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Playing by the Rules? The Development of an Amended Index to Measure the Impact of Rules of Origin on Intra-PTA Trade Flows

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Working Paper

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Abstract:

Rules of Origin (RoO) are essential components of any preferential trade agreement (PTA) short of a full customs union. The recent proliferation of PTAs has led to increased interest in the effects of RoO with empirical estimates consistently showing that they act as barriers to intra-PTA trade. However, this paper argues that the indices of RoO restrictiveness currently used in empirical analysis are flawed as they focus solely on product specific RoO and do not incorporate information on regime wide provisions, that is, those rules that apply across all goods in a particular agreement. As such, they do not capture fully the effective restrictiveness of a given RoO. In order to address this issue, this paper weights the Harris Index of RoO restrictiveness by three regime wide provisions; the size of the Cumulation Zone, the de minimis allowance, and certification type. The resulting new measure, the Regime Weighted Harris Index (RWHI), is then each used in both OLS and IV regressions to measure the impact of RoO on intra-PTA trade flows. Across an eleven year panel of 90 country-pairs, a negative effect of RoO on intra-PTA trade is found using OLS. However, the results of an IV regression suggest that the situation is somewhat more complicated, with RoO actually promoting trade flows in certain product groups. This is the first attempt in the literature to develop an instrument for RoO restrictiveness which constitutes a second source of value added for this paper.

JEL Codes: F13, F15

Keywords: Rules of Origin, International Trade Agreements, Nontariff Barriers

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1 Introduction

The rapid proliferation of preferential trade agreements (PTAs) in recent years has led to increased interest in Rules of Origin (RoO).[2] RoO specify the minimum criteria a good must meet in order to be considered 'originating' in a member of a PTA and thus eligible for trade preferences. As failure to meet RoO disqualifies firms from availing of these preferences, they are an important determinant of the utilisation of tariff preferences and thus the ultimate impact of an agreement. Empirical work over the past decade has examined the impact of these rules on trade flows, investment decisions and utilisation of tariff preferences.[3] Other papers have attempted to quantify the costs of complying with these rules and have questioned if RoO are being used as a protectionist policy instrument.[4] The indices of RoO restrictiveness most frequently used in empirical work include the Harris Index and Estevadeordal's R-Index.[5] These indices are ex-ante measures, derived from observation of the product-specific components of the agreements. However, they fail to take account of regime wide provisions, that is, the rules that apply across all of the products in a particular agreement. In particular the size of the Cumulation Zone, the de minimis allowances and the certification type are overlooked.[6] In this paper, these three components are combined with the Harris Index in order to create the Regime Weighted Harris Index (RWHI).

A panel of 90 country-pairs from fifteen PTAs over the period 2000 to 2010 is used to measure the effect of RoO on intra-PTA trade flows. In panel OLS regressions, the RWHI is found to have a significant, negative impact on trade between PTA members. However, the results change when an instrumental variable is developed to control for potential

[2] In 2011, there were almost 300 PTAs in force. This compares to 70 in 1990 (World Trade Organisation, 2011).
[3] Papers estimating the trade flow effects of RoO include Estevadeordal et al (2009) and Anson et al (2005), papers estimating the effects of RoO on investment decisions include Cadot and de Melo (2008), and papers estimating the impact of RoO on preference utilisation include Estevadeordal et al (2006).
[4] Papers estimating the compliance costs of RoO include Cadot et al (2006), Carrère and de Melo (2004), Anson et al (2005), Francois et al (2006), and Manchin and Pelkmans-Balaoing (2007). Papers examining if RoO are being used as protectionist instruments include Estevadeordal (2000), Chase (2007), and Harris (2007).
[5] Outlined in Harris (2007) and Estevadeordal (2000) respectively.
[6] The Cumulation Zone is the list of countries from which members of a PTA can source inputs without compromising the origin status of the final good. As the effective restrictiveness of RoO depends on the availability of cheap inputs in the geographic pool of permitted imports, the size of the Cumulation Zone can significantly alter the effective restrictiveness of RoO (Estevadeordal et al, 2008). A larger Cumulation Zone lessens the potential impact of RoO by increasing the probability that an efficient producer of a particular input lies within the zone. De minimis allowances are specified percentages of non-originating materials that can be used without compromising the origin status of the final good. The de minimis requirement inserts leniency into the RoO by making it easier for products with non-originating inputs to qualify. There are three main forms of certification, with self-certification by exporters being the least costly. The more numerous the bureaucratic hurdles involved in obtaining origin certification, the lower the incentive to seek PTA conferred preferential treatment.

endogeneity between the RoO index and trade flows. The coefficients on the RoO variables are insignificant when the entire database is used in the IV regression, but at higher levels of disaggregation it appears that RoO promote trade for certain types of goods while discouraging it in others. This is the first attempt in the literature to develop an IV for RoO restrictiveness.

2 Rules of Origin in Trade Agreements

By their nature PTAs are discriminatory, with preferences extended to some countries but not to others. This necessitates the use of a mechanism which can distinguish between goods produced in a signatory state and those from countries outside the agreement. Without such a distinction, trade deflection would occur, whereby countries from outside the PTA would take advantage of the relatively low external tariffs or weak customs monitoring capacities of one PTA member to bring in imports destined for a relatively more protected market. This is shown in Figure 1; Countries A and B form a PTA, and all tariffs between them are removed (τ =0%). Without RoO provisions, Country C, which is not part of the PTA, will have an incentive to route goods through Country B and into Country A, thereby paying a tariff of 5% as opposed to the 10% required to enter Country A directly. This process would be limited only by the costs to Country C of shipping goods through Country B. In the absence of RoO, the effect of the PTA on Country A would thus be the equivalent of unilateral liberalisation as A no longer receives any tariff revenue as imports are deflected through B. As well as reducing tariff revenue, trade deflection results in the unintended extension of preferences to countries outside the area thus undermining the value of the agreement to the signatory states.

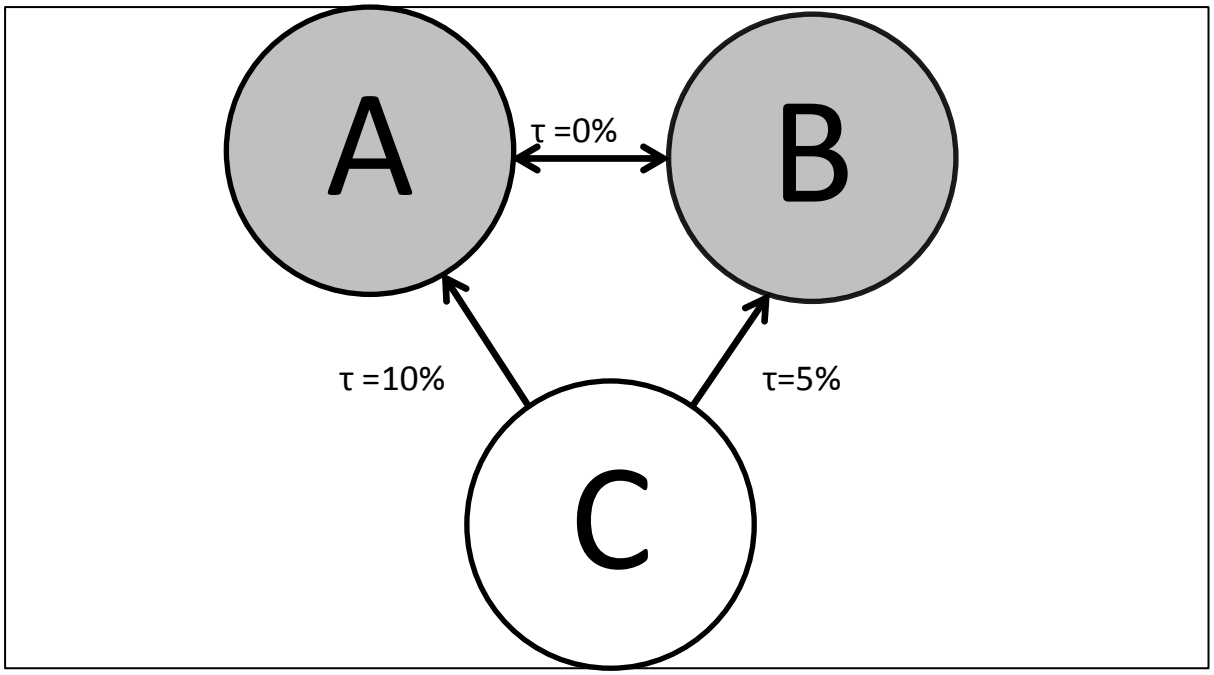

Figure 1: Trade Deflection.

In order to avoid trade deflection, trade agreements contain RoO. These are provisions specifying the criteria a product must satisfy in a member state in order for that good to be considered 'originating' in that state. Agreements include both product specific and regime wide RoO.

Product specific RoO are defined at the six or eight digit level of disaggregation. There are three main methods used to determine origin at the product level; a change in tariff classification, the local content rule, and the technical requirement. The change in tariff classification criterion requires that imported components and the final good do not belong to the same tariff classification. This rule can be defined at the Chapter, Heading, Sub-heading or Item level. The requirement of a change of tariff classification at Chapter level is more restrictive than a change of Heading, which is more restrictive than a change in Subheading, with a change at Item level being the least restrictive. Under the local content rule, the product in question has to acquire a minimum value added in the exporting state in order to be deemed originating in that state. The technical requirement rule stipulates a specific procedure or step in the manufacturing process that a good has to undergo before obtaining origin status. Most PTAs employ more than one of these criteria when setting RoO. Additionally, most agreements include alternative rules for fulfilling origin for some

products; Harris (2007) examined thirteen agreements and found that just over 20% of rules provide two or more alternatives.

PTAs also include regime wide rules. These are rules that apply similarly to all products and can either increase or decrease the restrictiveness of the product specific criteria. Regime wide rules include the Cumulation Zone, de minimis provision and certification type. The Cumulation Zone is the list of countries from which a firm can source inputs without jeopardising the origin status of the final good. The de minimis provision indicates the percentage of non-originating materials that may be used without affecting the origin status of the final good. The type of certification process required to confirm origin is specified in the agreement. Different certification types have different associated costs.

Producers who fail to comply with RoO are ineligible for preferential tariffs and have to pay non-preferential tariffs when exporting to their PTA partner. RoO are therefore essential in upholding the integrity of any trade agreement short of a full customs union where the presence of a common external tariff eliminates the potential for trade deflection (i.e. Country C will face the same tariff entering Countries A and B).

2.1 Existing Empirical Literature on RoO

For many years, research into intra-PTA trade flows focused on the tariff provisions of agreements, with RoO viewed simply as a supporting instrument (Estevadeordal, 2000). Research into the distinct effects of RoO was also hampered by poor data availability, particularly regarding their restrictiveness. However, starting with Estevadeordal (2000), a number of different indices of the relative restrictiveness of RoO have been developed (including Harris (2007), Productivity Commission (2004), and Anson et al (2005)). These indices are based on observation of the components of the RoO in the PTAs, and have facilitated the inclusion of a measure of RoO restrictiveness in econometric regressions.

This research has often found evidence that RoO act as a barrier to trade between PTA members and undermine the trade promotion goals which underlie PTA creation. In particular, the production and administrative costs associated with complying with RoO can limit the take up of trade preferences. Production costs arise as binding RoO oblige firms to alter their production techniques either by carrying out more production domestically, or shifting input sources to more expensive, permitted suppliers. Administrative costs are

essentially book-keeping costs for the exporter due to the paperwork associated with certifying origin.

A number of papers have found that the compliance costs of RoO are so high that trade preferences are not exploited and expected volumes of trade flows do not occur.[7] The high compliance costs of RoO can be detected by examining the utilisation rate of different preference regimes. Cadot and de Melo (2008) note that NAFTA and EU GSP have equal preference margins for apparel, but that their utilization rates vary widely – 50% for Cotonou vs. 80% for NAFTA. They find that as preferential margin goes up, utilisation rate falls, and state that "RoO are an obvious culprit" (pg 84). Manchin and Pelkmans-Balaoing (2007) find that the level of take up in the ASEAN FTA is just 5%, and refer to complaints from ASEAN exporters about computation of costs, invoicing and other documentation demands of RoO. They find that the preferential tariffs favourably affect intra-regional trade only at very high preference margins (when preferential tariffs are at least 25 percentage points lower than the non-preferential rates) pointing to the likelihood of high compliance costs. Brenton and Manchin (2003) also find that RoO affect take up of trade preferences in a PTA. They note the high level of outward processing trade between the EU and the Central and Eastern European countries in 2000. This is despite the fiscal incentive for outward processing being eliminated following the introduction of duty free access to the EU in 1997. The authors suggest that companies continue to use outward processing trade to avoid costs involved in satisfying RoO.

Both Anson et al (2005) and Estevadeordal and Suominen (2008) find that PTAs have a positive effect on aggregate trade flows. However, RoO are found to reduce trade flows at a high level of significance. Although both papers find that the net effect of PTAs on trade is positive, it is evident that RoO claw back some of the trade liberalisation provided for in tariff reduction. Estevadeordal and Suominen include a variable to capture the effect of five regime-wide mechanisms (including different cumulation provisions) that can add flexibility to the application of the product-specific RoO. This variable consistently has a positive effect on trade flows, indicating that the effective restrictiveness of a given RoO can be affected by regime-wide rules.

[7] A number of empirical papers attempt to estimate the administration costs of RoO. These estimates vary quite widely; Cadot et al (2005) find compliance costs to be 2% of the value of goods traded and Francois et al (2006) estimate double this at 4% of the value of the goods traded. Cadot et al (2006) estimate compliance costs at 6.5% of good value under NAFTA and 8% under Paneuro.

There is evidence that RoO are driven by the same political economy forces as traditional trade barriers. However, unlike other trade policy instruments such as tariffs and quotas, RoO in bilateral agreements are not currently regulated by the WTO.[8] As failure to meet RoO disqualifies firms from availing of trade preferences, they are a potentially powerful protectionist instrument undermining efforts for bilateral trade liberalisation. Portugal-Perez (2009) addresses the possibility that RoO are affected by political economy forces examining Mexican textile and apparel exports to the US under NAFTA. He separates variations in the RoO index into a component attributable to trade deflection and one associated with political economy motives. His results suggest that lobbying activities associated with the determination of RoO have increased the costs of RoO by, on average, 3.5% of the price of a good. More generally, a number of other papers (including Cadot et al (2006), Estevadeordal (2000), and Estevadeordal et al (2008)) find that the average restrictiveness values of RoO are higher in sectors with tariff peaks. Chase (2007) and Hirsch (2002) both note that the opaque nature of RoO leaves them open to industry capture as the implications of a particular rule (especially in terms of the technical requirement) are only evident to industry experts.

3 Development of the Regime Weighted Harris Index (RWHI)

3.1 Regime Weighted Harris Index

Each of the existing RoO indices focus on product specific RoO, and fail to incorporate information about regime wide rules. Although products in different PTAs may have the same ex-ante RoO as measured by either the Harris or Estevadeordal indices, their effective restrictiveness will differ depending on the regime wide provisions. The Regime Weighted Harris Index developed in this paper recognises this and incorporates three regime wide rules – the size of the Cumulation Zone, the de minimis provision and the certification type. An economically larger Cumulation Zone has a greater probability of containing efficient producers of a given input than a smaller zone. RoO impact upon production decisions by limiting permitted access to low cost inputs from third countries. Thus a key

[8] GATT 1947 left it to "each importing member country to determine, in accordance with the provisions of its law… whether goods do in fact originate in a particular country". The WTO Agreement on Rules of Origin, concluded as part of the Uruguay Round in 1994, relates to the application and administration of RoO under non-preferential agreements only.

determinant of the effective restrictiveness of RoO is the probability that a producer will be able to source globally low cost inputs from *within* the Cumulation Zone, a point originally made in Estevadeordal et al (2008). The de minimis allowance reduces effective restrictiveness by inserting leniency into the change in tariff classification or technical criteria by making it easier for products with non-originating inputs to qualify – it 'softens the rough edges' of RoO (Estevadeordal et al, 2009). The de minimis levels applying to agricultural goods and to the textiles and clothing sectors are often less generous than the general de minimis provisions. There are three main forms of certification; in increasing levels of administrative complexity these are self-certification by exporters, public certification and two step public and private certification. The more numerous the bureaucratic hurdles required to confirm origin status, the higher the cost of the RoO and the lower the incentive to apply for preferential treatment.

As the Harris Index is the most comprehensive index of the restrictiveness of RoO available, it is used as the foundation of the new index. The Harris Index is available as Appendix Table 1.Both the de minimis provision and the size of the Cumulation Zone directly impact the effective restrictiveness of the product specific Harris Index. These are therefore are used to weight the Harris Index (see Equation 1)

$$RWHI_{ijkt}^{GDP} = \left\{Harris\ Index_{ijk}\left[1 - \frac{\sum GDP_t\ Cumulation\ Zone}{\sum GDP_t\ World}\right] * \left[\frac{100 - de\ minimis_{ijk}}{100}\right]\right\} + Cert_{ij}[1]$$

where i is importer, j is exporter, k is product measured at the six digit level of disaggregation and t is year.

The first square bracket focuses on the Cumulation Zone. The Cumulation Zone's share global GDP is computed and is then subtracted from one in order to capture the size of the zone of non-permitted inputs (i.e. the rest of the world). As the Cumulation Zone gets bigger, the quotient gets bigger, reducing the size of the term in the bracket and consequently the magnitude of the index, i.e. the effective restrictiveness of the RoO. When the quotient equals one, i.e. the Cumulation Zone comprises the entire world, the RWHI will equal zero as all inputs will be permitted. Thus, the RWHI of the same ex-ante RoO is lower in PTAs with a larger Cumulation Zone. The second set of square brackets incorporates the de minimis provision. This is the maximum level of non-originating materials permitted before the origin status of the final good is affected. Thus, the absolute minimum percentage of the product's

inputs that must be originating is computed. The more non-originating materials allowed, i.e. the lower the term in the bracket, the lower the effective restrictiveness of the RoO.

The final component of the RWHI, the certification type, is not used as a weight as it has the same effect across each value of the Harris index. Instead it is added on to the weighted product. Self-certification by producers is the most cost effective form of certification, followed by public certification with two step public and private being the most cumbersome. In this index, self-certification is given a value of 0, public certification a value of 4 and the two step option a value of 8. Those values were chosen as they are in line with the scaling used in the Harris Index; for each type of product specific RoO, the Harris Index restrictiveness ranking goes from 1 to 8, with eight being the most restrictive.

4 Model and Data

4.1 Data

The database used in this paper is an unbalanced panel of 90 country-pairs from fifteen PTAs from 2000 to 2010. The unit of analysis is "ijkt";importer i, exporter j, product k (at a six digit level) in year t. The trade flows under analysis are those between countries that were in a PTA in at least one of the time periods under consideration. Details on the PTAs and country-pairs in the dataset are provided in Appendix Tables 2 and 3. The Harris Index is sourced from the Inter-American Development bank - INTradeBID database, with the coding methodology detailed in Harris (2007).

Data on both GDP and GDP per capita are sourced from the World Bank (2011). Data on both the non-preferential and preferential tariffs were extracted from the UN TRAINS database (United Nations Conference on Trade and Development, 2011). The TRAINS database is unfortunately quite incomplete. Anderson and van Wincoop (2004) find that for the 121 reporting countries in 2000, only 36.4% report tariffs. Import flows were sourced from the UN's COMTRADE database (United Nations Statistical Division, 2011).GDP, GDP per capita and import flows are measured in constant 2000 US dollars.

RoO are essentially the 'cost' that producers pay in order to avail of preferential tariffs with PTA partners. Of the fifteen PTAs in the analysis, only two were in place for all

of the years under analysis.[9] The higher the RWHI, the more difficult or costly it is for producers to avail of preferential tariffs. Thus, for those years where there is no PTA in place, the RoO variable was set to 1, i.e. extremely lenient. This can be interpreted as saying that all products have full access to any trade preference available pre-PTA.

Product and tariff data used are at the six digit level of disaggregation. The HS nomenclature periodically changes with new codes being introduced, categories being merged and categories subdivided. There was a change in the coding of some of the HS nomenclature between 1996 and 2002. These changes resulted in a number of codes being made redundant in 2002 and others being introduced. The RoO of the three oldest PTAs in this analysis were written using the 1996 nomenclature while the remainder use the 2002 coding.[10] As such, there is not a complete correlation between the RoO product codes across the PTAs. As direct mapping of the 1996 to 2002 nomenclature is impossible and any attempts to do so are quite crude, all product codes which were either eliminated from the 1996 nomenclature or introduced into 2002 version are excluded from the analysis.

There are a significant number of missing values in the dataset. For the 1,247,868 observations, 251,589 (20.16%) trade flow figures and 846049 (67.8%) preferential tariff values are missing. A number of steps were taken to increase the usable sample size. As the raw dataset only contained two observations of zero trade flows, I assumed that all missing values indicate zero trade flows. In addition, tariff preferences were set to zero for those trading cases where there was no PTA in place, or where the non-preferential tariff was zero. A large proportion of observations are still excluded from analysis however, and it is likely that weaknesses in the data set result in interesting information being lost.

4.2 Model

The use of panel data has a number of advantages over cross-sectional data, allowing for analysis of relationships between variables across time and also for the inclusion of country-pair dummies. Country-pair fixed effects control against time invariant determinants of trade such as bilateral distance, common language, and common border, and protect against biased estimates which would result from the omission of such variables (Hummels and Levinsohn (1995), Egger and Pfaffermayr (2003), and Cheng and Wall (2005)). Country-

[9] Canada-Chile and Mercosur.
[10] The three PTAs using the 1996 coding are Canada-Costa Rica, Canada-Chile, and Chile-Korea.

pair fixed effects also proxy for the multilateral resistance terms identified by Anderson and van Wincoop (2003) (see Feenstra, 2004).Product dummies are included at a two-digit level. These will capture effects specific to particular groups of products. A Hausman test indicates that a Fixed Effects model is appropriate; as such, importer-exporter-product fixed effects are used.

Year dummies are included in the model to account for any variables affecting bilateral trade that vary over time but are constant across country-pairs and are not included in the list of regressors. These would include, for example, global macro movements.

Bilateral imports of good k (measured at the six digit level of disaggregation) from country j to country i in year $t$are dependent on traditional gravity variables plus applied tariffs.

$$lnM_{ijkt} = \alpha_0 + \delta_{ijk} + \delta_t + \alpha_1 X_{ijkt} + \alpha_2 \tau^A_{ijkt} + \varepsilon_{ijkt} \quad [1]$$

X_{ijkt} are the standard components of gravity models plus a dummy for those observations without a RoO. This dummy takes the value one if the observation does not have an associated RoO, zero if it does. An observation may not have a RoO either because a PTA is not in place for that country-pair in the year in question, or because the product in question was excluded from PTA coverage. This is a more refined measure than the inclusion of a PTA dummy in the regression as it takes into account that the PTA may not cover all products. $\tau^A$is a vector of variables which determine the tariffs actually applied by i on imports of good k from j, inclusive of preferences. In other words, $\tau^A$is the non-preferential tariff rate minus savings accruing from membership of a PTA;

$$\tau^A_{ijkt} = \tau^{NP}_{ikt} - Net\ Savings \quad [2]$$

τ^{NP}_{ikt}indicates non-preferential tariffs imposed by *i* on the import of product *k* in year *t* (there is no subscript *j* as non-preferential tariffs do not vary across trading partner). Tariffs impede trade, so $\alpha_2$from [1] is expected to be negative.

The savings associated with membership of a PTA are a function of the non-preferential tariff (τ^{NP}_{ikt}), the preferential tariff offered to the PTA partner *j* (τ^P_{ijkt})and the level of difficulty/cost of complying with the RoO, as captured by the RWHI. Thus,

$$Net\ Savings = f\left(\tau^{NP}_{ikt}, \tau^P_{ijkt}, CWHI_{ijkt}\right) \quad [3]$$

As in Cadot et al (2006), the preferential margin(τ_{ijkt}^{PM}) is computed as the normalised difference between non-preferential tariffs and preferential tariffs.

$$\tau_{ijkt}^{PM} = \frac{\tau_{ikt}^{NP} - \tau_{ijkt}^{P}}{1+\tau_{ijkt}^{P}} \quad [4]$$

Thus,

$$Net\ Savings = f\left(\tau_{ijkt}^{PM}, CWHI_{ijkt}\right) \quad [5]$$

Substituting [2] and [5] back into [1] and expanding;

$$lnM_{ijkt} = \alpha_0 + \delta_{ijk} + \delta_t + \alpha_1 X_{ijkt} + \alpha_2[\tau_{ikt}^{NP} - f\left(\tau_{ijkt}^{PM}, CWHI_{ijkt}\right)] + \varepsilon_{ijkt} \quad [6]$$

$$lnM_{ijkt} = \alpha_0 + \delta_{ijk} + \delta_t + \alpha_1 X_{ijkt} + \alpha_2 \tau_{ikt}^{NP} + \alpha_3 f\left(\tau_{ijkt}^{PM}, CWHI_{ijkt}\right) + \varepsilon_{ijkt} \quad [7]$$

This function is approximated as a linear function of these variables and their products to form the estimated equation;

$$lnM_{ijkt} = \alpha_0 + \delta_{ijk} + \delta_t + \alpha_1 X_{ijkt} + \alpha_2 \tau_{ikt}^{NP} + \alpha_3 \tau_{ijkt}^{PM} + \alpha_4 CWHI_{ijkt} + \alpha_5 CWHI_{ijkt} * \tau_{ijkt}^{PM} + \varepsilon_{ijkt} \quad [8]$$

Coefficient	Variable Name	Expected Sign
α_2	$Tariffs_{NON-PREFERENTIAL}$	-
α_3	$Preferential\ Margin$	+
α_4	$CWHI$	-
α_5	$Preferential\ Margin * CWHI$	-

The non-preferential tariff is expected to have a negative effect on trade flows. This is the tariff paid by exporters in countries that are not party to the PTA, products not covered by a PTA, or in cases where firms fail to meet RoO criteria. The preferential margin is the normalised difference between non-preferential tariffs and preferential tariffs, and represents the benefit of complying with RoO. It is expected that as the difference between the non-preferential and preferential margin increases, the trade flow between PTA members will increase, i.e. the expected sign is positive. The key variable of interest in the model is the RWHI. As higher values of the RoO measures are more restrictive (i.e. make it more difficult for countries to avail of trade preferences), the RWHI is expected to have a negative sign;

that is, stricter RoO restrict trade flows. In terms of the interaction term, the marginal effect of RWHI on trade flows is the sum of a direct and indirect effect.

$$\frac{\partial lnM_{ijkt}}{\partial CWHI_{ijkt}} = \alpha_4 + \alpha_5 \tau_{ijkt}^{PM}$$

As discussed above, the direct effect is expected to be negative; as RoO rise, trade flows fall. The indirect effect is also negative; for a larger preferential margin, an increase in RoO has a bigger negative effect than for a smaller margin. This is because trade flows which occurred under the larger margin now do not take place due to the stricter RoO – it is no longer worthwhile for firms to pay to avail of the margins. Thus, it is expected that the interaction term will be negative.

Log linearization is incompatible with the existence of zeros in trade data. In order to deal with the presence of zero trade, $ln(1 + M_{ijkt})$ is used as a dependent variable. Robust standard errors are used in all regressions, as indicated by the Hausman test.

5 OLS Results

5.1 OLS Results – Complete Database

Table 1 shows the results of the baseline specification when the entire dataset is used. The key result is as expected, with the RoO index highly significantly negative. This supports previous empirical findings that RoO have a negative effect on intra-PTA trade flows. However, the interaction term is positive, indicating that for a larger preferential margin, an increase in RoO has a smaller negative effect than for a smaller margin. Having a RoO (i.e. not being part of a PTA) has a positive effect on trade flows as would be expected.

GDP for both the importer and exporter have negative signs while the GDP per capita variables have positive coefficients. This may reflect that larger countries tend to trade less outside their own borders. The signs associated with the two tariff variables, preferential margin and applied tariffs are the opposite of what one would expect. These results are surprising but not of particular concern as these are not the variables of interest in the paper.

5.2 OLS Results – Sample Split

To investigate the possibility that the effects of RoO vary across the level of production, the dataset is split into three subsectors – Primary goods, goods that have undergone basic processing (Basic Processing) and more technologically advanced (Highly Processed) goods. The HS nomenclature comprises twenty-one sections along which I split the sample (details are provided in Appendix Table 4). The key results do not change significantly when the sample is split by subsectors, with Basic and Highly Processed goods maintaining the significant negative sign. The Primary category also retains the negative sign but becomes insignificant (see Table 2).

When the dataset is disaggregated further, into 21 sections, the coefficient on the RWHI variable is positive in one case, negative for ten sections and insignificant for ten (see Table 3).

6 Instrumental Variable

6.1 Instrument Design

As discussed in Section 2.1, the empirical literature suggests that RoO are driven by political economy forces. As such, it is not unreasonable to assume that the level of imports of a particular good influences the restrictiveness of the corresponding RoO, leading to bias in the OLS results[11]. Indeed, the Hausman test confirms the concerns about endogeneity, rejecting the consistency of OLS at a very high level of significance. This potential endogeneity of the RoO index has not previously been addressed in the literature. In this section, instrumental variables are developed as a response to this problem. The regression used in this paper has two endogenous variables as the RWHI term appears twice in the regression specification; as a regressor and in the interaction term, RWHI* Preferential Margin. At least one valid instrument is required for each endogenous variable.

The instrument developed for the RWHI variable is based on the average RWHI for every country-pair excluding those in the PTA of the country-pair in question. Excluding all other country-pairs in the PTA is necessary as each country-pair within the same PTA has the same RWHI and failure to subtract them out would result in continued endogeneity. To give a specific example, Brazil and Uruguay are members of the Mercosur PTA. The proposed IV for the RWHI of a particular good for Brazil and Uruguay is thus the average of the relevant

[11] The potential for endogeneity of the RoO measure is identified by Anson et al (2005).

RWHI for each of the other 89 country-pairs in the dataset excluding the eleven other country-pairs from Mercosur. Appendix Table 3provides a full list of country-pairs in the sample.

Define $p \in P(PTA)$as the set of country-pairs in a given PTA.

$$\frac{\sum_{p \notin P(i,j)} RWHI}{\sum_{p \notin P(i,j)} 1} = Z_{ijkt}$$

The instrument for the interaction term is created by multiplying the instrument for RWHI developed above (Z_{ijkt}) by the preferential margin (i.e. $Z_{ijkt} * \text{Pref Margin}$). The tests for weak identification will indicate if these instruments are too correlated.

6.2 IV Results – Complete Database

Table 4 shows the results for the IV regressions when the entire database is used. The sample size has fallen slightly, as Stata's xtivreg2 command explicitly excludes groups in which there is only one observation in a fixed effects regression. This is because these singletons have zero within-group information.

The Angrist-Pischke first-stage χ^2 and F statistics are tests of under identification and weak identification where there are multiple endogenous variables. They are the most appropriate diagnostic tests in regressions with more than one endogenous variable (Angrist and Pischke, 2009). Critical values for the Angrist-Pischke first-stage F statistics are not available. However, the Stock and Yogo critical values (2002) for the i.i.d. case can be used with caution, or the Staiger and Stock (1997) rule-of-thumb that the F-statistic should be ten or greater can be applied.

The Kleibergen-Paap Wald rk F statistic is the appropriate test for weak identification in these regressions as robust standard errors are used. Underidentification is tested for by the by the Kleibergen-Paap rk LM statistic.

When the IV regression is run using the entire database, the RWHI term becomes insignificant, indicating that the endogeneity bias inherent in the use of OLS overestimates their impact on trade flows. However, the interaction term remains significant and positive.

6.3 IV Results – Sample Split

The result that RoO do not impact upon trade flows only holds for the database as a whole. When the sample is split into three subsectors, differences across the categories of goods emerge (see Table 5). The primary goods subsector fails to reject the nulls of weak and under identification, but the other two categories pass the diagnostic tests. Whilst the basic processing goods column maintains the negative sign it exhibited in the OLS regression, the results now indicate the RoO actually promote trade in highly processed goods. In addition, the interaction term has become negative across the sample splits (albeit insignificantly so for basic processed goods). This was the sign predicted in Section 4.2. The coefficients on the preferential margin variable also change signs, becoming positive and significant, suggesting that the higher differential between the original tariff and the preferential tariff the greater the trade flows. Again, this is the sign predicted in Section 4.2. The GDP variables and applied tariff variables still have unexpected signs.

When the IV regression is run at a more disaggregated section level, is it found that for the 21 sections, the coefficient of the RWHI variable is insignificant for three sections, positive for eight and negative for four. Six of the regressions failed IV diagnostic tests so their results are not reported here (see Table 6).

The different signs on the coefficients of the RoO indices is not surprising; as RoO limit permitted third country inputs, they may have the effect of altering the pattern of intermediate good procurement by encouraging firms to source inputs from within the Cumulation Zone even if these are not globally efficient (Manchin and Pelkmans-Balaoing (2007), Cadot and de Melo (2008)). Rodriguez (2001) and Estevadeordal et al (2009) have identified that stricter RoO for final goods increase trade in intermediates. That is, as RoO for the final goods increase, the demand for PTA sourced intermediate goods increases even if these are relatively expensive compared to RoW alternatives. Essentially, strict RoO for final goods means that firms have to make a choice between shifting their input sources to less efficient permitted suppliers or losing preferential market access.

7 Conclusions

The growing number of preferential agreements indicates that Rules of Origin (RoO) will be an increasingly important trade policy issue over the coming years. This paper

contributes to the empirical literature on the effects of RoO in two ways; firstly by proposing weighting existing indices of RoO restrictiveness to better capture their effective restrictiveness (the RWHI), and also through the development of an instrumental variable for RoO.

The RWHI reports similar results to the Harris Index and appears to be a valid index for capturing the restrictiveness of RoO, but with a stronger theoretical foundation than non-weighted indices. In the OLS regressions, RoO are shown to have a negative impact on trade flows, in keeping with the existing literature. However, the IV regressions suggest that the impact of RoO varys across different categories of goods, and that the story may be complicated than it appears from simple OLS analysis.

Future work arising from this paper includes further examination of the trade diversion effect of RoO by looking production chains and identifying important inputs for various final goods. Theory would suggest that intra-PTA intermediate goods should experience an increase in demand when the RoO for final goods increase. However, RoO would be expected to have a negative effect on non-intermediate goods.

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Table 1: OLS Results – Complete Database

Dependent Variable= Log (1+Imports in Constant 1000 USD)	**Complete Database**
RWHI	-0.653***
	(0.0261)
RWHI*Preference Margin	0.0227***
	(0.00610)
Applied Tariff	0.0880***
	(0.00985)
Preference Margin	-0.0981***
	(0.0133)
GDP Partner	-5.553***
	(0.169)
GDP per Capita Partner	6.210***
	(0.175)
GDP Reporter	-0.950***
	(0.107)
GDP per Capita Reporter	2.068***
	(0.107)
Dummy [1 if RoO, 0 if no RoO]	0.708***
	(0.0215)
Constant	102.8***
	(4.176)
Importer-Exporter-Product code Dummies	Yes
Year Dummies	Yes
Observations	719,253
Number of identifier	181,352
R-squared	0.560

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: OLS Results – Sample Split by Subsector

Dependent Variable= Log (1+Imports in Constant 1000 USD)	**Primary Goods**	**Basic Processing**	**Highly Processed**
RWHI	-0.0973	-0.810***	-0.418***
	(0.0938)	(0.0402)	(0.0571)
RWHI*Preference Margin	0.0373**	0.0456***	-0.0193
	(0.0146)	(0.00817)	(0.0125)
Applied Tariff	0.0891***	-0.00779	0.150***
	(0.0227)	(0.0186)	(0.0136)
Preference Margin	-0.111***	-0.131***	-0.0207
	(0.0312)	(0.0179)	(0.0271)
GDP Partner	-3.946***	-3.171***	-8.607***
	(0.374)	(0.279)	(0.253)
GDP per Capita Partner	4.962***	3.876***	9.177***
	(0.392)	(0.284)	(0.264)
GDP Reporter	-1.811***	-1.201***	-0.479***
	(0.234)	(0.192)	(0.154)
GDP per Capita Reporter	2.858***	2.905***	1.272***
	(0.237)	(0.195)	(0.152)
Dummy [1 if RoO, 0 if no RoO]	0.161**	0.852***	0.576***
	(0.0802)	(0.0395)	(0.0404)
Constant	84.70***	59.07***	153.5***
	(9.255)	(7.117)	(6.197)
Importer-Exporter-Product code Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
Observations	158,543	238,659	322,051
Number of identifier	41,259	59,546	80,547
R-squared	0.553	0.546	0.574

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Selected OLS Results – Sample Split by 21 Sections

Dependent Variable= Log (1+Imports in Constant 1000 USD)	RWHI	RWHI*Preferential Margin	Sample Size
Section 1	-0.1827 (0.3345)	-0.0039 (0.0371)	15,819
Section 2	-0.6504** (0.2699)	0.0277 (0.0286)	30,637
Section 3	-2.2617** (0.9065)	0 .1767** (0.0947)	4,274
Section 4	0.1980 (0.1862)	0.1151*** (0.0283)	30,087
Section 5	-0.3743 (0.6847)	-0.1392 (0.0898)	10,690
Section 6	-0.2018* (0.1096)	-0.0536* (0.0295)	86,552
Section 7	-0.1543 (0.1618)	0.0685* (0.0387)	38,136
Section 8	0.5336 (0.3418)	0.0768* (0.0445)	7,058
Section 9	-1.4893** (0.6878)	-0.1245** (0.0583)	9,943
Section 10	0.0646 (0.2745)	0.1040*** (0.0341)	18,074
Section 11	-0.8342*** (0.0792)	0.0509*** (0.0098)	110,874
Section 12	-0.2240 (0.1959)	0.0308 (0.0427)	10,710
Section 13	-0.2536 (0.1909)	0.0278 (0.0285)	23,720
Section 14	0.9815* (0.5261)	-0.1016 (0.0868)	5,026
Section 15	-0.4357*** (0.1245)	0.0597*** (0.0223)	82,154
Section 16	-0.8368*** (0.0871)	-0.0332* (0.0193)	149,267
Section 17	-0.2261 (0.2598)	0.1987*** (0.0589)	18,033
Section 18	-1.4956*** (0.1884)	-0.0236 (0.0392)	35,950
Section 19	-0.1256 (1.4007)	-0.4334 (0.3284)	1,245
Section 20	-0.7117*** (0.2213)	0.0452 (0.0288)	29,503
Section 21	-2.7674*** (0.7954)	-0.5156*** (0.1265)	1,501

Table 4: IV Results - Complete Database

Dependent Variable= Log (1+Imports in Constant 1000 USD)	**Complete Database**
RWHI	2.400
	(1.702)
RWHI*Preference Margin	0.934***
	(0.358)
Applied Tariff	-0.116
	(0.080)
Preference Margin	-2.223***
	(0.845)
GDP Partner	-6.896***
	(0.770)
GDP per Capita Partner	7.245***
	(0.708)
GDP Reporter	-0.159
	(0.321)
GDP per Capita Reporter	2.104***
	(0.116)
Dummy [1 if RoO, 0 if no RoO]	-2.300
	(1.578)
Importer-Exporter-Product code Dummies	Yes
Year Dummies	Yes
Observations	672,874
RWHI Angrist-Pischke F test	61.12
RWHI *Pref Margin Angrist-Pischke F test	73.18
RWHI Angrist-Pischke χ^2	61.13
(p-value)	(0.000)
RWHI *Pref Margin Angrist-Pischke χ^2 test	73.19
(p-value)	(0.000)
Kleibergen-Paap Wald rk F statistic	14.929
Kleibergen-Paap rk LM statistic	30.469
(p-value)	(0.000)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: IV Results – Sample Split by Subsector

Dependent Variable= Log (1+Imports in Constant 1000 USD)	**Primary Goods**	**Basic Processing**	**Highly Processed**
RWHI	-1.853	-9.367***	1.017**
	(20.685)	(1.515)	(0.495)
RWHI*Preference Margin	-0.326***	-0.275	-0.750***
	(0.099)	(0.188)	(0.077)
Applied Tariff	0.181	-0.008	0.301***
	(0.219)	(0.046)	(0.022)
Preference Margin	0.677***	0.800*	1.597***
	(0.199)	(0.459)	(0.171)
GDP Partner	-3.266	-1.893***	-9.629***
	(8.652)	(0.332)	(0.297)
GDP per Capita Partner	4.352	-0.299	10.991***
	(10.650)	(0.765)	(0.292)
GDP Reporter	-2.065**	-3.572***	-0.560***
	(0.952)	(0.737)	(0.192)
GDP per Capita Reporter	2.983**	3.264***	1.312***
	(1.392)	(0.283)	(0.178)
Dummy [1 if RoO, 0 if no RoO]	1.854	9.476***	-0.075
	(17.444)	(1.651)	(0.349)
Importer-Exporter-Product code Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
Observations	147,331	223,878	301,665
RWHI Angrist-Pischke F test	2.02	93.42	1040.06
RWHI *Pref Margin Angrist-Pischke F test	366.95	163.54	2380.75
RWHI Angrist-Pischke χ^2	2.02	93.43	1040.14
(p-value)	(0.155)	(0.000)	(0.000)
RWHI *Pref Margin Angrist-Pischke χ^2 test	367.01	163.56	2080.94
(p-value)	(0.000)	(0.000)	(0.000)
Kleibergen-Paap Wald rk F statistic	1.013	29.122	553.587
Kleibergen-Paap rk LM statistic	2.036	63.119	1433.917
(p-value)	(0.1536)	(0.000)	(0.000)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Selected IV Results – Sample Split by 21 Sections

Dependent Variable= Log (1+Imports in Constant 1000 USD)	RWHI	RWHI* Preferential Margin	Sample Size	Note
Section 1	11.6615 (10.1426)	-0.4844 (0.4190)	14,541	
Section 2	41.1415* (24.8023)	0.1870 (0.2283)	28,714	
Section 3	-26.0109** (12.3836)	-2.0303 (1.5482)	3,941	
Section 4	7.2153** (3.5270)	-0.4190* (0.2540)	28,549	
Section 5			9,674	Fails diagnostic tests
Section 6	0.4038 (0.8273)	-1.8251*** (0.1553)	81,097	
Section 7	3.1786** (1.3372)	-3.8844*** (0.5686	36,379	
Section 8	-36.6329*** (11.4831)	0.5805** (0.2819)	6,750	
Section 9			9,000	Fails diagnostic tests
Section 10	6.5285*** (1.4935)	-0.6034*** (0.1606)	17,277	
Section 11	-21.5863*** (3.3018)	0.6187*** (0.0693)	102,653	
Section 12			10,118	Fails diagnostic tests
Section 13	-0.1182 (4.8130)	0.03056 (0.1849)	22,152	
Section 14			4,679	Fails diagnostic tests
Section 15			76,782	Fails diagnostic tests
Section 16	3.9963*** (1.3949)	-0.9783*** (0.2036)	139,692	
Section 17	3.9152** (1.5730)	-0.3414 (0.3627)	16,718	
Section 18	-7.6186*** (1.5346)	0.5542* (0.3289)	33,585	
Section 19			1,155	Fails diagnostic tests
Section 20	15.2136* (8.4300)	0.00216 (0.15044)	28,002	
Section 21	14.4389** (6.8266)	0.9045* (0.5247)	1,416	

Appendix

Appendix Table 1: Harris Index	
The Harris index uses a system of points for the different rule forms. Points are added or subtracted based on the components of the Rules of Origin resulting in a single ordinal measure of restrictiveness.	
Change of Classification Points	
Change Item	+2
Change Subheading	+4
Change Heading	+6
Change Chapter	+8
Change Subheading/Change Heading w/AI	+2
Exception Points	
Ex Item	+4
>ex Item and ≤ex Subheading	+5
>ex Subheading and ≤ex Heading	+6
>ex Heading and ≤ex Chapter	+7
>ex Chapter	+8
Addition Points	
Add Item	-5
>add Item and ≤add Subheading	-6
>add Subheading and ≤add Heading	-7
>add Heading and ≤add Chapter	-8
add without Change of Classification	+8
Value Test Points	
>0% and ≤40%	+5
>40% and ≤50%	+6
>50% and ≤60%	+7
>60%	+8
Net Cost	+1
Technical Requirement Points	+4
Alternative Rule Points	-3
Source: Harris, 2007	

Appendix Table 2: PTAs and Countries in the Sample		
PTA	**Countries**	**Year Established**
Australia – USA	Australia USA	2005
Bahrain – USA	Bahrain USA	2006
CAFTA RD	Costa Rica Dominican Republic El Salvador Guatemala Honduras Nicaragua USA	2006
Canada – Chile	Canada Chile	1997
Canada – Costa Rica	Canada Costa Rica	2002
Chile – China	Chile China	2006
Chile – Korea	Chile Korea	2004
Chile – USA	Chile USA	2004
Japan – Mexico	Japan Mexico	2005
Mercosur	Argentina Brazil Paraguay Uruguay	1991
Morocco – USA	Morocco USA	2006
Oman – USA	Oman USA	2009
P4	Brunei Chile New Zealand Singapore	2006
Peru – USA	Peru USA	2009
Singapore – USA	Singapore USA	2004

Appendix Table 3: Country-Pairs by PTA					
Australia -USA	Australia	USA	**CAFTARD**	El Salvador	Dominican Republic
Australia-USA	USA	Australia	**CAFTARD**	El Salvador	Guatemala
Bahrain-USA	Bahrain	USA	**CAFTARD**	El Salvador	Honduras
Bahrain-USA	USA	Bahrain	**CAFTARD**	El Salvador	Nicaragua
CAFTARD	Costa Rica	Dominican Republic	**CAFTARD**	El Salvador	USA
CAFTARD	Costa Rica	Guatemala	**CAFTARD**	USA	Costa Rica
CAFTARD	Costa Rica	Honduras	**CAFTARD**	USA	Dom Republic
CAFTARD	Costa Rica	Nicaragua	**CAFTARD**	USA	Guatemala
CAFTARD	Costa Rica	El Salvador	**CAFTARD**	USA	Honduras
CAFTARD	Costa Rica	USA	**CAFTARD**	USA	Nicaragua
CAFTARD	Dominican Republic	Costa Rica	**CAFTARD**	USA	El Salvador
CAFTARD	Dominican Republic	Guatemala	**Canada -Chile**	Canada	Chile
CAFTARD	Dominican Republic	Honduras	**Canada -Chile**	Chile	Canada
CAFTARD	Dominican Republic	Nicaragua	**Canada -Costa Rica**	Canada	Costa Rica
CAFTARD	Dominican Republic	El Salvador	**Canada -Costa Rica**	Costa Rica	Canada
CAFTARD	Dominican Republic	USA	**Chile-China**	Chile	China
CAFTARD	Guatemala	Costa Rica	**Chile-China**	China	Chile
CAFTARD	Guatemala	Dominican Republic	**Chile-Korea**	Chile	Korea
CAFTARD	Guatemala	Honduras	**Chile-Korea**	Korea	Chile
CAFTARD	Guatemala	Nicaragua	**Chile - USA**	Chile	USA
CAFTARD	Guatemala	El Salvador	**Chile - USA**	USA	Chile
CAFTARD	Guatemala	USA	**Japan - Mexico**	Japan	Mexico
CAFTARD	Honduras	Costa Rica	**Japan - Mexico**	Mexico	Japan
CAFTARD	Honduras	Dom Rep	**Mercosur**	Argentina	Brazil
CAFTARD	Honduras	Guatemala	**Mercosur**	Argentina	Paraguay
CAFTARD	Honduras	Nicaragua	**Mercosur**	Argentina	Uruguay
CAFTARD	Honduras	El Salvador	**Mercosur**	Brazil	Argentina
CAFTARD	Honduras	USA	**Mercosur**	Brazil	Paraguay
CAFTARD	Nicaragua	Costa Rica	**Mercosur**	Brazil	Uruguay
CAFTARD	Nicaragua	Dominican Republic	**Mercosur**	Paraguay	Argentina
CAFTARD	Nicaragua	Guatemala	**Mercosur**	Paraguay	Brazil
CAFTARD	Nicaragua	Honduras	**Mercosur**	Paraguay	Uruguay
CAFTARD	Nicaragua	El Salvador	**Mercosur**	Uruguay	Argentina
CAFTARD	Nicaragua	USA	**Mercosur**	Uruguay	Brazil
CAFTARD	El Salvador	Costa Rica	**Mercosur**	Uruguay	Paraguay

Table 3 (cntd.): Country-Pairs in Sample by PTA					
Morocco -USA	Morocco	USA	**P4**	New Zealand	Brunei
Morocco -USA	USA	Morocco	**P4**	New Zealand	Chile
Oman - USA	Oman	USA	**P4**	New Zealand	Singapore
Oman - USA	USA	Oman	**P4**	Singapore	Brunei
P4	Brunei	Chile	**P4**	Singapore	Chile
P4	Brunei	New Zealand	**P4**	Singapore	New Zealand
P4	Brunei	Singapore	**Peru - USA**	Peru	USA
P4	Chile	Brunei	**Peru - USA**	USA	Peru
P4	Chile	New Zealand	**Singapore - USA**	Singapore	USA
P4	Chile	Singapore	**Singapore - USA**	USA	Singapore

Appendix Table 4: Splitting Data into Subsectors	
Primary Goods	
Section 1 (Chapters 1-5)	Live Animals; Animal Products
Section 2 (Chapters 6-14)	Vegetable Products
Section 3 (Chapters 15)	Animal or Vegetable Fats and Oils and their Cleavage Products; Prepared Edible Fats, Animal or Vegetable Waxes
Section 5 (Chapters 25-27)	Mineral Products
Section 9 (Chapters 44-46)	Wood and Articles of Wood; Wood Charcoal; Cork and Articles of Cork; Manufactures of Straw, or Esparto or of other plaiting materials; Basket ware and wickerwork
Section 14 (Chapter 71)	Natural or Cultured Pearls, Precious or Semi-precious stones, Precious metals, Metals clad with precious metals, Metals clad with Precious Metal and Articles Thereof; Imitation Jewellery; Coin
Section 15(Chapters 72-83)	Base Metals and Articles of Base Metal
Basic Processing Goods	
Section 4 (Chapter 16-24)	Prepared Foodstuffs; Beverages, Spirits and Vinegar; Tobacco and Manufactured Tobacco Substitutes
Section 7 (Chapters 39-40)	Plastics and Articles Thereof; Rubber and Articles Thereof
Section 8 (Chapters 41-43)	Raw Hides and Skins, Leather, Fur skins and Articles Thereof; Saddlery and Harness; Travel Goods, Handbags and Similar Containers; Articles of Animal Gut (other than Silk-Worm Gut)
Section 10 (Chapters 47-49)	Pulp of Wood or of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper of Paperboard; Paper and Paperboard and Articles Thereof
Section 11 (Chapters 50-63)	Textiles and Textile Articles
Section 12 (Chapters 64-67)	Footwear, Headgear, Umbrellas, Sun Umbrellas, Walking-Sticks, Seat-Sticks, Whips, Riding-Crops and Parts Thereof; Prepared Feathers and Articles made Therewith; Artificial Flowers; Articles of Human Hair
Section 13 (Chapters 68-70)	Articles of Stone, Plaster, Cement, Asbestos, Mica or Similar Material; Ceramic Products; Glass and Glassware
Highly Processed Goods	
Section 6 (Chapters 28-38)	Products of the Chemical or Allied Industries
Section 16 (Chapters 84-85)	Machinery and Mechanical Appliances; Electrical Equipment; Parts Thereof; Sound Recorders and Reproducers, and Parts and Accessorise of Such Articles
Section 17 (Chapters 86-89)	Vehicles, Aircraft, Vessels and Associated Transport Equipment
Section 18 (Chapters 90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof
Section 19 (Chapter 93)	Arms and Ammunition; Parts and Accessories Thereof
Section 20 (Chapters 94-96)	Miscellaneous Manufactured Articles
Section 21 (Chapter 97)	Works of Art, Collectors' Pieces and Antiques

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