The Determinants of Parts and Components Trade:

The Role of Trust and Commitment*

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Abstract

We draw on the knowledge from the fields of international economics and international marketing to improve our insights on the determinants of bilateral trade, in particular trade in Parts and Components (P&C). While international trade economists have been focusing on macro-level variables to assist in policy development, international marketing researchers have been pre-occupied with strategies to improve the relationship between the exporter and importer. Using gravity models, trade economists have confirmed the importance of trade agreements, infrastructure and institutional quality among others, as important determinants of trade. International marketers, on the other hand, point to the critical role of trust and commitment among partners as antecedents to cross border relationships. In this paper, we introduce macro level variables to represent the antecedents of trust and commitment between dyads in a trade gravity model. We base our findings on 17,030 bilateral relationships involving 291 SITC 5 digit products that we classify as P&C. Our findings confirm the importance of cultural distance, business ethics and transaction specific investments in a bilateral trade relationship. In particular, we find that trust and commitment among partners are more important in P&C trade. We highlight some important policy implications based on our findings.

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1.0 Introduction

Trade in parts and components (P&C) contribute such a substantial part of international trade, particularly in East Asia, that it's evaluation and analysis has attracted the attention of a number of trade economists (Arndt, Jones, Kierzkowski, Athukorala, Menon, Kimura, Obashi, Yamashita, among others). In addition to the volume of trade that involves P&C, the inability of traditional trade theories to fully explain the phenomenon justifies the interest among these researchers. Previous researchers have focused their efforts in explaining the trends in P&C trade (Athukorala, 2005; Athukorala and Menon, 2010), it's determinants (Athukorala and Yamashita, 2006; Yamashita, 2011), location (Ando, 2006; Arndt and Kierzkowski, 2001) and theoretical reasoning behind such trade (Jones, Kierzkowski and Lurong, 2005; Kimura and Obashi, 2011). However, interest in P&C trade is not limited only to international trade economists. Concurrent with the developments in the international economics area, researchers in the field of international industrial marketing have also been involved in discovering the driving force behind the relationship between importers and exporters. In particular, B2B relationships between dyads across borders also include P&C trade. One area that has been the focus of many international marketers is trust across borders among partners in a trading relationship (Zaheer and Zaheer, 2006; Katsikeas et. al., 2009; Dyer and Chu, 2003). Although some aspects of trust have been considered by trade economists by including cultural distance in empirical models (Child et. al., 2009; Linders et. al., 2005), importer-exporter relationship has largely been ignored. Thus, in addition to updating the works of Athukorala, Menon, and Yamashita, the objective of this paper is to draw on the knowledge derived from both the fields of international economics and international marketing so as to enrich our understanding of the antecedents/determinants of P&C trade. This paper is an effort to directly answer the call made by Kimura and Obashi (2011) for more inter-disciplinary research on P&C trade. In particular, we empirically test the importance of importer-exporter relationship as an antecedent of P&C bilateral trade. More specifically, we attempt to show that the degree of trust and commitment between the dyads in an international relationship contributes significantly to bilateral trade. We also question whether or not such a relationship is more prominent in P&C trade, when compared with non P&C manufacturing trade.

In the next section we highlight some key attributes of P&C trade which provides a context for explaining the determinants of bilateral trade in such products. Section 3 reviews literature from the

international economics and marketing fields to identify the main variables that influences P&C trade. We explain the sources of data and methodology in section 4, followed by a discussion of our findings. In section 6 we conclude our paper.

2.0 Parts and Components Trade Patterns

Three important factors have contributed towards the explosion of P&C trade worldwide. First, the introduction of production technology that allowed for the fragmentation of production stages. In the Information Technology (IT) sector, this technology is attributed to the IBM PC with its modular product architecture which allowed fixed and publicly known components to be produced by firms (Langlois and Robertson, 1995). Component producers could now work independently based on their core capabilities and take advantage of location and ownership advantages (Bonham et. al., 2007). The standardization of components reduced the barriers to entry and lowered prices in a highly competitive environment. Potential reduction in production costs motivated PC producers to search for cheaper locations to set up subsidiaries or establish links with suppliers (Athukorala and Yamashita, 2008). A similar rationale applied for other machineries including the automobile industry (Athukorala, 2005). Second, the reduction of trade barriers (particularly import tariffs) worldwide stemming from the various GATT/WTO rounds of negotiations allowed for easier movement of goods (and later, services) across international borders. The Kennedy Round focused on the reduction of tariffs on manufactured goods and since the completion of that round, trade policy which previously was biased against manufactured goods had been reversed (Bridgman et. al., 2011). Third is the rise of the East Asian economies (including China) as factories for the world (Kimura and Obashi, 2011). The share of East Asia (excluding Japan) in total world exports of P&C increased from 20.2% in 1992/93 to 34.1% in 2006/7 (Athukorala, 2011). The governments of the East Asian nations (Singapore, Chinese Taipei, Hong Kong SAR, South Korea, Malaysia, Thailand and China in particular) have been proactive in promoting their respective locational advantages to attract FDI from Japanese, American and European multinationals, More recently, intra-regional FDI has also been courted with. In addition to reducing trade barriers, East Asian governments have vied with each other to develop their infrastructures and human resources so that international production networks include firms from their respective countries.

The trends and patterns of P&C trade has been explained extensively by others (Athukorala, 2005; Athukorala and Menon, 2010). We highlight below two important features of trade in P&C that may not have been emphasized in previous papers that dealt with the subject (Athukorala and Yamashita, 2006, 2008; Kimura and Obashi, 2011; Athukorala, 2011 and Yamashita, 2011). The first feature concerns the

specific intermediate goods that dominate trade in P&C. Table 1 extracts the top 20 of the 291 5-digit SITC product categories included in our analysis. The trade values are averaged for the 2008-2009 period. These 20 top categories make up 51.45% of total imports of P&C and 49% of total exports. The following 20 product categories (21-40) make up an additional 16-17% of total trade while the last 100 product categories add a mere 2.44% of total imports. Among the top 20 product categories, automobile related P&C make up 20.14% of imports (8 items), while 22.92% of total imports are related to electronic and electrical P&C (8 items). There are a few items which can be considered lumpy products like P&C for airplanes and helicopters (SITC 79295), turbojets and turbo-propellers (SITC 71491) and civil engineering machinery (SITC 72399). However, it should be noted that the top 2 product categories (SITC 75997 Parts of automatic data processing machines and units thereof, magnetic or optical readers and machines for transcribing and processing data n.e.s. and SITC 78439 Parts and accessories n.e.s. for tractors, motor cars and other motor vehicles, trucks, public transport vehicles and road vehicles, n.e.s) seem to be a potpourri of various parts and accessories. These two items make up 8.01% and 7.62% of total imports respectively, and may include items that do not fit perfectly into other SITC categories. These two product categories are also the top two export items.

Table 1. Top 20 Parts and Components product categories, 2008/09

SITC	Imports (%)	Cumulated Imports (%)	Exports (%)	Cumulated Exports (%)
75997	8.01	8.01	7.40	7.40
78439	7.62	15.63	8.23	15.63
76493	4.43	20.05	3.63	19.26
79295	3.20	23.26	2.91	22.17
78432	2.95	26.20	2.70	24.87
77637	2.40	28.61	2.23	27.10
71491	2.22	30.83	1.92	29.02
78434	2.19	33.02	2.08	31.11
77689	1.86	34.87	1.05	32.15
77259	1.83	36.71	1.86	34.01
89319	1.64	38.35	1.59	35.59
71392	1.58	39.93	1.68	37.28
71391	1.57	41.50	1.38	38.66
77812	1.52	43.02	1.54	40.20
77261	1.51	44.53	1.59	41.79
71322	1.47	46.00	1.46	43.25
71323	1.47	47.47	1.64	44.89
77282	1.36	48.83	1.34	46.23
72399	1.32	50.14	1.40	47.63
78433	1.31	51.45	1.37	49.00

Source: *UN Comtrade*

The second interesting feature concerns those bilateral trade relationships that dominate the P&C trade. Table 2 extracts out the top 50 bilateral relationships in the P&C trade. As can be seen in the last row of the table, these 50 trade relationships make up 40.63% and 36.94% of import and export of global P&C trade respectively. Among these top 50 trade relationships, there are 22 distinct countries, 14 of which are involved in both import and export relationships. All the usual suspects are in the list. On the import side, Germany and the US dominate with 6.94% and 6.4% respectively. Asian economies like Hong Kong SAR, Singapore, South Korea and Japan are also major importers of P&C. On the export side, three main countries dominate: the US, China and Germany comprising a total of 23.52% of total P&C exports. Among the bilateral relationships, the imports of US from China, Canada from the US, Hong Kong from China and US from Mexico are among the leading ones. On the export side, China's exports to Hong Kong, Canada to the US and Mexico to the US are the three leading ones.

A cursory look at these 50 bilateral relationships provides us with some indications as to the determinants of P&C trade. First, distance between trading partners is obvious as the main trade relationships seems to take place more among neighbors (Hong Kong-China; US-Canada; Japan-China; Germany-France etc.). Second, trade between developed and developing economies is also quite prominent. Nearly every relationship in Table 2 that involves a developing country on one side has a developed country on the other side. At the same time, trade relationships among developed countries are also significant (US-Canada; Japan-US etc.). It should also be noted that the developing countries listed in Table 2 are mainly middle and upper middle income countries. Third, there is an obvious absence of countries from the African and South American continents. While distance can be attributed to this, lack of proper infrastructure and other transaction costs involved in dealing with such countries may be additional reasons. These three reasons and other determinants are the focus of our paper in the following sections.

Table 2. Main Bilateral Relationships in P&C Trade

Importer	Exporter	Import (%)	Cumulative Imports (%)	Exports (%)	Cumulative Exports (%)
United States	China	2.23	2.23	0.47	0.47
Canada	United States	2.15	4.38	1.62	2.09
Hong Kong SAR	China	2.13	6.51	2.73	4.82
United States	Mexico	2.09	8.60	1.84	6.67
China	Japan	1.98	10.58	1.00	7.66
Mexico	United States	1.55	12.13	2.35	10.01
United States	Canada	1.52	13.65	2.49	12.50
United States	Japan	1.48	15.13	0.50	13.00
France	Germany	1.28	16.41	0.92	13.92
Japan	China	1.16	17.57	1.65	15.57
United States	Germany	0.95	18.52	0.51	16.08
Singapore	United States	0.88	19.40	0.34	16.42
Germany	France	0.80	20.20	1.26	17.68
Germany	China	0.76	20.96	0.66	18.34
United Kingdom	Germany	0.76	21.72	0.46	18.80
China	Germany	0.76	22.48	0.56	19.36
Spain	Germany	0.72	23.20	0.33	19.69
United Kingdom	United States	0.71	23.90	0.59	20.28
Germany	Czech Republic	0.67	24.57	0.52	20.80
France	United States	0.66	25.23	0.43	21.23
Austria	Germany	0.65	25.88	0.64	21.87
Italy	Germany	0.64	26.53	0.55	22.42
Germany	United Kingdom	0.64	27.17	0.71	23.13
Japan	United States	0.63	27.81	1.47	24.60
Hong Kong SAR	Japan	0.63	28.43	0.21	24.81
Germany	Austria	0.60	29.04	0.58	25.39
Germany	United States	0.60	29.64	0.96	26.35
Spain	France	0.58	30.22	0.39	26.74
United States	France	0.58	30.80	0.41	27.15
Korea, Rep	Japan	0.55	31.35	0.17	27.32
Korea, Rep	China	0.55	31.90	1.16	28.48
Netherlands	Germany	0.54	32.44	0.40	28.88
Czech Republic	Germany	0.52	32.97	0.77	29.64
Germany	Italy	0.52	33.48	0.58	30.23
Thailand	Japan	0.51	34.00	0.22	30.45
Mexico	China	0.50	34.50	0.01	30.46
United States	United Kingdom	0.50	35.00	0.58	31.04
China	United States	0.50	35.50	1.63	32.67
Germany	Hungary	0.48	35.98	0.37	33.04
Belgium	Germany	0.48	36.46	0.28	33.32
Germany	Poland	0.46	36.93	0.53	33.84
France	Italy	0.46	37.39	0.27	34.11
Malaysia	United States	0.45	37.84	0.30	34.41
Poland	Germany	0.44	38.28	0.53	34.94
Hungary	Germany	0.43	38.71	0.57	35.51
Germany	Japan	0.40	39.10	0.16	35.66
Switzerland	Germany	0.39	39.49	0.32	35.98
Singapore	Malaysia	0.39	39.88	0.45	36.43
United Kingdom	France	0.37	40.23	0.19	36.62
Singapore	China	0.37	40.63	0.32	36.94

Source: *UN Comtrade*

3.0 Literature Review

Differences that exist between countries motivate trade, just as differences among individuals forces specialization and exchange. Early international trade theories tend to explain the sources of differences – whether due to differences in factor productivity (David Ricardo) or in factor endowments (Hecksher-Ohlin). Newer trade theories however emphasize similarities between countries to explain the nature of trade. In particular, economies of scales advantages and the desire for greater choices are reasons given for greater intra-industry trade (Helpman and Krugman, 1985; Krugman, 1980). Intra-industry trade is likely to be larger among countries of similar size and factor proportions, as evidenced by trade among Western European countries (Greenaway and Milner, 1986).

3.1 General Determinants of Bilateral Trade

The use of gravity equations has dominated empirical research in international trade. It has been used extensively to estimate various factors affecting bilateral trade – from currency unions (Rose, 2000) to the Dalai Lama effect (Fuchs and Klann, 2010). The general gravity framework theorizes that "the volume of trade between two countries is proportional to the product of an index of their economic size, and the factor of proportionality depends on measures of 'trade resistance' between them" (Helpman, Melitz and Rubinstein, 2008:442). While geographical distance between the two countries is used to capture all kinds of resistance, the tradition of identifying commonalities among countries to explain bilateral trade has been a focus of attention in recent years. The underlying logic behind the reason why countries that are more similar tend to trade more with each other is transaction costs. Bae and Salomon (2010) suggests that various distances among countries - political, regulatory, economic, cultural or cognitive - are manifested in the "liability of foreignness" (Hymer, 1960) which results in an increase in various costs including coordination, knowledge transfer, labour and legal costs for the trading firm. To minimize this liability, international exchange tends to take place among firms from more similar countries. Thus, countries that share a common border, a common language, a common history (e.g. colonial master), a common currency and a common political system tend to trade more with each other (Frankel, *et. al.*, 1998). It can be argued however, that these commonalities stem from the similarities in values, behavior and attitudes (or in a general sense, culture) of the people in the two countries.

Thus, the GDPs and GDP per capita of both partners and the geographic distance between them are the most common determinants of bilateral trade. Other "trade resistance" factors are added based on the specific focus of various scholars.

3.2 Specific Determinants of International Trade in Parts and Components

When examining the specific determinants of trade in P&C. one should expect some overlaps with the general determinants. Based on the theory of trade under imperfect competition, countries would trade more with partners with a larger GDP because of the scale effect (Jones et. al., 2005). In addition, GDP per capita also acts as a proxy for the economic depth of countries, which is conducive for international production networks (Grossman and Helpman, 2005; Athukorala and Yamashita, 2006). GDP per capita has also been used as a proxy for the quality of infrastructure in countries - another important determinant of P&C trade (Egger and Egger, 2005). Geographical distances between countries also represent transportation and time costs, an important variable in vertical trade. Related factors like sharing a common border, language and polity may also be significant as transaction costs can be reduced if partners are able to understand each other more easily (Athukorala and Yamashita, 2006). Thus, the geographic proximity of Japan to China for example, might explain a lower coordination cost for firms from these countries, compared to those incurred by American firms intending to offshore some of their production blocks in China (Dean et. al., 2009).

The theory of comparative advantage provides a good basis for locational advantages that a nation may have over another. Relative labour cost is an important determinant of vertical specialization (Jones, 2000). More specifically, unit labour cost (ULC) which takes into account both wage rates and productivity has been found to be a significant determinant of P&C trade (Yamashita, 2011). The shifting of labour intensive production blocks within the PC industry to East Asian countries in the 1980s for instance, was motivated by an abundant supply of low-wage labour and reasonably priced high skilled engineers (Bonham et. al., 2007). Since goods may cross multiple borders in P&C trade, import tariffs influences the extent of trade. Bridgman (2011) proved that falling tariffs are in fact more important in explaining greater P&C trade than falling transportation costs. As such, membership of partners in a common regional trading bloc provides a seamless movement of these goods resulting in trade creation among member countries (Ramasamy, 2011). The proposal of an Asian Economic Community which encompasses several key economies in East Asia (ASEAN, Japan, China and South Korea) for instance, would facilitate smoother back and forth trade in P&C. Yamashita (2011) found that the quality of

infrastructure (proxied by time involved in trade facilitation) and institutions (proxied by an index of governance) are also significant determinants of P&C trade for the US and Japan.

As a large portion of P&C trade is among subsidiaries of multinationals, the stock of FDI of one country in another is a good measure of the extent of MNC activity. Gorg (2000) for instance found that US FDI in the EU was strongly related to US imports of P&C. Similarly, East Asian exports of PC parts and components have also been influenced by the inward FDI they have received, particularly from Japan, US and the EU countries (Bonham et. al., 2007). Exchange rates movements over time can also reflect cost competitiveness (Soloaga and Winters, 2001) of the exporting country. Ceteris paribus, a depreciating currency reduces the cost of production and promotes more exports of P&C (Yamashita, 2011). However, when evaluating the exports of P&C of East Asian countries, Jongwanich (2010) found the exchange rates to be an insignificant predictor of P&C trade. Since P&C trade may involve more than two countries, the real effective exchange rates (REER) of one country may have to be combined with the REER of other supplier countries to obtain the exact role of exchange rates (Thorbecke, 2011).

In sum, the purpose of an international production network is to reduce costs of production by taking advantage of locational factors that a country provides. Thus, the determinants that act specifically for P&C trade are those that reduce the direct and indirect costs related to the production and movements of P&C across borders.

3.3 Importer – Exporter Relationship Quality

The industrial marketing literature is rich in conceptual and empirical work on a wide range of issues that pertain to buyer-seller relationships (Morgan and Hunt, 1994). The ideas developed at a domestic dyad level has been also extended to importer-exporter relationships by international marketing scholars (Skarmeas and Robson, 2008; Bianchi and Saleh, 2010). A common finding that has emerged from these studies is that trust and commitment are essential for a positive outcome in exporter and importer relationship (Samiee and Walters, 2003; Hewett, Money and Sharma, 2002; Walter et. al., 2003; Dwyer, Schurr and Oh, 1987). Trust is widely recognized as a basis for all types of human interactions. In the context of inter-firm relationships, trust is defined as the willingness to rely on an exchange partner in whom one has confidence (Moorman, Zaltman and Deshpande, 1992). Trust is created when one party has confidence in the reliability and integrity of their exchange partner (Morgan and Hunt, 1994). Trust influences the success of dyad relationship because it reduces transaction costs, facilitates the

investment by the seller in relation-specific assets and motivates the seller to share more information with buyers (Dyer and Chu, 2000; Xie et. al., 2010). There are several antecedents of trust with the main ones being opportunism (Morgan and Hunt, 1994; Katsikeas et. al., 2009) and cultural distance (Amelung, 1994).

Opportunism is defined as self-interest seeking with guile (Williamson, 1985) and occurs when suppliers withhold critical information, misrepresent facts, apply trickery or take advantage of trading partners (Wathne and Heide, 2000; Williamson, 1985). The opposite of opportunistic behavior is benevolence. In an importer-exporter relationship, "an importer's benevolence towards its exporters is the importer's voluntary helping behavior beyond the call of duty designed to enhance the well being of its exporting partners" (Lee et. al., 2008:10). The reason for benevolent behavior could be either altruistic or for mutual gains. Nevertheless, such behaviors are reciprocated by the exchange partner (Lee et. al., 2008; Merrilees and Miller, 1999). Thus, an opportunistic (benevolent) importer would engender a lesser (greater) degree of trust from the exporter. National culture has a powerful influence on trust levels among partners (Doney et. al., 1998; Zaheer and Zaheer, 2006). Cultural distance, as in the case of international trade literature, negatively affects several aspects of communications between the dyad including information content, frequency and modality (Lee et. al., 2008; Dow, 2000). In other words, the liability of foreignness increases with cultural distance and negatively affects that dyad relationship.

Commitment, on the other hand, shows a desire by one party to continue a relationship with its exchange partner (Richey and Myers, 2001), by helping each other out to meet common goals (Lee et. al., 2008). Grayson and Ambler (1999) found that the higher the perceived quality of buyer-seller interactions and the greater the supplier's involvement in the buyer's marketing process, the greater the commitment by the buyer to the relationship. Antecedents of commitment include opportunism (Joshi and Arnold, 1997; Skarmeas et. al. 2002) as well as transaction specific investment (Skarmeas et. al., 2002). Transaction specific investment is similar to asset specificity in the transaction cost theory (Williamson, 1981) in that when one partner invest in assets that are highly specialized such as purchasing equipment for the sole purpose of producing for the partner (Heide and John, 1992), the level of commitment between both parties increases (Skarmeas and Robson, 2008). This is particularly true in the case of international production networks where firms incur a substantial sunk costs in "identifying location advantages and the strength of business partners, as well as building up reliable links" (Kimura and Obashi, 2011: 15).

Thus, the three common antecedents to importer-exporter relationship quality that is considered in this paper are opportunism, cultural distance and transaction specific investments.

4.0 Data and Model

In order to estimate the effects of trust and commitment on bilateral P&C trade and non-P&C manufacturing trade, we employed a version of the standard gravity model specified by Gassebner, *et. al.* (2010) modified from Rose (2004) to fit the following equation:

$$\ln(trade_{ei}) = c + \beta_1 \ln(gdp_e \times gdp_i) + +\beta_2 \ln(gdpc_e \times gdpc_i) + \beta_3 \ln(dist_{ei}) + \beta_4 \ln(IF_e \times IF_i) + \beta_5 IQ_{ei} + \gamma'' X_{ei} + \lambda_1 CD_{ei} + \lambda_2 ln(ETH_e \times ETH_i) + \lambda_3 ln(TSI_e \times TSI_i) + e_{ei} \quad \text{Eq.1}$$

where:

$trade_{ei}$ represents the real exports or imports of different trade categories (P&C or non-P&C manufacturing goods) from country *e* (exporting country) to country *i* (importing country), deflated by the US GDP deflator;

$gdp_e \times gdp_e$ is the product of the two trading countries' real GDP;

$gdpc_e \times gdpc_i$ is the product of the two trading countries' real GDP per capita;

$dist_{ei}$ is the geographical distance between the two trading countries' most populated cities;

IF_e is the exporting country's quality of trade relevant infrastructure;

IF_i is the importing country's quality of trade relevant infrastructure;

IQ_{ei} is the relative distance in institutional quality between the two trading partners.;

CD_{ei} is the cultural distance between the two trading countries;

$ETH_e \times ETH_i$ is the product of the two trading countries' national ethics;

$TSI_e \times TSI_i$ is the product of the two trading countries' transaction-specific investments;

X_{ei} is a set of controlling dummy variables to take into account common language (LANG), colonial relationship (COLONY), common colonizer (COMCOL), common border (CONTIG) and membership in a common regional trade agreement (RTA_{ei}); and

e_{ei} is the error term.

The construction of some important variables is described below.

Specification of P&C

The values of exports and imports of P&C were calculated using the approach suggested by Yamashita (2011). The procedures to identify P&C products are as follows: First, relying on UN's Broad Economic Category (BEC), we chose goods under BEC 2 (supplies), 4 (capital goods) and 5 (transport equipment) which had a sub-category titled 'parts and accessories'. 1558 items were identified and were checked to ensure that they also correspond to goods under SITC 7 and 8. Next, the items that do not belong to SITC 7 (machinery and transport equipment) and 8 (miscellaneous manufacturing) were removed. The remaining 291 items at the 5-digit SITC level were classified as P&C items for our analysis. Exports and imports from country *e* to/from country *i* of the selected items were downloaded from UN COMTRADE. The averages values of 2008 and 2009 were named $Exports\_PC_{ei}$ and $Imports\_PC_{ei}$. We also calculated the values of exports and imports of non-P&C manufacturing goods, namely $Exports\_ME_{ei}$ and $Imports\_ME_{ei}$ by subtracting $Exports\_PC_{ei}$ and $Imports\_PC_{ei}$ from the sum of exports and the sum of imports of all goods under SITC 7 and 8, respectively.

Cultural Distance (CD)

We use Kogut and Singh's (1988) index, based on Hofstede's (1980) data on national cultures to measure the cultural distance (CD_{ei}) between an exporter (*e*) and importer (*i*). A large CD_{ie} implies that the national culture of country *e* is very different from the national cultural of country *i*. Kogut and Singh's aggregation has been widely used as a measure of cultural distance and has become the proxy of choice of national cultural differences (Xu and Shenkar, 2002).

Business Ethics (ETH)

We use the average of two question items from the Global Competitiveness Report 2010-2011 (GCR) of the World Economic Forum to construct the measure of business ethics at a national level (*ETH*). The selected question instruments are listed below:

1.16. How would you compare the corporate ethics (ethical behavior in interactions with public officials, politicians, and other enterprises) of firms in your country with those of other countries in the world? (1 = among the worst in the world; 7 = among the best in the world)
1.17. In your country, how would you assess financial auditing and reporting standards regarding company financial performance? (1 = extremely weak; 7 = extremely strong)

ETH_e and ETH_i denote the business ethics of the exporting (*e*) and importing county (*i*), respectively. The measure shows that New Zealand, Sweden, Finland, Singapore, and Denmark are the top five most ethical countries. The 2010-11 report of *GCR* is based on face-to-face interviews (63%) and online surveys (27%) of a total of 12,614 business executives across 133 participating countries carried out during the 2008-2009 period.

Transaction-specific investments (TSI)

We use the average of four question items from *GCR* to construct the measure of transaction-specific investment (*TSI*) at the country level. The selected question instruments are listed below.

11.02. How would you assess the quality of local suppliers in your country? (1 = very poor; 7 = very good)
11.05. In your country, do exporting companies have a narrow or broad presence in the value chain? (1 = narrow—primarily involved in individual steps of the value chain (e.g., resource extraction or production); 7 = broad—present across the entire value chain (i.e., do not only produce but also perform product design, marketing sales, logistics, and after-sales services))
11.07. In your country, how sophisticated are production processes? (1 = not at all—labor-intensive methods or previous generations of process technology prevail; 7 = highly—the world's best and most efficient process technology prevails)
12.01 In your country, how do companies obtain technology? (1 = exclusively from licensing or imitating foreign companies; 7 = by conducting formal research and pioneering their own new products and processes)

Countries that scored high in these areas are likely to be perceived as ideal partners in terms of lower risk owing to greater reliability and are more willing to invest in specific relationships, signaling commitment to existing and potential partners. Countries that topped the list were Germany, Japan, Switzerland, Sweden, and Finland.

The sources and proxies used for these and other variables are shown in Table 3. To match the data collection period of the *GCR* (2008-2009), time-varying variables in Eq.1 were the average units of the

same period (2008-2009) measured at 2005 constant dollar[1]. Data was collected for 131 countries with 17,030 possible bilateral relationships.

The fitted models with all the r.h.s. variables were checked for the presence of (a) multicolinearity (VIF>5), (b) heteroskedasticity (rejecting the null in the White test) and (c) normality of the error term (by examining the histogram of the error term). (a) and (b) were detected but were remedied by removing the GDP per capita variable and by applying White's heteroskedasticity-consistent estimator, respectively. The presence of multicollinearity also forced us to enter *CD*, *ETH* and *TSI* in separate equations. The final fitted models provided very neat specifications after the above remedies. Collectively, the goodness-of-fit for all fitted models were satisfactory, with adjusted R^2 ranging from 58.8% to 63.6%.

[1] For example, $\boldsymbol{gdp_e \times gdp_i} = (gdp_{e,2008} \times gdp_{i,2008} + gdp_{e,2009} \times gdp_{i,2009})/2$; $gdp_{e,year}$ and $gdp_{i,year}$ are measured at the constant dollars of year 2005.

Table 3. Data and Sources

Variables	Description	Source
$Export\_PC_{ei}$	The average of 2008 and 2009 value of P&C exports from the exporting country *e* to the importing country *i* measured at constant (2005) US dollars.	UN Comtrade
$Import\_PC_{ie}$	The average of 2008 and 2009 value of P&C imports of the importing country i from the exporting country e measured at constant (2005) US dollars.	UN Comtrade
$Export\_ME_{ei}$	The average of 2008 and 2009 value of manufacturing exports (SITC 7 and 8) excluding $Export\_PC_{ei}$ from the exporting country *e* to the importing country *i* measured at constant (2005) US dollars.	UN Comtrade
$Import\_ME_{ie}$	The average of 2008 and 2009 value of manufacturing imports (SITC 7 and 8) excluding $Import\_PC_{ei}$ to the importing country i from the exporting country e measured at constant (2005) US dollars.	UN Comtrade
$gdp_e x\ gdp_i$	The product of the average real GDP (2008-2009) of country *e* and country *I* measured at constant (2005) US dollars	World Development Indicators (WDI)
$gdpc_e x\ gdpc_i$	The product of the average real GDP per capita (2008-2009) of country *e* and country *I* measured at constant (2005) US dollars (removed from the fitted equation given the needs for correcting multicollinearity)	WDI
$contig_{rp}$	1=the trading countries share a common border; 0=otherwise	CEPII Databases
$Dist_{ei}$	The geographical distance (in km) between the trading countries	CEPII Databases
$Comlang_{ei}$	1=the trading countries share a common language; 0=otherwise	CEPII Databases
$Colony_{ei}$	1=the trading countries were once in a colonial relationship; 0=otherwise	CEPII Databases
$Comcol_{ei}$	1=the trading countries had a common colonizer; 0=otherwise	CEPII Databases
RTA_{ei}	1= If country e and country i are members of a common regional trade agreement; 0=otherwise	WTO
IQei	The distance in institutional quality between country e and country i. We use three of the six dimensions that are most connected to institutional quality namely Regulatory Quality, Rule of Law and Control of Corruption. The data were combined in a similar way to the Kogut and Singh (1988) index.	www.govindicators.org
IF_e *and* IF_i	The quality of infrastructure in the trading country, measured based on 'time for processing trade' as per Yamashita (2011)	WDI
CD_{ei}	The distance in culture between country e and country I *(see text for details)*	http://geert-hofstede.com
$ETH_e x\ ETH_i$	The product of national ethics of country *e* and country *I (see text for details)*	Global Competitiveness Report 2010-11 (GCR 2010)
$TSI_e x\ TSI_i$	The product of transaction-specific investment of country *e* and country *I (see text for details)*	GCR 2010

5.0 Results and Discussion

Table 4a and 4b show the results of our estimations. Both the beta and standardized beta coefficients are reported. Column A shows the results of the base model for P&C trade which includes some of the main determinants used by previous authors including GDP of the importer and the exporter, distance, shared features like language, common colonizer etc. We have also included a dummy for membership in an RTA, a proxy for infrastructure as well as the institutional quality distance between partners. The same determinants have also been used in a separate model using non P&C products (SITC 7 plus 8 minus the 290 SITC 5 digits P&C) as the dependent variable (see Column E). Our results for the base model are consistent with the results of previous studies (Gassebner et. al., 2010; Nitsch, 2007; Rose, 2000). Briefly, bilateral trade in both P&C and non P&C manufacturing trade are greater when the economic size of the exporter and importer is larger (GDP) and when trading partners are nearer to each other (DIST and CONTIG). Bilateral trade is also influenced by commonalities like a similar language (LANG) and colonial history (COLONY and COMCOL). The quality of infrastructure is important for both types of trade, but our findings show that infrastructure quality of the exporter is marginally more important for P&C trade. This is not surprising as P&C requires more and much speedier movements between locations. The institutional quality distance (IQ) has a significant negative co-efficient for both types of trade, implying that countries that are more similar in their institutional quality tend to trade more. This determinant seems more important for P&C trade. Finally, membership in a trading bloc also contributes to greater bilateral trade. There is no significant difference between P&C and non P&C goods in this regard. Note that the results for the export and import functions are consistent.

Turning now to the main antecedents of trust and commitment, our findings show that all three factors are significant at the 1% level. Due to multicollinearity issues, the three factors are included in separate models (Columns B-D and F-H). Cultural distance represented by the Kogut and Singh index (CD) has a negative co-efficient implying that cultures that are more similar tend to trade more (Columns B and F). Cultural distance is also more important in the import function. In fact, our cultural distance variable is relatively more important than other culture variables like LANG and COMCOL as shown by the standardized betas. In other words, cultural similarity is more important than cultural familiarity in explaining bilateral trade (Linders et. al., 2005). As explained earlier, a wider cultural distance increases the liability of foreignness which may lead to difficulties in communication and coordination, not only among subsidiaries of an MNC (Bae and Salomon, 2010) but also between importers and foreign third

party suppliers. This may lead to a lower level of trust and commitment between the dyads and adversely affect trade flows.

In our study, the perceived level of business ethics in a country is used as an antecedent of opportunism. Traders with a higher level of ethics can be trusted as they are more likely to be benevolent and/or are less likely to take advantage of the shortcomings of partners. We find that our proxy to be positive and significant indicating that a higher level of business ethics in both the exporting and importing country contribute to greater bilateral trade. Two important points can be seen from our results. First, the level of ethics among exporters is more important than the perceived levels of their counterparts. The results are consistent in both the export and import equations. In fact, based on our standardized betas, the ethics of the exporter is more important than several of the traditional variables used in the past including membership in a common RTA or institutional quality distance. Second, the importance of ethics as a determinant of bilateral trade is more prominent in P&C trade. Both the beta co-efficient as well as the standardized beta co-efficient is larger in the P&C equations.

Among the three antecedents of trust and commitment, transaction specific investment (TSI) is the most important determinant of bilateral trade (columns D and H), particularly for P&C trade. In the import equation, we find that TSI is more important than all other variables (based on the standardized beta co-efficients), while for the export equation, TSI of the exporter is among the three most important variable. The quality of local suppliers, the sophistication of production processes within the country and the capacity for innovation among domestic businesses adds up to the ability of suppliers to meet the demands of buyers. It shows commitment by the supplier to the business relationship. Thus, it is not surprising that TSI plays a critical role in P&C trade.

6.0 Conclusion

In this paper, we have drawn on the knowledge from both international economics and international marketing fields to improve our understanding on the determinants of bilateral, in particular trade in P&C. While international trade economists have been focusing on macro-level variables to assist in policy development, international marketing researchers have been pre-occupied with strategies to improve the relationship between the exporter and importer. Using gravity models, trade economists have confirmed the importance of trade agreements, infrastructure and institutional quality as important determinants of trade. On the other hand, by analyzing data at the firm-level, international marketers point to the critical role of trust and commitment among partners as antecedents to a cross

border relationship. Indeed, in the present study, both conduits are found to be equally important in enhancing trade relationships. In modeling import and export, we have introduced macro level variables to represent the antecedents of trust and commitment between dyads in a gravity model. Our findings confirm the importance of cultural distance, business ethics and transaction specific investments in a bilateral trade relationship. In particular, we find that trust and commitment among partners are more important in P&C trade.

Our findings have important policy implications. First, the crucial role that transaction-specific investments play in bilateral trade, and more specifically in P&C trade, points to the need for policy-makers to invest more in raising the quality of local suppliers so that they would be capable of expanding the breadth of the value chain by increasing the sophistication of the production processes and innovation. This could be supported through tax incentives, investing in human capital development, setting up a quality supplier directory and encouraging capital inflows. Although such policies are not new, our findings provide additional support for such efforts. P&C production and trade is projected to continue to grow over the next 2 decades (Athukorala, 2011), and it would be futile for policy makers to use restrictive trade policies to interfere with its trajectory. Rather, improving the capacity of local suppliers in terms of capabilities and competitiveness would ensure that more gains are accrued. Second, our findings highlight the importance of business ethics of exporters, particularly in P&C trade. Thus, improving the level of business ethics among suppliers can no longer be seen exclusively at a firm level. Efforts at a national level to raise the general standards of ethics become equally important. While eradicating corruption in the public sector has been emphasized in the past, efforts at reducing malpractices, cheating and breaking of contracts among businesses are equally important. To uphold the rule of law would be useful, but educating the business community on its importance by encouraging industry level code of conducts, protecting whistleblowers and the like would also contribute towards a more ethical business community.

The current study is the first of its kind to include trust and commitment of international businesses into an empirical trade model. No doubt, there are limitations. These include the proxies used to represent the new variables. Other important variables like exchange rates and cost of labour have also been excluded from our current model. Moreover, a sufficient length of time series of the main variables of interest is not available to conduct a longitudinal analysis. Future work could address these shortcomings. Nevertheless, we hope that our research would motivate more interdisciplinary studies into the drivers of P&C trade.

Table 4a. Determinants of Exports (P&C and non P&C)

	Dependent variable: P&C exports								Dependent variable: Manufacturing exports (P&C exports excluded)							
	Column A		*Column B*		*Column C*		*Column D*		*Column E*		*Column F*		*Column G*		*Column H*	
	Base Model		*Cultural Distance*		*Ethics*		*TSI*		*Base Model*		*Cultural Distance*		*Ethics*		*TSI*	
Variable	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta
C	-12.512***	NA	-16.064***	NA	-21.356***	NA	-22.311***	NA	-10.071***	NA	-12.239***	NA	-16.288***	NA	-19.018***	NA
$GDP_{exporter}$	0.901***	0.395	0.848***	0.362	0.88***	0.386	0.761***	0.334	0.83***	0.403	0.805***	0.378	0.823***	0.399	0.722***	0.351
$GDP_{importer}$	0.895***	0.314	1***	0.324	0.897***	0.315	0.691***	0.242	0.854***	0.330	0.913***	0.326	0.849***	0.328	0.658***	0.254
DIST	-1.543***	-0.323	-1.357***	-0.319	-1.576***	-0.330	-1.398***	-0.293	-1.352***	-0.317	-1.246***	-0.326	-1.377***	-0.323	-1.227***	-0.288
COLONY	0.697***	0.024	0.629***	0.024	0.715***	0.025	0.709***	0.025	0.587***	0.023	0.557***	0.024	0.602***	0.024	0.599***	0.024
COMCOL	0.651***	0.038	0.113	0.006	0.544***	0.032	0.542***	0.032	0.781***	0.051	0.414***	0.023	0.705***	0.046	0.683***	0.045
LANG	0.355***	0.029	0.234**	0.018	0.266***	0.022	0.686***	0.056	0.255***	0.023	0.096	0.008	0.192***	0.017	0.559***	0.051
CONTIG	1.536***	0.064	1.043***	0.045	1.515***	0.063	1.692***	0.071	1.507***	0.071	0.994***	0.048	1.491***	0.070	1.639***	0.077
$IF_{exporter}$	-1.267***	-0.172	-1.104***	-0.148	-0.715***	-0.097	-0.227***	-0.031	-1.052***	-0.159	-0.968***	-0.144	-0.732***	-0.110	-0.149**	-0.022
$IF_{importer}$	-0.88***	-0.133	-0.368***	-0.054	-0.572***	-0.086	-0.106*	-0.016	-0.954***	-0.160	-0.54***	-0.089	-0.671***	-0.112	-0.215***	-0.036
IQ	-0.081***	-0.045	-0.029**	-0.017	-0.117***	-0.065	-0.113***	-0.063	-0.07***	-0.044	-0.03**	-0.019	-0.093***	-0.058	-0.096***	-0.059
RTA	0.473***	0.041	0.441***	0.041	0.448***	0.038	0.474***	0.041	0.361***	0.035	0.343***	0.035	0.343***	0.033	0.36***	0.035
CD			**-0.288*** **	**-0.158**							**-0.24*** **	**-0.145**				
$ETH_{exporter}$					**3.165*** **	**0.122**							**1.837*** **	**0.079**		
$ETH_{importer}$					**1.696*** **	**0.067**							**1.558*** **	**0.068**		
$TSI_{exporter}$							**5.342*** **	**0.268**							**4.618*** **	**0.256**
$TSI_{importer}$							**3.591*** **	**0.191**							**3.404*** **	**0.202**
R-squared	0.589		0.603		0.599		0.620		0.599		0.616		0.604		0.629	
Adj. R2	0.589		0.602		0.599		0.620		0.599		0.616		0.604		0.629	
S.E.	2.723		2.607		2.691		2.619		2.419		2.311		2.403		2.326	
Max. VIF	2.020		1.894		2.491		3.919		1.953		1.888		2.410		4.019	

***,**,* denote significant at 1%, 5% and 10% levels, respectively.

Table 4b. Determinants of Imports (P&C and non P&C)

	Dependent variable: P&C imports								Dependent variable: Manufacturing imports (P&C imports excluded)							
	Column A		*Column B*		*Column C*		*Column D*		*Column E*		*Column F*		*Column G*		*Column H*	
	Base Model		*Cultural Distance*		*Ethics*		*TSI*		*Base Model*		*Cultural Distance*		*Ethics*		*TSI*	
Variable	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta	Beta	Std. Beta
C	-8.612	NA	-13.340	NA	-17.629	NA	-21.911	NA	-6.047***	NA	-9.212***	NA	-11.731	NA	-17.437	NA
$GDP_{importer}$	0.016	0.007	0.093***	0.042	0.013	0.006	0.277***	0.126	0.045***	0.022	0.065***	0.032	0.039**	0.019	0.245***	0.121
$GDP_{exporter}$	1.591***	0.555	1.623***	0.528	1.567***	0.547	1.064***	0.371	1.453***	0.548	1.505***	0.530	1.441***	0.543	1.013***	0.382
DIST	-1.387***	-0.274	-1.207***	-0.271	-1.41***	-0.279	-1.232***	-0.243	-1.183***	-0.256	-1.078***	-0.265	-1.198***	-0.260	-1.049***	-0.227
COLONY	0.442***	0.014	0.527***	0.019	0.468***	0.015	0.504***	0.016	0.379***	0.013	0.508***	0.020	0.397***	0.014	0.434***	0.015
COMCOL	0.743***	0.042	0.118	0.006	0.625***	0.035	0.639***	0.036	0.677***	0.041	0.371**	0.019	0.601***	0.036	0.593***	0.036
LANG	0.256***	0.020	0.101	0.007	0.156**	0.012	0.62***	0.047	0.122*	0.010	-0.139*	-0.011	0.054	0.005	0.435***	0.036
CONTIG	1.639***	0.063	1.288***	0.052	1.614***	0.062	1.696***	0.065	1.576***	0.067	1.033***	0.046	1.561***	0.066	1.627***	0.069
$IF_{importer}$	-0.223***	-0.031	0.076	0.011	0.055	0.008	-0.141**	-0.020	-0.317***	-0.049	-0.052	-0.008	-0.083*	-0.013	-0.182***	-0.028
$IF_{exporter}$	-2.336***	-0.314	-1.899***	-0.253	-1.738***	-0.234	-0.297***	-0.040	-2.177***	-0.318	-1.751***	-0.253	-1.855***	-0.271	-0.465***	-0.068
IQ	-0.095***	-0.051	-0.03**	-0.016	-0.132***	-0.070	-0.12***	-0.064	-0.074***	-0.043	-0.009	-0.005	-0.098***	-0.057	-0.095***	-0.055
RTA	0.761***	0.061	0.687***	0.060	0.725***	0.058	0.66***	0.053	0.732***	0.065	0.669***	0.064	0.711***	0.063	0.652***	0.057
CD			**-0.341*** **	**-0.187**							**-0.332*** **	**-0.198**				
$ETH_{importer}$					**1.749*** **	**0.066**							**1.438*** **	**0.060**		
$ETH_{exporter}$					**3.292*** **	**0.125**							**1.758*** **	**0.073**		
$TSI_{importer}$							**0.598*** **	**0.030**							**0.857*** **	**0.048**
$TSI_{exporter}$							**8.996*** **	**0.448**							**7.492*** **	**0.407**
R-squared	0.569		0.589		0.579		0.636		0.563		0.584		0.567		0.618	
Adj. R2	0.568		0.588		0.578		0.636		0.562		0.583		0.567		0.618	
S.E.	2.885		2.709		2.851		2.651		2.663		2.499		2.650		2.489	
Max. VIF	1.930		1.913		2.633		4.238		1.845		1.818		2.577		4.103	

***,**,* denote significant at 1%, 5% and 10% levels, respectively.

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