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Liberalising Trans-Pacific Trade: An Ex-ante Assessment of the Mexico-South Korea FTA-to-be*

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This paper presents an ex-ante assessment of the FTA between Mexico and South Korea that has been under negotiation since 2007. It seeks to go beyond previous studies on this issue by including a more comprehensive analysis of trade and investment flows and a more rigorous appraisal of the trade potential between the two economies by means of a gravity model of trade fitted on a panel dataset for the 21 APEC member economies. The aim was to determine whether this agreement can be beneficial for both countries and, in passing, to contribute to the development of a more objective rationale for this purpose. Overall, the results point to the conclusion that an FTA can in fact be beneficial for both partners. On the other hand, the methodology adopted proves to be pertinent as a first step in the development of such rationale.

JEL Classification: F13, F14, F15

Keywords: Mexico, South Korea, free trade agreements, trade potential, gravity models

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1. INTRODUCTION

The ideal of achieving free and open trade in the Pacific Rim[1)] has been cherished by all the governments and international cooperation bodies in the region for the last several decades. This has been especially the case of the large trans-Pacific organisations that have been set up to promote economic exchange and cooperation in this part of the world: the Pacific Basin Economic Council (PBEC), the Pacific Economic Cooperation Council (PECC), and the Asia Pacific Economic Cooperation Forum (APEC).[2)]

The youngest of those organisations, APEC is also the ablest thanks to the direct involvement and participation of the heads of state and/or government of its member countries in its tasks and initiatives who pledged to achieve free and open trade among them in their summit meeting in Bogor, Indonesia in November 1994. This goal was to be reached no later than 2010 and 2020 in APEC's developed and developing economies, respectively, "in a GATT-consistent manner" (http://www.apec.org) and in line with the concept of open regionalism.[3)] The task was meant to be accomplished by way of trade policy instruments consistent with those principles.

Accordingly, APEC formally adopted a non-discriminatory, multilateral approach to trade liberalisation via non-binding accords in tune with the rules established first by the General Agreement on Tariffs and Trade (GATT) and then by the World Trade Organisation (WTO), especially the most favoured nation (MFN) clause. In practice, however, most of its members soon started to resort to binding instruments instead in the form of bilateral free trade agreements (FTAs) and plurilateral regional trade arrangements (RTAs).

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1) Refers to the trans-continental region formed by all the states and territories lying on the Western and Eastern sides of the Pacific Ocean.

2) APEC was launched in 1989 with representatives from 21 economies, PECC in 1980 as a tripartite organisation with representatives from 25 countries, and PBEC in 1967 by business representatives from some 20 economies in all three cases from both the Western and the Eastern Pacific.

3) Put forward in the late 1970s by Japan's then Prime Minister Masayoshi Ohira, this concept basically refers to the idea of promoting the liberalisation of trade in a given region while simultaneously opening it up to the rest of the world. See Kuwayama (1999) for a detailed discussion of the several ways in which this concept has been defined.

APEC itself officially ended up endorsing and even praising the use of FTAs and RTAs to advance trade liberalisation in the Pacific (http://www.apec.org/en/Groups/Other-Groups/FTA_RTA.aspx).

As a result, FTAs and RTAs proliferated over the 1990s in the Western Pacific (Pomfret, 2009), giving rise to an intricate network of overlapping trade links that was dubbed as a "spaghetti bowl" (Baldwin, 2006; Baldwin and Thornton, 2008). In the 2000s the bowl extended across the Pacific with the signing of FTAs between Asian and American countries.

As active members of both APEC and all the other regional economic cooperation bodies, Mexico and South Korea have been keen advocates of free trade and trans-Pacific integration. Notwithstanding, the economic exchange they have maintained over the last half a century has been quite scant, so that the establishment of an FTA has appeared as a sensible strategy to expand that exchange. The task, though, is to prove that this is the case.

A number of studies have been produced to that end in government and academic circles in both Mexico and South Korea over the last years. These studies have mainly consisted of argumentative analyses of the economic and diplomatic links between the two countries or historical recounts of the talks and negotiations held so far between the two governments (e.g., Romero, 2011; 21st Century Commission, 2005), and evaluations of alternative kinds of accords considering possible scenarios (Uscanga, 2007). On those bases, the pros and cons of this FTA are then inferred or argued for.

The one reported in this paper seeks to go beyond those studies by including a more complete analysis of trade and investment flows as well as a formal assessment of the potential for enhancing trade exchange between the two economies by means of established econometric tools, specifically a gravity model of trade. A related goal is to contribute to the development of a more formal and systematic methodology for assessing the pertinence and desirability of this kind of agreements. The one in question is viewed as the most ambitious and promising initiative for increasing economic exchange between Mexico and South Korea and at the same time as a substantive step toward an effective liberalisation of trans-Pacific trade in general.

First, a cursory recount of previous bilateral trade accords signed by the two partners is presented, followed by a detailed examination of the main economic flows between the two countries over the last two decades. Against that backdrop, the potential for further trade between them is assessed by means of the gravity model referred to above. Finally, the results of all those analyses are discussed and their overall implications pondered. The exposition closes with some concluding remarks.

2. PREVIOUS ACCORDS AND THE STEPS TOWARD AN FTA

Economic and political interaction between Mexico and South Korea began formally with the establishment of full diplomatic relations in 1962. Commercial exchange proper was fostered a few years later with the subscription of a Trade Agreement between the Republic of Korea and the United Mexican States on December 12, 1966, the first trade accord ever signed by Mexico with an Asian country.

Bilateral ties were further strengthened in the late 1980s with the subscription, in 1989, of an agreement to promote economic, scientific and technical cooperation and, especially, the creation of the Mexico-South Korea Joint Commission. In September 1991 President Roh Tae Woo was in México and became the first South Korean head of state to visit a Latin American country.

The ties continued to be solidified over the following years with the signing of a series of bilateral agreements (double taxation and income tax evasion; cooperation in tourism; promotion and reciprocal protection of investments) and with the establishment, in June 2001, of the Mexico-Korea 21st Century Commission, a bi-national body charged with the mandate of formulating strategies to strengthen the diplomatic and economic relations between the two nations. Moreover, in 2005 the two governments decided to start negotiations toward a Strategic Economic Complementation Agreement

which was intended to encompass a wider range of areas of their economic exchange; the negotiations continued for several months but collapsed in late 2006.

Building on all the above initiatives, Mexico and South Korea agreed to begin negotiations for the establishment of a full FTA in December 2007. Although both governments have been officially committed thereafter to move forward with the negotiations, and ultimately to sign the deal, only one more round has taken place to date, in June 2008.

Nevertheless, the fact is that the two governments have remained officially committed to complete the project on the basis of their mutual conviction about "the necessity to tap the huge potential the relation between Mexico and the Republic of Korea holds" (21st Century Commission, 2005, p. 9). An examination of the exchange between the two economies over the last several decades will provide a proper perspective for a formal assessment of that potential.

3. TRADE AND INVESTMENT CROSS-FLOWS

3.1. Investment

South Korean investments began to land in Mexico in the late 1980s when Goldstar — now LG — and Samsung started to build plants for the assembly of colour TV sets in Tijuana in 1987 and 1988, respectively. Hyundai did so in 1991, Daewoo in 1993, and POSCO in 2006 (http://www.maquilareference.com). Up to the late 1990s, the amounts invested yearly were rather small, except for two years when the figures increased significantly, as table 1 shows.

Things improved slightly in the 2000s. As table 2 presents, annual flows in this period were larger and more consistent, surging up to US$350 million in 2008 and totalling nearly US$900 million dollars in this period vis-à-vis a little more than US$500 million in the 1990s. Most of the 2008 inflow

Table 1 South Korean Direct Investment in Mexico, 1989-1999 (Million US Dollars)

Year	Annual	Cumulative	% of Total
1989-1990	1.5	-	0.0
1991	2.5	4	0.1
1992	0.04	4.04	0.0
1993	8.4	12.44	0.2
1994	15.1	27.54	0.1
1995	103.7	131.24	1.2
1996	85.8	217.04	1.1
1997	199.2	416.24	1.6
1998	52.6	468.84	0.6
1999	46.2	515.04	0.3

Source: 21st Century Commission (2005), tables 2 and 3.

Table 2 South Korean Direct Investment in Mexico, 2000-2010 (Million US Dollars)

Year	Annual	Cumulative	% of Total
2000	30.2	-	0.2
2001	50.5	80.7	0.2
2002	31.8	112.5	0.1
2003	57.1	169.6	0.3
2004	47.6	217.2	0.2
2005	96.8	314.0	0.4
2006	72.1	386.1	0.4
2007	45.2	431.3	0.2
2008	367.6	798.9	1.5
2009	75.5	874.4	0.5
2010	–3.6	870.8	0.0

Source: Foreign Investment National Registry, Ministry of the Economy.

corresponded to POSCO's investment in a galvanised steel sheets plant in Tamaulipas whose construction began that year.

In any event, South Korean investments have been flowing into Mexico consistently for all those years. As a result, as many as 1,434 companies with South Korean capital were operating in Mexico by 2010, as Mexico's Ministry of the Economy reported; these include LG, Samsung, Daewoo, and POSCO. Only LG and Samsung are said to have exported jointly US$7 billion in 2009 from their subsidiaries emplaced in Mexico (Velazco, 2010).

However, those investments have not been as significant in relation to Mexico's total inflows of FDI. As tables 1 and 2 present, South Korean capitals have respectively accounted for only 0.5 and 0.4% in average of total yearly inflows over the last two decades. Between 1999 and 2006, though, South Korean investment accounted for 7.8% of investments coming from Asia Pacific countries so that it ranked third among them (DGIE, 2006, p. 2). In any case, the fact remains that there is a huge room for South Korean companies to invest in Mexico and tap into the myriad market niches and business opportunities this Latin American partner offers to them.

In contrast, according to the Mexico-South Korea 21st Century Commission, cumulative Mexican investments in South Korea had barely reached US$200 million by mid-2005 (21st Century Commission, 2005, p. 59). According to the Korean Ministry of Knowledge Economy, capital inflows from countries of all the Americas except the United States and Canada amounted to US$7.2 billion from 2001 to 2010 out of a total of US$173.6 billion, i.e. only four percent of this latter figure (http://www.mke.go.kr). It can then be inferred that the proportion of those inflows corresponding to investments by Mexican companies was quite below four percent.

Significantly enough, that occurs when the outflow of Mexican capitals to other countries has increased unprecedentedly in the last few years. The Bank of Mexico reported that Mexican direct investment abroad amounted to US$5.4 billion only in the first quarter of 2010 (Rojas, 2010). That figure was as high as US$8 billion in the first half of that year, which amounted to

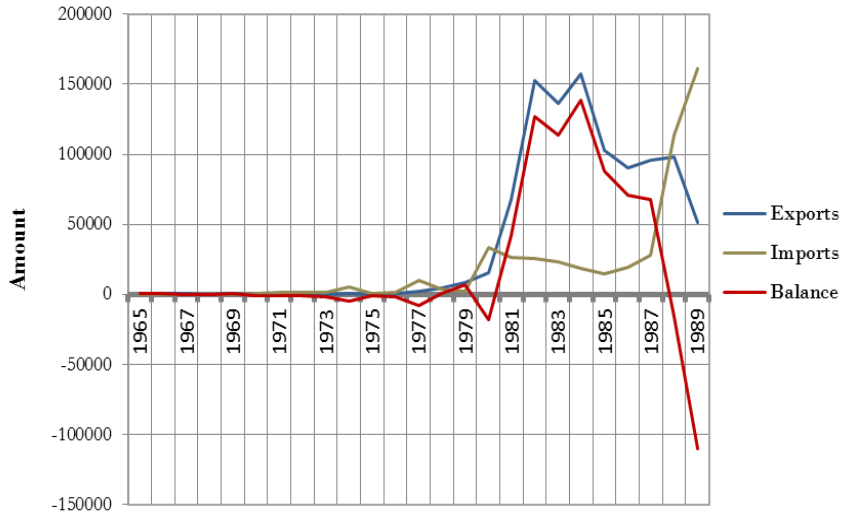
two thirds of total foreign investment inflows (http://www.elfinanciero-enlinea. com.mx).

The point is then that the room for Mexican companies to invest in South Korea is much larger than that South Korean concerns have for investing in Mexico.

3.2. Trade

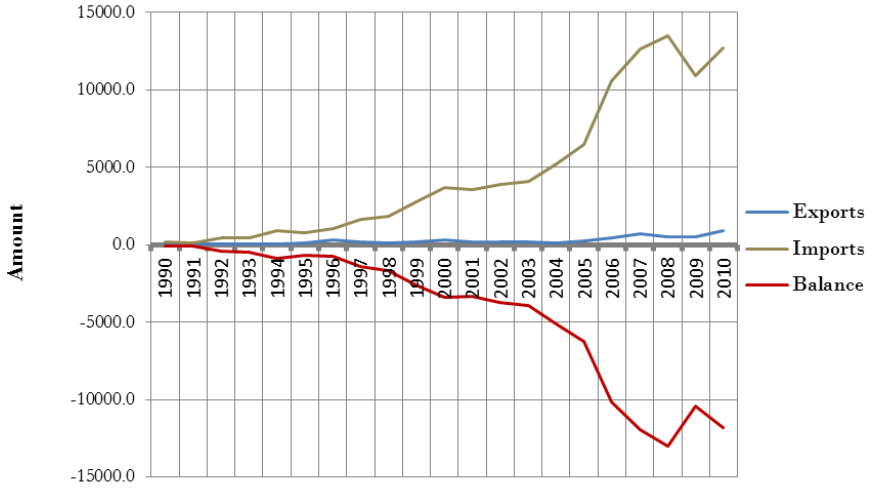
Commercial transactions between Mexico and South Korea have been increasing consistently since their respective governments signed their first bilateral trade accord in 1966. As figure 1 shows, Mexican exports to and imports from South Korea expanded and contracted in a similar pattern up to 1988. From that year on Mexico started to post negative trade balances.

Figure 1 Mexico's Trade Balance with Korea, 1965-1989 (Thousand US Dollars)



Source: Table A1, in the Appendix.

Figure 2 Mexico's Trade Balance with Korea, 1990-2010 (Million US Dollars)



Source: Table A2, in the Appendix.

Indeed, Mexican exports to South Korea stagnated up to the late 1970s but exploded in the early 1980s. Thus, except for 1980, Mexico registered a positive trade balance in the last two years of the 1970s and most of the 1980s, posting large surpluses around the middle of the latter decade. At that time, though, Mexican exports started to decline and imports started to surge so that the balance turned negative in 1988.

Those trends continued into the 1990s and 2000s. As figure 2 illustrates, Mexican exports stagnated again throughout these two decades the same as in the 1960s and 1970s. Conversely, Mexico's imports from South Korea kept increasing consistently up to 2008 and although they contracted a bit the following year, started to expand again in 2010.

In any case, Mexico's trade balance with this Asian partner has been consistently and increasingly negative during that protracted time span as a result. Conversely, of course, South Korea's trade balance with Mexico has been consistently and increasingly positive throughout the same period.

Notwithstanding, South Korea was México's overall sixth trading partner

(and its 26th buyer and 4th supplier) in 2009. In the context of Asia Pacific, South Korea was México's third trading partner (and its 5th buyer and 3rd supplier) in that same year (http://www.economia.gob.mx).

In spite of those imbalances, it is significant that the actual trade between the two countries is not of the sort of that between an industrialised and a developing economy. As Box 1 shows, except for salt and beer, all the major products exported from Mexico to South Korea are industrial goods.

Box 1 Mexico's Top Exports to Korea

- Zinc ores	- Aluminium scrap	- Mono blocks
- Lead ores	- Refined lead	- Alternators
- Copper ores	- Copper mattes	- Acrylonitrile
- Silver ores	- Cement coppers	- Pre-tanned bovine hides
- Remote control units	- Galvanized steel sheets	- Strontium carbonate
- Memory sets	- Pistons and cylinder liners	- Alloys
- Modular circuits	- Rings and valves	- Salt
- Cell phones	- Cylindrical gear	- Malt beer

Source: Under Ministry of International Trade Negotiations, Ministry of the Economy, Mexican Government.

Box 2 Mexico's Top Imports fom Korea

- Flat-screen set sub-assemblies	- Washing machines
- Modular circuits	- Filters
- Hybrid integrated circuits	- Electrical wires and harnesses
- Cell phones	- Moto compressors
- Memory sets	- Styrene copolymers
- Semiconductors	- Epoxy-glass
- Remote control sets	- Components for starters and alternators
- Parts for fixed-line telephone sets	- Gasoline

Source: Under Ministry of International Trade Negotiations, Ministry of the Economy, Mexican Government.

Likewise, as Box 2 details, all Mexican imports from South Korea are, as can be expected, of an industrial nature too. In this case, the most unlikely item is gasoline given that Mexico is a major producer of crude oil and petrochemical products and South Korea is a net importer of petroleum-related goods in general.

Table 3 Mexico's Top Five Exports and Imports, 2009 (Billion US Dollars)

Exports			Imports		
Product	Value	%	Product	Value	%
Crude Oil (Petroleum)	25.9	11.3	Gasoline	8.3	3.5
Flat Screen TV Appliances	15.7	6.8	Parts for TV Sets	6.6	2.8
Automobiles	11.3	4.9	Electronics Parts	3.9	1.7
Mobile Telephones	9.4	4.1	Mobile Phones	3.3	1.4
Gold Products	3.6	1.6	Automobiles	2.4	1.0
Other	163.7	71.3	Other	209.9	89.6
Total	229.6	100.0	Total	234.4	100.0

Source: Prepared by the author with data from the Under Ministry of International Trade Negotiations, Ministry of the Economy, Mexican Government.

Indeed, as table 3 presents, crude oil is Mexico's top export staple which accounts for over 11% of the country's total exports. Conversely, gasoline is its top import although it accounts for only three and a half percent of total imports. This further illustrates the paradoxical case of gasoline in the commercial exchange between Mexico and South Korea, which adds to the quantitative imbalances referred to above.

The point is that trade between these partners is not as asymmetrical as their differences in industrial and technological development might imply. In fact, its composition departs from the typical one between Asia and Latin America: exports from the former to the latter consist of goods like motor vehicles, communication and electronic devices, and some intermediate goods like textiles, fabrics, iron and steel; in turn Latin American exports to Asia consist largely of commodities like iron ore, soybean, copper, paper and food for animals (García-Herrero, 2011, p. 2). But this also occurs in the case of the United States. As Tompkins and Cubitt (2003) observed, U.S. imports from Asia-Pacific mainly consist of computers, auto parts, electronics and other consumer goods, while U.S. exports to that region are mostly commodities like wheat, corn, soybeans and pork, as well as manufactured goods.

In any event, a more formal assessment of that exchange will shed light on the potential that can actually exist for further trade between these transpacific partners.

3. ASSESSING THE TRADE POTENTIAL BETWEEN MEXICO AND SOUTH KOREA

The decision to sign a full FTA between Mexico and South Korea requires an objective and convincing rationale based on a proper assessment of the potential for trade to expand between the two economies. To this end, a statistical analysis of their cross-trade flows was performed by means of a gravity model of trade, an econometric tool that has proved to be adequate and efficient for this task.

Since Linnemann (1966) put forward the first elaborate formulation of their analytical potential and Anderson (1979) laid down the corresponding theoretical foundations, gravity models have been widely used as an effective tool for analysing the structure and behaviour of trade interactions between regions and national economies (Baldwin, 1994, p. 70).

Given the purpose of this study, the model specified here was fitted on a panel dataset. Although they have been questioned for their supposed inability to estimate the parameters of the model in a consistent way (Fontoura *et al*., 2006; Santos Silva and Tenreyro, 2005), panel datasets have several advantages vis-à-vis cross-sectional and time-series (Brüderl, 2005; Frees, 2004; Hsiao, 2003). Among others:

- Contain a much larger number of observations
- Allow more variability and more degrees of freedom
- Decrease collinearity among explanatory variables and so produce more efficient estimators
- Standard errors become smaller and so efficiency increases
- Allow to control for unobserved heterogeneity, the fundamental problem of non-experimental research

- Provide means for resolving, or at least reducing, the problem of omitted or unobserved variables that are correlated with the explanatory variables

In general, gravity models fitted on panel datasets have the advantage of capturing the variation of the predictors stemming from features unique to each entity, i.e., their unobserved heterogeneity. Hence, they have been employed by a long spate of authors including: Wang and Winters (1991), Hamilton and Winters (1992), Egger (2002), Egger and Pfaffermayr (2003), Baldwin (1994), McCallum (1995), Brülhart and Kelly (1999), Fontoura *et al*. (2006), Rahman *et al*. (2006), Armstrong and Drysdale (2009); and, Ozdeser and Ertac (2010). The model specified here draws on this tradition.

3.1. Data

As pointed out earlier, the assessment of the trade potential between Mexico and South Korea was approached from the broader perspective of trans-Pacific trade liberalisation. Hence, APEC's member economies offered a useful statistical framework for the task given that an FTA between these two countries would operate under APEC's institutional and geographic context. A similar approach was adopted by Egger and Pfaffermayr (2003) who studied bilateral trade among 11 APEC countries for the period 1982-1998. Likewise, Nandasiri and Hur (2008) used an augmented gravity model fitted on panel data for the period 1997-2005 to assess the impact of FTAs on the trade diversion and creation effects of regional blocs in Asia Pacific.

In consequence, the dataset assembled in this case consists of 21 panel units with yearly observations for a 20-year period spanning from 1990 to 2009. A detailed description of the sources, limitations, and main features of the data making up this dataset is presented in the Appendix.

As explained in that appendix, the dataset's size and extent were ultimately determined by the availability of data on the dependent variable in its main source: the UN Comtrade database. Thus, the data on the explanatory variables included in the model were compiled only for the years for which

data on bilateral imports were available in that database.

3.2. Specification of the Model

The one fitted here is an augmented gravity model of trade. It is augmented insofar as it includes two variables — GDP per capita and adjacency — in addition to the core explanatory variables originally considered in this kind of models, i.e., GDP and distance.

Although there is no general consensus about the inclusion of population variables in gravity models, some economists (e.g., Harris and Mátyás, 1998) use total population as an independent variable. GDP per capita has also been considered as a relevant explanatory variable and so has been used by many authors including Wang and Winters (1991), Baldwin (1994), Egger (2002), Martínez Zarzoz and Nowak Lehmann (2003), Egger and Pfaffermayr (2003), and Tang and Wang (2006).[4] On those bases, GDP per capita was included in the model specified here as a measure of each APEC economy's relative size as weighted by the size of its population. Moreover, since it reflects the level of income as Head (2003) notes, GDP per capita is also a measure of both the propensity to trade and the tariff level of the trading countries or regions involved.

Adjacency was included to account, together with distance, for the barriers to trade between each country pair. Distance was represented with data on great circle distances between capitals which, as Baldwin (1994, p. 73) put it, is a strategy that "is at least extremely transparent".

Therefore, the explanatory variables that were included are: GDP, GDP per capita, distance, and adjacency or lack thereof. Although exports are widely used, the magnitude that was selected in this case as the dependent variable was bilateral import flows between each pair of APEC countries. This choice was based on the observation that governments tend to record imports with more care and accuracy than exports (Baldwin, 1994).

In general, the choice of the variables included is in line with the basic

[4] GDP per capita is also used as a proxy of a country's capital-labour ratio (Egger, 2002).

rationale of gravity models. As Egger (2002, p. 297) stated, "According to the traditional concept of the gravity equation, bilateral trade can be explained by GDP and GDP per capita figures and both trade impediment (distance) and preference factors (common border, common language, etc.)". It is also in tune with the views of economists like McCallum (1995) whose celebrated "border puzzle" about trade among Canadian provinces and between the latter and US states was based on a model that included provincial GDP and distance as its core explanatory variables. Furthermore, it is consistent too with the views of Anderson and van Wincoop (2003) who endorsed and complemented McCallum's model by adding other variables meant to account for what they termed as "multilateral resistances," which constituted a significant contribution to strengthening the theoretical foundations of gravity models.

Other economists include additional variables such as FDI flows, exchange rates, FTA or RTA membership, and others that account for macro or global influences. However, the inclusion of particular variables in addition to the gravity models' core predictors has to be expressly dictated by the specific form of and the theoretical framework within which each model is specified. Otherwise, there is no proper way to know how many and which variables to include or exclude (Armstrong and Drysdale, 2009).

As it is commonplace, the parameters of gravity models fitted on panel data can be estimated using either fixed-effects (FE) or random-effects (RE) estimators. Each of these has its own merits and limitations, so their suitability depends on the nature of the data used and the objectives of the model in question.

A fixed-effects estimator is always consistent but not always efficient, while a random-effects estimator tends to be more efficient but not always consistent. The main issue, though, is whether endogeneity is present or not in the model or, in formal terms, whether:

$$\text{Cov}(x_{it},\, e_{it}) \neq \text{ or } \text{Cov}(x_{it},\, e_{it}) = 0.$$

This issue can be resolved by means of a Hausman test which basically determines whether endogeneity is present and whether the model is well specified and consistent with the data used (Hausman, 1978). If endogeneity is not present then the FE estimator would be biased and inconsistent and so not suitable for estimating the parameters of the model. Conversely, if endogeneity exists, the RE estimator would be biased and so would not be efficient for that estimation; hence FE would be the right estimator in this case.

The model specified here was estimated using both methods in order to generate the elements required for running a Hausman test. On the other hand, since all gravity models are derived from Newton's gravity equation, all the variables are expressed in natural logarithms, except for adjacency which is represented by a dummy. On those bases, the model estimated was the following:

$$\ln y_{it} = \beta_1 \ln GDPi_{it} + \beta_2 \ln GDPx_{jt} + \beta_3 \ln GDPcapi_{it} + \beta_4 \ln GDPcapx_{jt} + \beta_5 dist_{ij} + \beta_6 border_{ij} + \alpha_i + \varepsilon_{ijt},$$

where:
$\ln y_{it}$: stands for imports from country *j* to country *i*,
$\ln GDPi_{it}$: for the importing country *i*'s GDP,
$\ln GDPx_{it}$: for the exporting country *j*'s GDP,
$\ln GDPcapi_i$: for the importing country *i*'s GDP per capita,
$\ln GDPcapx_j$: for the exporting country *j*'s GDP per capita,
$\ln dist_{ij}$: for the great circle distance between country *i*'s and *j*'s capital cities,
$border_{ij}$: for whether a common border exists in each country pair,
α_i : for the unknown intercept for each panel entity (country), and
ε_{ijt} : for the error term.

The FE method was chosen subsequently to estimate the model's coefficients in view that it focuses on within-group variation and controls for the effects of the countries' fixed characteristics. Thus by using observations

on each country for several years, this method permits one to remove the omitted variable bias incurred when using conventional time-series or cross-section models which can only capture between-group variation. In other words, FE controls for the influence of omitted factors that may be correlated with the predictors within each panel.

3.4. Model Results

Table 4 summarises the results of the regressions performed on the above model, as well as some basic references about the dataset on which they were run.

Table 4 Panel Regression Results for Bilateral Imports among APEC Economies 1990-2009

Independent Variables	Fixed Effects	Random Effects GLS
Log of Importing Country GDP	**0.0767** (0.1206)	**0.5881** (0.0684)
Log of Exporting Country GDP	**0.9622** (0.0104)	**0.9605** (0.0104)
Log of Importing Country GDP per Capita	**0.6442** (0.1416)	**0.1144** (0.0822)
Log of Exporting Country GDP per Capita	**0.0096** (0.0133)	**0.0077** (0.0133)
Log of Distance	**–1.1828** (0.0233)	**–1.1824** (0.0233)
Border	**0.1233** (0.1074)	**0.1300** (0.1076)
Constant	**–2.4259** (2.0459)	**–1.2394** (1.2638)
R^2 within	0.6557	0.6548
R^2 between	0.2319	0.8870
R^2 Overall	0.5319	0.6903
Hausman Statistic	-	0.0001
No. of Observations	7,149	7,149
No. of Country Pairs	398	398

Note: Standard errors are in parentheses.

As can be observed, all the coefficients are different from zero (Prob > F = 0.0000) and all the signs are in the expected direction so that the specification of the model can be said to be consistent with the basic rationale of gravity models. This consistency is also reflected by the rather high correlation coefficients (R^2s). This means that bilateral import flows between APEC countries were largely determined by their absolute and relative economic size as measured by total GDP and per capita GDP, the geographic distance between each other, and their being or not adjacent to each other.

Given that the Hausman test returned a *p*-value of 0.0001 it can be inferred that the differences among estimators are systematic. Likewise, since this value is below the 0.01 significance level adopted in the regressions the results can be said to be statistically significant and the presence of endogeneity can be established, i.e., Cov (x_{it}, e_{it}) $\neq 0$.

Therefore, FE was confirmed as the proper estimator in this case, as it is the one that, unlike RE, can produce unbiased estimates. In fact, since endogeneity is present in most panel data models, FE tends to be used more commonly than RE (Brüderl, 2005). The study reported in this paper is a case in point.

On those bases, the potential for further trade among APEC economies was estimated next following the usual procedure of plugging in the estimated coefficients into the model and fitting a linear projection of the actual trade flows that took place in the period under study.[5] This projection constitutes the counterfactual, i.e., the trade flows that could have been generated between each APEC country pair during that period if their respective production and export capacities had been used to the full.

Next, the ratios of potential — as represented by the projected figures — to actual bilateral imports were calculated in order to determine the trade that could have taken place between each country pair during the study period. A ratio higher than one indicates that yearly exports from the exporting to the importing country were below their potential levels and so that they can

[5] This procedure can be performed most efficiently nowadays with any major econometrics software package, especially Stata, the one used in this study.

increase beyond that period. In turn, a ratio smaller than unity means the opposite, i.e., that exports were above potential and so that there is no room for them to expand.

Tables A3 and A4 in the Appendix present the resulting trade potential ratios for the 398 pairs of APEC economies for the terminal year of the study period: 2009. The overly large ratios for Brunei, Peru and Russia owe to the overly small figures the U.N. Comtrade database records for their respective import flows for several years of that period.

It is significant that the highest average ratios are posted by APEC's Latin American economies: Mexico and Chile (Peru is put aside because of the said problem with the data on its import figures). The next highest averages correspond to Taiwan and New Zealand, on the Western Pacific. These are the four APEC members that have more room for expanding their imports from other fellow members. Overall, more than two thirds of the average ratios are positive, which indicates that bilateral exports among most — 14 of 21 — APEC economies were below their potential levels during the 1990s and the 2000s and so that they can increase in the future.

The picture is mixed when it comes to trade flows between Mexico and South Korea. In this case, the respective trade potential ratios were calculated for each of the 20 years of the period of the study in order to highlight the fluctuations in the size of that potential during this period. Table 5 presents the results.

In a clear instance of asymmetrical trade, all the ratios of potential to actual imports turned out to be negative for Mexico — except for 1990 and 1991 — and positive for South Korea over the two decades. This means that Mexican actual exports to South Korea were above the level they could have reached in those years and so that there is no scope for them to grow hereafter. This in turn can be taken to indicate that South Korea's trade barriers to Mexican exports have been lower than Mexico's to South Korean exports. Therefore, an FTA would be a suitable instrument to widen the access to Mexican markets for South Korean exports. Conversely, South Korean exports to Mexico were quite below their potential, so that the room

Table 5 Mexico and Korea: Bilateral Trade Potential Ratios (Imports)

Year	Importer	Exporter	Ratio	Importer	Exporter	Ratio
1990	Mexico	Korea	1.020	Korea	Mexico	1.085
1991	Mexico	Korea	2.907	Korea	Mexico	1.693
1992	Mexico	Korea	0.622	Korea	Mexico	2.648
1993	Mexico	Korea	0.707	Korea	Mexico	3.402
1994	Mexico	Korea	0.426	Korea	Mexico	2.726
1995	Mexico	Korea	0.472	Korea	Mexico	1.598
1996	Mexico	Korea	0.407	Korea	Mexico	1.456
1997	Mexico	Korea	0.276	Korea	Mexico	1.949
1998	Mexico	Korea	0.173	Korea	Mexico	3.021
1999	Mexico	Korea	0.158	Korea	Mexico	2.441
2000	Mexico	Korea	0.161	Korea	Mexico	2.564
2001	Mexico	Korea	0.167	Korea	Mexico	3.711
2002	Mexico	Korea	0.175	Korea	Mexico	3.827
2003	Mexico	Korea	0.195	Korea	Mexico	3.938
2004	Mexico	Korea	0.180	Korea	Mexico	3.747
2005	Mexico	Korea	0.182	Korea	Mexico	4.176
2006	Mexico	Korea	0.135	Korea	Mexico	2.927
2007	Mexico	Korea	0.131	Korea	Mexico	2.652
2008	Mexico	Korea	0.113	Korea	Mexico	2.486
2009	Mexico	Korea	0.106	Korea	Mexico	1.995
Average			**0.436**	Average		**2.702**

for them to grow has been large and can be larger if barriers to trade are reduced and let alone eliminated, a task that can also be accomplished by means of an FTA between these two otherwise economically similar trading partners.

In sum, the above results substantiate the argument that the subscription of

a trade agreement would be beneficial for both countries from an economic point of view. On the other hand, since they were gotten by means of an established econometric procedure, these results can be a relevant part of a formal and objective rationale for assessing the boons of this trade deal and thus for informing the decision to sign it.

A note of caution is in order, however. For the fact is that trade between two economies does not expand mechanically just because a given potential for it to increase is shown to exist. In other words, the mere existence of a given potential is not sufficient for bilateral trade to grow. As Fontoura *et al*. (2006) pointed out, in order for that potential to be realised and be mutually beneficial the trading partners involved have to be willing and able to do whatever it takes to make a better use of their respective production and export capacities. Only in this way will they be able to take the advantages and reap the full benefits an FTA can bring about.

That circumstance has to be considered seriously particularly by the Mexican government given that South Korea has a more industrialised, more technologically advanced, and far more productive economy than Mexico. For once tariff and non-tariff barriers to trade are reduced, let alone lifted, both the volume of goods and services the partners are able to trade with each other as well as the benefits that can be derived from the accord in question will only depend on their respective production and export capacities.

4. APPRAISING THE RESULTS

Overall, the results of the various analyses presented in the preceding sections point to the conclusion that the subscription of a full FTA can be a sound move for Mexico and South Korea alike. Therefore, it can be stated that, to begin with, these results substantiate the argument that the negotiations between the two governments, on hold for over nearly four years, should be resumed and, by extension, that the whole initiative be taken to completion.

The assessment performed by means of the gravity model indicates that there is ample room for South Korean exports to Mexico to expand. On the other hand, the negative trade balances that Mexico has consistently posted with South Korea over the last two decades indicate that there is a wide scope for Mexican exports to South Korea to increase as well. In both cases the most effective way to make that happen is to sign a full FTA for it can facilitate the abatement and eventual elimination of tariffs, secure a wider access to each other's markets exports, and level off Mexico's bilateral trade balance with South Korea.

Likewise, since the room for direct investment flows to increase is huge in both directions, especially from Mexico to South Korea, an FTA can also help for South Korea to pull down its barriers to FDI so that Mexican capitals could enter more freely to South Korea where they have been negligible so far. This seems quite likely in view of the recent surge of Mexican investments in other countries, including some in Asia Pacific. The myriad investment opportunities that exist in both economies will do the rest to enhance the flow of productive capitals between the two partners across the Pacific.

The pressing need for Mexico to diversify both its foreign trade markets and its sources of FDI reinforces those prospects. More than 80% of its exports still go to just one of its trading partners: the United States. By the same token, over half of Mexico's FDI inflows come from its northern neighbour: 52% in 2008, vis-à-vis 33% from Europe (Tagle, 2008).

South Korea shows a more balanced foreign market structure. Its main export destinations in 2007 were China with 22%, the European Union 15% the United States 12%, and Japan seven percent (WTO, 2008, p. 11). As for FDI, the Ministry of Knowledge Economy reports that of the total stock accumulated from 1962 to 2010, 34% came from Europe (20% only from the Netherlands), 25% from the United States, and 15% from Japan (http://www.mke.go.kr/).

In general, the point to stress is that the economic exchange between Mexico and South Korea has been below the level it can potentially reach

and quite meagre when looked at in absolute numbers. This has occurred despite the active participation both countries have displayed in all trans-Pacific economic cooperation bodies, especially APEC, and so the fact that they have been for decades strong advocates of the ideal of attaining free trade in the region. Like their fellow members in those organisations, the Mexican and South Korean governments pledged to reach that goal via non-binding, multilateral channels in tune with the concept of open regionalism. However, they are resorting once more to a binding, bilateral instrument in order to effectively liberalise their trade with each other and so to enhance it in a managed way with the certainty and formality only that kind of instruments can provide.

If it is considered that in 1993 Mexico posted a deficit of US$2.4 billion with the USA and that by 2009 that deficit had turned into a surplus topping US$72 billion under NAFTA (Villarreal, 2010, pp. 13-14), it can well be expected that the same can happen to this Latin American country under a full FTA with South Korea.

That prospect is reinforced by the fact that Asia Pacific has been a priority region for Mexico since the late 1980s, well before entering into the negotiations for NAFTA. Conversely, Latin American markets are considered as a major target in South Korea's FTA Roadmap since it was chartered in 2003. As a result, in 2009 South Korean exports to Latin America accounted for 20% of Asia's total, while Japan's did so for only 16%. In turn, Mexican exports to Asia only accounted for 9.5% of Latin America's total, a proportion well below those of Brazil and Chile which accounted for 44% and 27% respectively (García-Herrero, 2011, p. 3). It goes without saying that Mexico's low participation is a reflection of the notably low volume of Mexican exports to South Korea discussed above.

In sum, the results discussed in the foregoing paragraphs provide sufficient ground to assert that a full FTA can be beneficial for both Mexico and South Korea and, by extension, that the decision to resume the negotiations and finalise this accord can be well founded. However, this decision will depend crucially on the extent to which South Korean government is willing to

remove the tariff and non-tariff barriers it still has in place, in particular to ease its resistance to open up its primary sector markets to Mexican agricultural and agro industrial products; conversely, it will also depend on the willingness of the Mexican government to persuade the opposing sectors to overcome their fears and face competition from South Korean companies.

In any event, the decision at both ends will ultimately rest on considerations about the economic benefits each government perceives the agreement can entail for its respective country. The study reported in this paper provides statistical evidence that substantiate the perception that those benefits can in effect flow under the codes and provisions only a full FTA can provide.

5. CONCLUDING REMARKS

As discussed, for decades Mexico and South Korea have been firm advocates of non-binding, multilateral means to achieve free trade and trans-Pacific integration. Over the last several years, though, their respective governments have shared the conviction that an FTA can be beneficial for both countries and so have taken a series of steps toward the subscription of an accord of that sort.

The results presented in this paper are in line with that conviction. They show that a large potential for expanding trade and investment flows between the Mexican and South Korean economies lies dormant and that such objective can be attained most effectively by means of an FTA. On the other hand, the formulation and estimation of a gravity model to that end permitted the delineation of a formal, systematic methodology that constitutes a relevant contribution to the development of a more objective rationale for assessing this accord vis-à-vis the essentially inferential, intuitive criteria used by other studies that have also been conducted for that purpose.

After more than four years since they started negotiations and over eleven

since they signed their first major bilateral investments agreement, the Mexican and South Korean governments have now valid reasons and sufficient ground to take the decision to complete the negotiations and finally sign the deal which, as this paper shows, can in fact be beneficial for both countries. In this sense, the year 2012 will be a propitious context to do that for the two nations will celebrate the 50th anniversary of the establishment of formal diplomatic relations and so the beginning of their political, economic and cultural interaction.

APPENDIX

Dataset Sources and Rationale

Countries

The 21 APEC member economies which thus became the panel units in the model

Period

The period chosen for the study encompasses 20 years, from 1990 to 2009, on the basis that it is long enough for a gravity model fitted on panel data and covers virtually all of APEC's lifespan. Another reason was because it is a period for which more data were available in the relevant databases for all the countries and all the variables considered in the model.

Sources

Most bilateral trade flows data (imports) were taken from the United Nations Commodity Trade Statistics Database (UN Comtrade), where data were available for all APEC countries for that period, except for Taiwan. In the case of the latter, imports data were gotten from the Taiwanese Ministry of Finance's statistical database. UN Comtrade data were available from the SITC Revision 2 product nomenclature.

The countries with incomplete entries presented data for the following years: Brunei Darussalam: 1990-1994, 1997-1998, 2001-2004, and 2006; Papua New Guinea: 1990, 1998, and 2000-2004; Russia: 1996-2009; and Viet Nam: 1997-2009. Data on all the other explanatory variables included in the model were restricted to the years for which data on import flows were available. In other words, the size and extent of the dataset were determined by the availability of data on imports.

Data on gross domestic product (GDP) — both total and per capita — were taken from the World Bank's National Accounts Database; the figures are in current US dollars and were determined applying the World Bank's Atlas method. The missing entries for Brunei's GDP (2007-2009) were obtained by converting the GDP figures for those years (in Brunei current dollars) into current US dollars using a mid-year exchange rate taken from the Oanda.com website. The missing entry for Hong Kong (2009) was taken from the IMF statistics at the Trading Economics.com website.

Data on GDP and GDP per capita for Taiwan were taken from the World Economic Outlook Database (October 2010) of the International Monetary Fund.

Size

Given that the Comtrade database contains numerous missing entries, the total number of observations (7,149) fell short of the total possible (8,400), i.e., $n(n-1)*t$. Accordingly, the number of country pairs (398) also fell short of the total possible (420).

In those cases, the criterion was to drop the missing observations from the sample. Other, more desirable options would have been to enter zeros in those entries or to use techniques such as Tobit procedures which take account of truncated data. However, these procedures are more complicated and, besides, as Baldwin (1994, p. 72) noted, "most studies show that the resulting estimates are not substantially affected by the choice of approach".

Table A1 Mexico's Trade Balance with Korea, 1965-1989 (Thousand US Dollars)

Year	Exports	Imports	Balance
1965	390.118	18.703	371.415
1966	375.018	5.754	369.264
1967	409.944	43.241	366.703
1968	305.442	89.881	215.561
1969	908.423	32.427	875.996
1970	241.216	719.656	–478.44
1971	194.498	1,348.019	–1,153.521
1972	130.685	1,267.089	–1,136.404
1973	168.901	1,432.348	–1,263.447
1974	946.193	5,764.069	–4,817.876
1975	119.51	811.288	–691.778
1976	455.761	1,863.742	–1,407.981
1977	2,363.804	10,066.21	–7,702.407
1978	5,035.86	4,174.903	860.957
1979	8,784.154	1,937.559	6,846.595
1980	15,899.04	33,468.92	–17,569.885
1981	68,051.71	26,312.15	41,739.56
1982	152,799.1	25,434.69	127,364.416
1983	136,621.6	23,186.06	113,435.51
1984	157,701.7	18,915.72	138,786.004
1985	102,887	14,601.44	88,285.573
1986	90,761	19,653	71,108
1987	95,645.87	27,804.09	67,841.784
1988	98,092.42	113,897.9	–15,805.48
1989	51,331.01	161,052.4	–109,721.392

Source: Assembled by the author with data from the United Nations Commodity Trade Statistics Database (UN Comtrade).

Table A2 Mexico's Trade Balance with Korea, 1990-2010 (Thousand US Dollars)

Year	Exports	Imports	Balance
1990	101,961	184,560	–82,599
1991	33,781	84,718	–50,937
1992	43,753	463,983	–420,230
1993	26,947	475,764	–448,817
1994	37,850	937,989	–900,139
1995	88,337	770,560	–682,223
1996	337,711	1,059,374	–721,663
1997	212,998	1,641,173	–1,428,174
1998	136,287	1,822,402	–1,686,115
1999	150,258	2,780,215	–2,629,957
2000	293,972	3,689,619	–3,395,647
2001	208,509	3,531,353	–3,322,844
2002	161,846	3,909,340	–3,747,494
2003	181,410	4,112,549	–3,931,139
2004	110,780	5,227,476	–5,116,695
2005	241,842	6,495,910	–6,254,068
2006	457,495	10,621,409	–10,163,914
2007	680,568	12,613,700	–11,933,132
2008	537,605	13,527,288	–12,989,684
2009	498,752	10,946,194	–10,447,442

Source: Assembled by the author with data from the United Nations Commodity Trade Statistics Database (UN Comtrade).

Table A3 Trade Potential Ratios among APEC Economies 2009 (I) (Imports)

Importer \ Exporter	AUS	BRN	CAN	CHL	CHN	HKG	IDN	JPN	KOR	MYS	Average
Australia	0.000	0.211	2.569	1.555	0.924	1.677	1.557	2.388	0.981	0.282	1.214
Canada	1.841	23.976	0.000	0.659	0.622	2.689	1.779	2.106	0.748	0.316	3.474
Chile	6.238	0.000	3.656	0.000	0.730	8.769	2.705	3.248	0.323	1.394	2.706
China	0.032	0.162	0.126	0.008	0.000	0.238	0.103	0.279	0.157	0.020	0.112
Hong Kong	2.480	35.705	2.804	0.000	0.789	2.648	0.000	2.300	1.104	0.342	4.817
Indonesia	0.421	0.134	0.591	0.000	0.533	0.372	0.000	0.696	0.281	0.337	0.336
Japan	0.194	0.056	0.766	0.095	1.313	4.851	0.260	0.000	2.684	0.141	1.036
Korea	0.216	0.112	0.984	0.076	3.800	2.661	0.345	3.459	0.000	0.186	1.184
Malaysia	0.804	2.805	1.840	0.841	1.003	0.523	1.461	0.918	0.514	0.000	1.071
Mexico	1.480	103.854	1.052	0.297	0.189	0.870	0.592	0.630	0.106	0.048	10.912
New Zealand	3.667	0.172	8.480	23.885	3.630	7.945	5.415	9.085	3.197	1.149	6.663
Peru	10.279	2,208.581	5.579	0.927	0.784	6.377	4.243	3.120	0.713	0.790	224.139
Philippines	1.162	3.611	2.100	0.616	2.835	1.098	0.723	1.954	0.731	0.336	1.517
Russia	1.906	9,365.353	3.005	0.829	0.807	16.400	1.705	1.725	0.519	0.423	939.267
Singapore	1.652	6.041	3.484	2.031	1.855	1.667	2.696	2.179	0.592	1.941	2.414
Taiwan	0.576	341.441	2.379	0.159	3.863	9.867	0.829	2.132	1.949	0.432	36.363
Thailand	0.341	0.818	1.367	0.546	0.986	1.015	0.789	0.470	0.487	0.327	0.715
United States	0.427	1.183	0.944	0.221	0.086	0.288	0.145	0.287	0.118	0.033	0.373
Viet Nam	0.464	0.000	1.643	0.305	0.644	0.732	0.590	0.882	0.222	0.200	0.568

Table A4 Trade Potential Ratios among APEC Economies 2009 (II) (Imports)

Importer / Exporter	MEX	NZL	PNG	PER	PHL	RUS	SGP	THA	USA	VNM	Average
Australia	3.318	0.719	0.087	4.711	3.940	13.770	0.195	0.210	2.066	0.263	2.928
Canada	0.992	1.085	16.730	0.460	0.934	6.199	0.602	0.472	9.598	0.388	3.746
Chile	2.039	7.699	61.856	1.786	3.134	42.026	2.957	1.234	3.951	0.618	12.730
China	0.207	0.059	0.053	0.021	0.075	0.147	0.034	0.049	0.174	0.136	0.096
Hong Kong	2.025	1.288	6.724	4.310	1.649	7.073	0.291	0.863	1.963	5.268	3.145
Indonesia	2.518	0.248	0.445	1.425	1.050	2.156	0.165	0.250	0.759	0.452	0.947
Japan	1.480	0.375	0.165	0.273	0.601	1.061	0.370	0.234	1.053	0.248	0.586
Korea	1.995	0.420	0.237	0.235	0.863	0.949	0.169	0.753	1.074	0.520	0.722
Malaysia	2.028	0.471	0.252	7.834	1.085	8.285	1.199	0.636	0.786	0.427	2.300
Mexico	0.000	0.635	67.466	1.852	0.180	4.115	0.135	0.139	0.915	0.171	7.561
New Zealand	21.888	0.000	3.698	26.487	7.909	19.067	0.769	1.400	10.483	3.328	9.503
Peru	3.301	5.580	193,366.710	0.000	5.966	5.045	2.897	0.651	5.895	1.066	19,339.711
Philippines	6.547	0.295	0.062	0.370	0.000	3.264	0.152	0.354	0.906	0.304	1.225
Russia	5.719	1.150	2.793	6.628	2.357	0.000	0.639	0.818	3.458	0.409	2.397
Singapore	3.216	1.151	1.328	13.071	0.715	2.494	0.000	1.334	1.054	1.015	2.538
Taiwan	4.570	0.817	7.419	0.558	3.378	2.024	0.389	1.312	1.366	2.208	2.404
Thailand	2.351	0.440	0.191	1.682	0.554	1.060	0.333	0.000	0.991	1.046	0.865
United States	0.148	0.218	0.360	0.402	0.107	0.557	0.048	0.059	0.000	0.034	0.193
Viet Nam	1.898	0.252	0.686	0.353	1.130	0.577	0.064	0.361	1.292	0.000	0.661

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