probability that the selection variable is omitted from the original equation. A significant Mills ratio is therefore an indication of sample bias and justifies the use of the Heckman model. The selection equation should include all the variables in the response equation as well as at least one additional significant variable to explain the probability of being selected (Shepherd, 2012).

Two methods for estimating the Heckman model are available, namely the original two-step method (also referred to as limited information maximum likelihood) and the full information maximum likelihood method. Puhani (2000) indicates that the full information maximum likelihood method gives more robust estimation results since it controls for collinearity, and therefore it is also the method used in this paper (however, results are robust to the use of the two-step method, and are available from the authors upon request).

The second problem encountered with the FE-OLS estimation is that of heteroskedasticity in the error terms, which is also exacerbated by log linearization of the variables (Gomez-Herrera and Migram-Baleix, 2010). Since the error term is multiplicative in the original non-linear gravity specification, the problem cannot be solved by applying a robust covariance matrix estimator and it is likely that the estimators are biased and inconsistent. In fact, using the Modified Wald test for groupwise heteroscedasticity in STATA (xttest3), the results show that we can reject the null hypothesis of homoscedasticity with 99% certainty $[\chi^2 = 48546.7(p < 0.001)]$. A different estimation methodology is hence required. Santos Silva and Tenreyro (2006) suggest that the models can be estimated in semi-log specification, with the dependant variable expressed in levels, applying either Non-linear Least Squares (NLS) or Poisson Pseudo Maximum Likelihood (PPML). They find that NLS gives less efficient estimates, while PPML delivers consistent estimates of the original non-linear model and it is hence the model used in the paper.

The PPML has the following properties which makes its use desirable in gravity models: (i) it gives consistent estimates when fixed effects are entered as dummy variables as in the FE-OLS model; (ii) it includes the zero observations in the estimation, therefore also addressing the sample-bias problem raised above and avoiding the sample selection bias due to dropping zero observations; (iii) the interpretation of the coefficients is similar to OLS coefficients, with logarithmic independent variable coefficients still representing elasticities. Moreover, the estimated coefficients are different from the ones estimated using FE-OLS and, typically, the distance coefficient is usually smaller in absolute value, a consequence of dealing with heteroskedasticity (Santos Silva and Tenreyro, 2006).

The estimation of the gravity equation with PPML specification is added in the paper as a further robustness check, with the independent variables in natural logs, and the dependent variable in levels. All the estimations in this paper have been carried out using Stata 13 and Stata 14.

Results

When estimating the effect played by trade agreements and economic co-operation in the gravity model recalled in eq. 2, the main econometric problem is the estimation and interpretation of coefficients when there is non-exclusivity of trade blocs. Countries (and country-pairs) participate in more than one agreement: for example, all countries in the Eurozone are also members of the EU; similarly the three members of NAFTA are also OECD members. In order to avoid collinearity and to clearly isolate the impact of each trade bloc on international tourism we use a multiple-step approach. In the first step we check the effect of three mutually exclusive clubs, which represent three important economic clusters globally: the "club of rich countries" (OECD), the club of important emerging economies (BRIC), the regional area of Middle-East and Northern Africa

(MENA), a group of middle and low-income countries which is, however, important for tourism.

In the second step, we focus on the OECD group (plus Malta, Cyprus, Slovenia and China) and analyse the effect of three regional agreements that are enforced between OECD countries: two formal agreements (NAFTA and EU) and one informal (the tight economic partnership between the Asian-Pacific countries in our sample). Finally, in the third step we focus on the effect of the European currency union within the EU, since no country belongs to the EMU and not the EU.

Tourism arrivals as dependent variable

Having this multiple-step approach in mind, we start analysing the basic model recalled in eq. 2 when unilateral tourism arrivals from origin country *j* to destination country *i* is the dependent variable. Table 2 reports the relevant estimated coefficients. The basic specification is in (2.1) and includes country fixed-effects (CFE) for destination and origin countries, year fixed effects (YFE) and a multilateral resistance term (MRT) computed as the remoteness index of eq. 4.

Following the recent debate in the literature (see Santana-Gallego et al 2015) we also report (Column 2.2) the model using country-year fixed effects (CYFE) for both destination and origin countries as a way to control for MRT, but with the caveats as expressed in section above (refer to "Controlling for bias" section). With the introduction of time-varying country fixed effects, it is impossible to estimate coefficients for time-variant characteristics of the country: hence GDP per capita and population in destination and origin countries are dropped, together with the remoteness index.

Recent literature in trade (starting with Baier and Bergstrand, 2007; Flam and Nordstrom, 2006) also insert country-pair fixed effects (CPFE) together with CYFE to avoid estimation bias that stems from omitted time invariant factors. On the theoretical side, the estimates of country-pair dummies (which take the same value within the pair, independently from the role as destination or origin) are very different to those of individual country fixed effects. Since the dependent variable differs within country-pairs, CPFE may not be as appropriate when analysing unilateral arrivals, in which the direction of tourism, from the origin to the destination, is explicit. Individual dummies for destinations and origins seem to be more appropriate in this context, while country-pair dummies better fit in regressions where total bilateral tourism (mimicking the use of bilateral trade as dependent variable in the trade literature) is the dependent variable. Hence models with CFE, YFE and the MRT are the preferred ones when tourism arrivals is the dependent variable (and models with CYFE are used as a robustness check) as shown in Tables 2 and 3, while models with CPFE and YFE are used when total bilateral tourism is the dependent variable, as in Table 4.

[INSERT TABLE 2 AROUND HERE]

Table 2 shows that, as always the case in gravity models, the explanatory power is very high (R-squared is 0.856 and 0.838 in Columns 2.1 and 2.2 respectively) and the basic coefficients are almost all significant and with the expected sign: if we focus on 2.1 we see that the level of development (proxied by GDP per capita) and the size (proxied by the population size) of both destination and origin countries are impacting positively on bilateral tourism flows; distance (a proxy of transport costs) is impacting negatively, while bilateral trade flows (which are lagged of one period to avoid endogeneity) are positively associated with tourism arrivals (probably via the enhancement of business tourism and tighter economic integration). Land contiguity (CONTIG), the sharing of a common language (COMLANG) and a previous colonial history (COLONY) all have positive and significant coefficients, as expected and in line with previous literature.

Concerning the coefficients of interest (i.e. the ones of trade and co-operation agreements), it is evident that OECD and BRIC are not significant, while MENA has a positive and significant coefficient in both specifications: after controlling for country and year effects, being part of the MENA provides a consistent extra-flow of tourists within the region, estimated to be more than 300% in Column 2.1. To avoid that results are sensitive to the (small) control group, we also run regressions 2.1 and 2.2 including each cluster (OECD, BRIC, MENA) separately: coefficients are stable in both sign and significance.

In the second step of the analysis, we focus on OECD countries (plus Malta, Cyprus, Slovenia and China) only and estimate the effect of EU, NAFTA and of the strong economic cooperation between countries in the Asian-Pacific region on international tourism flows. Columns 2.3 and 2.4 show the main results. Again, almost all the basic coefficients have the expected sign and significance, while the variables of interest show that the extra flow of tourists stemming from being part of a trade agreement is not consistent. The coefficient of EU, although positive, is not significant, the coefficient of NAFTA is positive and significant (only at the 5% level in Column 2.4, where CYFE are included), while the coefficient of ASIA is positive and strongly significant and it can be estimated that, *ceteris paribus*, the extra-flow of tourists stemming from being part of the Asian-Pacific economic cluster is 324%.

Finally, in the third step of the analysis we move to the group of countries belonging to the EU to capture the effect of the European currency union, which introduced the Euro as a common currency in a subset of EU countries since 1999. Columns 2.5 (with CFE and YFE) and 2.6 (with CYFE) show the positive effect for international tourism in member countries of the currency union: *ceteris paribus*, sharing the common currency increases tourism arrivals by 23% and 88% in Column 2.5 and 2.6 respectively. While the exact impact of the EMU depends on the specification chosen, the positive effect of the currency union within the Eurozone is undoubtedly strong, and consistent with previous literature (Gil-Pareja et al 2007; De Vita 2014; Santana-Gallego et al 2015).

The likely cause of this positive impact stems from reduction of transaction costs linked to currency conversion, price transparency and stability, improved competitiveness and a better macroeconomic environment. It is worthy to notice that the coefficient of EMU stays positive and significant (although at the 5% level only) also when specifications 2.5 and 2.6 are run for all OECD countries (not shown here, but full results are available from the authors upon request. However, the effect is lower: with CFE and YFE the coefficient implies a positive impact of 12% on international tourism, while with CYFE the estimated impact is of 25%).

To track the EMU effect even more accurately over time, we also undertake the analysis with a series of interaction dummies between EMU and years, called EMU_XX, where XX stays for every year in which a country pair has been part of the EMU. Columns 2.7 (with CFE and YFE) and 2.8 (with CYFE) suggest that a “dilution effect” over time of the currency union might be at work: results show quite robustly that EMU membership increased bilateral tourism arrivals between member countries since its introduction in 1999, reaching its peak during 2002 and 2003, years in which we find the highest coefficients, and then decreasing. The close inspection of coefficients then shows that the effect of EMU on tourism is mainly stemming from the parity conversion of 1999 (through its advantages in terms of transparency, price comparability and stability), while the real introduction of Euro coins and notes only had a marginal effect. Our results are therefore only partially supporting the findings by Santana-Gallego et al (2015) who found instead that the introduction of the Euro coins and notes had a more advantageous impact on tourism flows than the parity conversion (perhaps this difference in results is due to the different method that they used to estimate pre-Euro years). Finally, Columns 2.7 and 2.8 suggest that the positive effect for tourism of being part of the currency union fades away in recent years: coefficients, although positive, are not significantly different from pre-Euro years. Since our estimations also include year dummies that control for business cycle effects, it is unlikely that the recent economic crisis has to be blamed for. On the contrary, it is more likely that the effect of the EMU on tourism is temporary, or short-lived.

[INSERT TABLE 3 AROUND HERE]

As highlighted in the methodology section, FE-OLS estimates suffer from heteroskedasticity (which cannot be solved using robust standard errors) and selection bias (due to the presence of many zero observations). To address these issues, more robust estimators can be used, namely the Poisson pseudo-maximum likelihood (PPML) estimator and the Heckman estimator. We start the sensitivity analysis carried out in Table 3 by showing, in Columns 3.1 and 3.2, the results using PPML. Noteworthy differences between the PPML estimates and those of FE-OLS include some of the control variables, which are weakly significant with PPML. Also the relevant coefficients are somehow different from the basic FE-OLS specifications of Table 2. In particular, OECD is positive and significant in the CYFE model, BRIC is weakly significant in the CFE + YFE model, while MENA is significant in the CYFE specification only. Keeping in mind that Hornok (2011) shows that CYFE absorb too much of the variation in the data, which make the interpretation of the policy dummy less meaningful, not too much should be read into the results of the CYFE estimation (Column 3.2).

Concerning sample selection bias, it is noteworthy that the estimates for the FE-OLS are based on almost 24,000 observations compared to the approximate 33,000 of the PPML estimates, indicating that almost 9,000 observations are dropped because of missing data. Missing data can stem from gaps in the data collection procedure or, as it is likely in the case for our dataset, because bilateral tourism flows between two countries are recorded only if they are above a certain threshold. Marginal tourism flows from origin countries to destinations are in fact grouped together by the UNWTO under the “other countries” label if they are below a certain threshold for each destination country. Hence, we could consider, without loss of precision, those missing data as zero (or close to zero) observations. This allows us to tackle the issue from the Helpman *et al* (2008) perspective and use the Heckman estimator. Both the full information maximum likelihood (ML) and the two-step procedure (2STEP) were executed although we only show the maximum likelihood results in Table 3 with the response equation (Column 3.4) and selection equations (Column 3.3) for the specification with CFE and YFE. The results of the two-step procedure confirm the maximum likelihood estimates and are available from the authors upon request.

To start with, it is clear from the values and the statistical significance of rho that sample selection bias is an important issue in our full dataset, and that Heckman estimates provide more consistent estimates. The selection variables included (COMLANG and COLONY) are significant and positive, and the estimates of the response equations are very similar to that of FE-OLS estimates: we find a positive and significant coefficient for MENA, an insignificant coefficient for BRIC, while the coefficient of OECD is now negative and significant.

Moving to the second step, and analysing the OECD club (plus Malta, Cyprus, Slovenia and China) through PPML, we find that, consistently with Table 2, ASIA has a positive and significant coefficient in both specifications (Columns 3.5 and 3.6). When the specification includes CYFE (Column 3.6), NAFTA has a positive and significant coefficient together with EU, although this should be interpreted with caution given the caveats explained. In column 3.5, which controls for country-specific effects using both the MRT, CFE and YFE, NAFTA and EU are not significant.

In Columns 3.7 and 3.8, the full information maximum likelihood (ML) results for the Heckman equations with CFE and YFE are reported, with the response equation in columns 3.8 and the selection equation in column 3.7. Again, results are consistent with PPML and with FE-OLS and show positive and significant coefficients for EU, ASIA and NAFTA in the response equations, although the EU dummy is only significant at a 10% level. However, the insignificance of rho indicate that sample selection bias and zero observations are not a serious problem in the OECD sub-sample of the dataset.

Finally, the robustness analysis of the third step shows that, for the sub-sample of EU countries in the dataset, the coefficient of EMU is insignificant when the PPML estimator is used in both specifications (CFE and YFE, Column 3.9; CYFE, Column 3.10). The coefficient of EMU is insignificant also in the response equation of Heckman model (which is not shown due to limited space). However, the value of rho, which is not statistically significant, indicates no correlation between the error terms of the two equations and suggests that PPML and FE-OLS estimates do not suffer from sample selection bias. The coefficient is positive and significant in the selection equation, suggesting that sharing the Euro might increase the probability of selecting tourism in another EMU country, being consistent with the idea that sharing the currency drops the “fixed” transaction costs linked to international tourism.

Bilateral tourism flows as dependent variable

Table 4 is equivalent to Tables 2 and 3, but reports the gravity results where the dependent variable is total bilateral tourism between countries *i* and *j*, and not arrivals from *j* to *i*. The variable is compiled by adding, for each country-pair, arrivals and departures between the two countries. It is therefore completely equivalent to the measure of total trade between country-pairs (sum of export and import) used in standard gravity models in trade literature.

With total travel as dependent variable we have four important implications for the gravity specification: first, the key variables of the gravity equation (GDP per capita and population) should be estimated by multiplying the values of GDP per capita of the two countries, and the same should be done for population, as recalled in eq. (3). Second, the value of total travel between a pair of countries in a specific year is the same for both countries: hence the concepts of destinations and origin countries are not relevant any more and the number of observations halves in the dataset. Third, if one of the two figures of arrivals is missing, total travel for both countries is coded as missing: hence, the number of observations that can be included in the regression further diminishes. Fourth, CPFE are more precise than CFE in capturing the effect of time-invariant factors that are correlated with bilateral tourism. The specifications of Table 4 are then including CPFE and YFE.

[INSERT TABLE 4 AROUND HERE]

Compared to Table 2, the results for the main control variables (i.e. level of trade, GDP per capita and population) are very similar to those found when tourism arrivals are considered. Concerning the first step, which focuses on three mutually exclusive trade agreements and economic co-operation and trade blocs, Column 4.1 shows that bilateral tourism flows are positively associated with the total size of the population, the level of personal income and the volume of past trade (which is again lagged to avoid reverse causality). Results shown in Column 4.1 using CPFE and YFE are robust with those of Table 2 (Columns 2.1 and 2.2): MENA has a positive and significant coefficient while the coefficients for OECD and BRIC are not significant.

Moving to the second step, we confirm again results of Table 2: EU is insignificant (Column 4.2), while NAFTA and ASIA are positive and strongly significant in both regressions. Finally, moving to the third step and limiting the analysis to the effect of EMU within the European Union, we find insignificant results (Column 4.3), even when we extend the analysis to the sub-set of OECD countries (results of this specification available from the authors). The lack of significance of EMU is reflected by the more careful analysis where the interaction terms between year dummies and the EMU is included (Column 4.4). Differently from the analysis on Arrivals, there is no significant effect of EMU on total tourism flow neither at its introduction (1999), nor when notes and coins started circulating (2002), nor in more recent years. On the different results between Arrivals and Total tourism when EMU is investigated we will return in the conclusions.

Finally, similarly to the robustness analysis carried out in Table 3, the remainder of Table 4 shows the gravity model estimates using alternative estimators (PPML and Heckman) in order to tackle the problems of zero observations and sample selection bias. It can be noted that the model regressing total tourism flows does suffer from sample selection bias, since the value of rho is significant (see Columns 4.6, 4.9 and 4.12). Although the low number of degrees of freedom exacerbates multicollinearity and problems of estimation in some of the specifications (see Columns 4.5 and 4.8), results are robust to the basic analysis of total tourism flows carried out in Table 4 (except the non significance of ASIA in Heckman's model (Column 4.10). An interesting observation though is that in the EU sub-sample, the EMU is highly significant in the selection equation (Column 4.12), albeit not in the response equation (Column 4.13).

Conclusions

In economic theory the effects of forming trade blocs (from informal tighter economic co-operation to formal organizations as currency unions) are widely discussed and one of the main advantages is identified in the positive effect that they have on international trade flows. In this line of research, Gil-Pareja *et al* (2007) studied the influence of the EMU on tourism flows, followed by a series of studies analysing the impact of different trade agreements and currency unions on international tourism: Santana-Gallego *et al* (2010a, 2010b, 2015, 2016) and De Vita (2014) are among a few others.

Our paper contributes to this literature in many respects: Firstly, we attempt to generalise results by expanding the size of the dataset in the number of countries under investigation (58 in total), also including emerging economies and countries not previously considered (within the region of Middle East and North Africa, Australia, Brazil, Chile, China, Russia, India and Israel). A panel data of more than 52,000 observations from 1995 to 2010 is used in the estimation, and a typical gravity approach is applied.

Secondly, this paper also tests the impact of a wide variety of trade agreements: (semi)formal and global organizations (OECD), informal and global economic integration agreements (BRIC), informal and regional agreements (MENA, ASIA) and formal and regional agreements (NAFTA, EU, EMU). Through the analysis of results we can test whether formal trade agreements create more significant benefits that pluri-lateral co-operation agreements. Similarly, we can test whether geographical considerations are more conducive to international tourism flows than economic and political co-operation: in other words, is geography more important than politics for tourism development?

Thirdly, we test the robustness of previous researches' findings through the use of alternative econometric specifications and estimation techniques, which have been demonstrated to be more effective in tackling problems of heteroskedasticity and sample selection bias stemming from zero observations, that are likely to be encountered in gravity models but mostly ignored in the tourism literature.

Fourthly, an important feature of this work is the estimation of the gravity model also using a measure of "total tourism" (constructed as the sum of arrivals from country *i* to country *j* and from country *j* to country *i*, in any country pair) as alternative dependent variable. This variable mimics the role played by the sum of imports and exports in traditional gravity models of international trade.

The main results of the research can be listed as follows:

First, there is a relevant degree of heterogeneity in the results: different formal agreements or different informal trade partnerships have different effects on tourism, likely depending on the level of tourism specialisation, economic development and geographical cohesion among the partnerships. The regional partnership of MENA countries is certainly more effective for international tourism than the OECD organisation. Similarly, the EMU has triggered tourism more than the EU has done. The policy implication of this result is straightforward: the complexity of international economic relationships indicates that tourism flows are not responding consistently to the strengthening of trade partnerships among groups of countries. It is likely that the positive economic effects on tourism triggered by tightened trade relationships spread over the different countries depending on the idiosyncratic characteristics of regions of origin and of destination, not showing any strong systematic lesson on the average.

Second, throughout the results, it is evident that regional cooperation agreements are more effective than global agreements: on top of the role played by distance and contiguity in gravity models for tourism, there is an extra advantage stemming from strengthening economic co-operation in regions of countries sharing, together with vicinity, similar cultures and economic conditions: the more robust positive effects are found for regional agreements and partnerships: MENA, ASIA, NAFTA, while global partnerships (OECD, BRIC) have a much lower, if not insignificant impact. Geography, in other words, seems to be more important than politics.

Third, the level of "formality" or binding in the co-operation agreements do not seem to be correlated with the effect on tourism: Strong formal market unions such as the EU and NAFTA have very different effects on tourism, while very similar effects are shared by formal agreements and informal trade blocs such as NAFTA and ASIA. In this respect, the impact of the strongest of trade agreements, the European Currency Union, is controversial. While the basic specification shows a strong effect of the Euro on tourism in the single-currency area, similar or even stronger than the one estimated by previous research, results are not robust to the use of estimators tackling problems of sample selection bias and heteroscedasticity: econometric issues might then play a role. Moreover, the insignificant coefficients for EMU found when the dependent variable is total bilateral tourism flows might suggest strong asymmetries of tourism flows within country pairs, which have to be further investigated.

Fourth, it can be argued that agreements are more effective in the first years of life: on one hand, the fact that the coefficients of EMU are higher in the early years of the European currency union when tourism arrivals are used as dependant variable (which is consistent with previous findings, see Santana-Gallego *et al* 2015), suggests that the effect is not ever-lasting and seems to taper down until it stagnates or becomes negative. This result would also imply that late joiners into a currency union cannot expect to reap the same benefits in terms of tourism as early joiners. On the other hand, the low significance of “older” agreements (like OECD and the EU in which there is also very little variation in their composition in the period under scrutiny) in most of the specifications might imply that those agreements already exhausted their effects. In other words, economic co-operation might have a temporary, not permanent, effect on international tourism. Hence, policy makers should be aware that the expectations of permanent positive effects on international tourism stemming from economic integration are ill-founded.

Fifth, the introduction of bilateral tourism flows as an alternative dependent variable to arrivals and the use of Heckman and PPML estimators is found to be useful: on the one hand they provide further robustness checks to previous and current findings; on the other hand they pave the way for further research in areas where results are less stable and consistent, as in the case of the EMU.

The sensitivity analysis carried out in this paper suggests that technical issues in the setting of the econometric specification are key in the interpretation of the results, and that the positive impact estimated also by previous research might partially stem from problems of heteroskedasticity and bias in the dataset.

As most of the empirical analysis, even our research has to be considered a work in progress. While our research addresses some of the methodological issues often found in gravity models, it does not explicitly deal with the problem of endogeneity. Popular methods to address endogeneity include the use of instrument variables and therefore the estimation of a two-stage least square regression, or estimations using a generalised method of moments (GMM) estimator (such as De Vita, 2014). However, Santana-Gallego *et al* (2016) found little difference in their results using a fixed effect two-stage least square estimator compared to the FE-OLS.

Further refinements in this field of investigation might originate from enlarging the dataset, both in the time and cross-section dimensions as well as the trade agreements and partnerships under scrutiny, jointly with a more careful analysis of the alleged temporary effect and of the creation and diversion effects of trade agreements in the vain of Santana-Gallego et al (2015) research on the EMU. Finally, should data related to domestic tourism be available, one would be allowed to test the existence of any substitution effect between domestic and incoming tourism as a consequence of stronger international economic integration: a comprehensive analysis of tourism creation and tourism diversion effects has indeed to consider total tourism within countries.

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i BRIC is a dummy variable that takes the value of 1 only for years from 2006 onwards, since this coincides with the first BRIC summit.

ii http://www.oecd-ilibrary.org/trade/data/international-trade-by-commodity-statistics_itcs-data-en

iii http://www.cepii.fr/welcome.asp