Theory of international trade and infrastructure economics essay

Economics

The theory of international trade has evolved over the years, moving from classical trade theories to new trade theory. The theories has transformed from explaining the national economy conditions to a much wider recognition of all sorts of imperfections such as industry characteristics, geography and institutions. In the pre-16th century, the mercantilists, who advocated an economic philosophy known as Mercantilism, believe that a country will gain if it exports more than its import, which is a zero-sum versus positive-sum game view of trade. The resulting trade balance will cause an inflow of precious metal that makes the country richer and more powerful. However, the gain for one country means the loss for the other country as the stocks of metal is fixed in the short run. This has led Mercantilism to advocate for high government interference in economic activity. Classical trade economists criticized mercantilists thought and produced classical theories of trade comprises two main concepts namely absolute advantage and comparative advantage. The theory of absolute advantage was proposed by Adam Smith (1776). According to absolute theory, a country is said to have an absolute advantage in the production of a particular good if it can produce more of goods by using same amount of inputs (more efficient) than the other country does. Therefore, the country should specialize and export the good for which it has an absolute advantage and import other products which it has absolute disadvantage. By producing goods according to each country’s absolute advantage, both countries can gain from free trade as resources are efficiently used and the total output of both goods increases. Smith’s belief is however contradicted with that of mercantilists than the gain by one country is at the expense of another country. The theory of

absolute advantage states further that trade will not take place if a country has absolute advantage in producing all goods. In attempting to deal with the above issue, Ricardo (1817) made a great contribution in the trade theory by proposing comparative advantage theory. Rather than focusing on absolute differences in countries' efficiencies in producing goods, comparative advantage theory concentrates on the differences on their relative efficiencies by using the concept of opportunity costs. As long as relative efficiencies different between two countries, trade will take place and is beneficial to both countries. The Ricardian theory states that a country should specialize in the production of goods which can be produced at lower opportunity costs compare to the other country. This means that even if the same country has absolute advantage in both goods, trade is still beneficial. However, factor endowments such as the relative amounts of labor and capital within a country is not considered in the Ricardian theory of comparative advantage. The theory is based on few assumptions such as only one factor of production (labour), two goods and two countries, constant return to scale and differences in technology between countries. The classical trade theories as proposed by Adam Smith and David Ricardo, suffers from few limitations such as only two goods and two countries, no transportation costs, constant returns to scale, fixed amount of labor and capital and immobility of resources across countries. However, in reality, there are many countries and many goods with transportation cost play a more significant role in international trade but not explained in classical theories. Resources can also be freely moved from one country to another country. Instead of treating labor as the only factor of production, Heckscher-

Ohlin (H-O) extended classical theory by giving equal importance to all factors. Unlike theories of comparative advantage and absolute advantage that focus on differences in productivity, the factor proportion theory or Heckscher-Ohlin (H-O) theory argue that differences in factor endowments determine the pattern of international trade. The H-O theory stresses that a labor abundant country should produce and export relatively labor-intensive goods and import capital-intensive goods. A country that is relatively capital abundant should specialize in the production of relatively capital-intensive goods and export it in exchange for labor-intensive goods. Basically, the theory suggests that a country should produce and export goods that use the factors that are most abundant locally. The theory produces several relationships in economic variables such as factor availability determines the factor prices; factor prices determine the product prices. Differences in factor availability and product prices are the source of cost advantage and specialization, and thus the reason for trade to take place. Factor price differences will remain due to the assumption that factors are immobile between countries. However, the validity of H-O theory was tested by Wassily Leontif (1953) on goods exported by and imported to the United States which is known as the Leontief paradox. Leontief found that the United States tended to export labor intensive goods despite being the capital abundant country, and thus contradict to what the theory predicts. Another theorem that arises out of the Heckscher-Ohlin trade theory is called the factor-price equalization theorem. The theorem, formulated by American economist Paul Samuelson, postulates that when the prices of the commodities are equalized between countries as a result of free trade, then

the prices of the factors (wages and rental rates) will also be equalized between countries. The theorem is based on the assumption such as the two countries have identical technology, perfect competition, no transport costs and identical tastes and preferences. Even though some of the assumptions in the neoclassical theory are not realistic such as perfect competition, identical preferences and constant returns to scale, it constitutes the basis for the development of alternative trade theories. In the wake of shortcomings of classical trade theory in explaining some of the important facts about post World War II trade data, new trade theory were developed in the late 1970’s and early 1980’s by researchers like Helpman (1981), Krugman (1979), and Lancaster (1980). Krugman (1991) incorporated transport cost together with increasing returns and capital and labor migration as factor of determinants. The new trade theory arose partly in response to America’s then trade problems with Japan. It attempts to focus on the role of increasing returns to scale and network effects. As Deardorff (1984) and Helpman and Krugman (1985) explain, the new trade theory was designed to account for three major facts: the ratio of trade to GDP has increased, trade has become more concentrated among industrialized countries; and trade among industrialized countries is largely intra industry trade. The neo-classical trade theory had failed to take into account the importance of the transport costs. In new trade theory, transport cost is incorporated as a factor of determinant, where trade is analyzed in models of increasing returns to scale, and imperfect competition (e. g. Dixit and Stiglitz, 1977; Krugman 1979, 1980; Krugman and Venables (1990)). The new trade theory has resulted in raising interdependence between countries.

This occurs through increased trade and/or increased factor mobility where transport costs play a vital role in assimilating the countries and/or factors. Nevertheless, foundation of new trade theory was laid down by Samuelson (1952) when he introduced the concept of iceberg transport costs. The literature on new trade theory introduces the importance of transport costs in explaining cross-country trade and movement of factors of production. The most prominent are Krugman and Venables (1990) and Krugman (1991). They show how an increase in the degree of economic integration affects the countries engaged in trade. Recently, New Economic Geography literature has developed as a theory which seeks to explain the importance of geography in relation to trade patterns. For instance, shipping costs have been found to be significantly affected by access to sea and distance to major markets (Limao and Venables, 2001)3. 2. 1Empirical EvidenceTrade facilitation has recently emerged as critical element of trade and economic policy. Trade facilitation is considered to be a tool that reduces transaction costs and the complexity of international trade and improves the trading environment. Trade facilitation is based on internationally accepted norms and practices resulting from the simplification of formalities and procedures; standardization and the improvement of physical infrastructure and facilities; and the harmonization of applicable laws and regulations. One of the approaches that have been used to quantify the impact of trade facilitation on trade flows is gravity model. The gravity model allows estimating the impact of different trade facilitation reforms on bilateral trade flows. There are substantial evidence linking improvements in trade facilitation and trade flows. For example, in a study by Wilson et al. (2005) on a sample of 75

countries, it is found that improved trade facilitation could increase trade by 10%. This study supports the earlier study by Wilson et al. (2003) on Asia Pacific region that improving trade facilitation could increase intra-APEC trade by 21%. In another study, Hertel and Mirza (2009) examine the impact of trade facilitation reforms in South Asia. Trade facilitation reform has resulted in an increase in intra-regional trade by 75% and an increase in trade with the other regions by 22%. Wilson and Shepherd (2009) have reported that trade in the region of Southeast Asia could increase by 7. 5% with trade facilitation reforms such as increasing the quality of port. Portugal-Perez and Wilson (2010) assess the impact of four indicators related to trade facilitation namely physical infrastructure, information and communications technology (ICT), border and transport efficiency and the business and regulatory environment on the export performance of 101 developing countries. The first two indicators represent hard infrastructure while the last two represent soft infrastructure. Unlike many previous studies that use principle component analysis, this study uses factor analysis in deriving aggregate indicator. They find that physical infrastructure has the greatest impact on exports in almost all specifications, and samples among four indicators. Utilizing a gravity model approach, Hernandez and Taningco (2010) address on the " behind the border" measures. The four " behind the border" measures that are found to be significant in influencing bilateral trade flows in East Asia are telecommunications services, the quality of port infrastructure, time delays in trade and depth of credit information. However, the impact may vary across sectors or product groups. Other studies that have made use of gravity modelling have highlighted the important role of

infrastructure on international trade. For example, Shepherd and Wilson (2009) find that bilateral trade flows in the Southeast Asia region are sensitive to information and communications technology (ICT) as well as to transport infrastructure, particularly port infrastructure. Using firm-level data with emphasis on small and medium enterprises (SMEs), Li and Wilson (2009) find that SMEs would more likely be an exporter and would have higher export propensity if certain trade facilitation measures are improved, such as ICT and policy predictability. Indeed, certain case studies have pointed towards the strong potential of ICT in lowering the transaction costs of SMEs, and thereby facilitate their entry into international trade, like that of the Philippines (de Dios 2009) and Republic of Korea (Yang 2009). Hoekman and Nicita (2008) mentions poor roads and ports, poorly performing customs, weakness in regulatory capacity and limited access to finance and business services as some of the behind the border factors affecting trade. Wilson et al., (2005) extended the gravity model to trade facilitation measures and have expanded their four indicators to a larger sample of 75 countries. They show that port efficiency and the quality of service sector infrastructure – proxied by use of internet by businesses and speed and cost of internet, among others, significantly affected trade flows in a sample of 75 countries. Focussing on the Asia-Pacific region, Wilson et al. (2003) find that increasing port and airport efficiency has a significant and large positive impact on intra-APEC trade. The literature has shown that infrastructure affects trade cost by changing transport costs (Limao and Venables, 2001; Bougheas et al., 1999; Edwards and Odendaal, 2008). Bougheas et al.,(1999) develop a gravity model to analyse the effect of infrastructure on trade through its

influence on transport costs. The model includes indexes for transport cost, public capital, and length of the motorway network. The finding reveals that the coefficients of infrastructure variables have a significant, positive relationship between the level of infrastructure and the volume of trade. As a result, differences in transport costs among countries may explain for differences in their ability to compete in international markets. Furthermore, differences in the volume and quality of infrastructure may account for differences in transport costs and, hence, variations in competitiveness. Therefore, improvement in transport services and infrastructure improves international market access and stimulates an increase in trade. Limao and Venables (2001) employed a gravity model similar to one developed by Bougheas et al., (1999). However, their model includes dummy variables representing landlocked countries or possibility for transit. Their study examined the determinants of transport cost and illustrated how transportation costs depend both on a country’s geography and on the level of infrastructure. In their study, infrastructure is measured by using variables includes paved and unpaved roads, railways and telephone mainlines. Infrastructure is found to be an important factor in determining transportation costs especially for landlocked countries. The study showed that improving infrastructure so as to move from the median country to the top 25th percentile in the distribution of infrastructure enhances trade by 68 per cent, moving down to the bottom 75th percentile reduces trade volume by nearly 30%. They estimate that differences in infrastructure explain for 40% of transport costs for coastal countries and 60% for landlocked countries. Adopting the study by Limao and Venables (2001), Nordas and

Piermartini (2004) investigate the role of infrastructure on total bilateral trade and on trade in the three sectors: clothing, automotive and textile. Indicators of the quality of infrastructure to be estimated are road, airport, port and telecommunication, and the time required for customs clearance. On top of that, this study also incorporates bilateral tariff which has been ignored in the literature. Their study proves that infrastructure quality is a significant determinant of trade performance, with port efficiency having the largest impact on trade amongst all infrastructure quality indicators. Timeliness is found to be relatively more important for export competitiveness in the clothing sector while access to telecommunication in the automotive sector. In addition, the study also finds that even after the quality infrastructure is included, the distance remains a significant factor. In another study, Djankov et al. (2006) claim that infrastructure directly affects transport costs in two ways i. e. by influencing the type of transport used and delivery time of the goods. By using data on time taken to export and import, the authors estimate the impact of delays on trade. The results of the study show that trade decreases by at least 1% for every extra day taken for moving the goods from the warehouse to the ship and this is comparable to an increase the distance of a country from its trading partner by 70km. Edwards and Odendaal (2008) examine the impact of the infrastructure quality on exports by specifically focussing on African trade. The authors construct variables of the minimum and maximum quality of infrastructure between bilateral trading partners instead of exporter and importer infrastructure variables. The results showed that it is the minimum quality of infrastructure that matters most for transport cost and thus trade flows.

Clark et al. (2004) investigated the determinants of shipping costs to the United States. Using a reduced form price equation they quantify the factors affecting transport costs on maritime transport charges paid by U. S. imports carried by liner companies from countries all over the world during the period 1995-2000. They stress the effect of port efficiency on maritime transport costs and address the problems of endogeneity and omitted variable bias associated with price equation. They find that port efficiency is an important determinant of shipping costs. Improving from 25th to the 75th percentile in the distribution of port efficiency reduces shipping costs by 12% and increases trade by 22%. Reductions in country inefficiencies associated to transport costs from the 25th to 75th percentiles imply an increase in bilateral trade of around 25%. Anderson and van Wincoop (2004) estimate that trade costs are equivalent to a 170 percent ad-valorem tax for industrial countries. Transportation costs are equivalent to a 21 percent tax, border-related barriers are equivalent to a 44% tax, and distribution costs are equivalent to a 55% tax. One of the important components of transport cost is time cost. This is particularly critical for perishable or other time-sensitive goods. Hummels (2001) found that the time cost of one day in transit for US imports is equivalent to an ad valorem tariff rate of 0. 8%, implying the equivalent of a 16% tariff on an average trans-Pacific shipment of 20 days. Clearly, improvements in infrastructure services that reduce delays in border crossing procedures, transit times, or ports will influence a country’s propensity to trade. Costs related to the time elapsed between the perception of demand and subsequent supply of products to the relevant retailer(s) can also figure prominently (Nordas and Piermartini, 2004). Apart

from physical transport infrastructure, information and telecommunication technology (ICT) can also influence trade flows. A few studies have investigated its effect on trade flows such as Fink et al., (2005) whose result reveled that that the cost of making a telephone call has a significant and negative effect on bilateral trade flows. The impact of ICT is relatively bigger for trade of differentiated products than on trade of homogenous products. In another study, Nicoletti et al., (2003) found that ICT is particularly important for trade in services due to its nature of highly dependent on well-developed infrastructure in both the exporting and importing countries. Recent literature has highlighted the roles of institutions in determining trade flows. Several institutional quality indicators, such as corruption, legal and regulatory costs and contract enforcement costs have been used to examine on the potential influence of institutional quality on trade. Levchenko (2007) suggests that differences in institutional quality can themselves be a source of comparative advantage, finding that institutional differences across countries are important determinants of trade patterns. Examined the institutional quality from regulatory perspective, Helpman et. al., (2008) found that regulation costs are significant in determining the trade between two countries. Others are Rodrik et. al., (2004), Francois and Manchin (2007), De Groot et. al., (2004) and Anderson and Marcouiller (2002). Indeed, all these studies reach the conclusion that quality of institutions has a positive impact on country’s trade flow. For instance, Francois and Manchin (2007), by using principal components to construct the two indicators on infrastructure and two indicators on institutional quality, found that institutional quality, along with transport and communication infrastructure

is significant determinant not only for country’s export levels but also for the prospect exports. The results support the notion that export performance, and the tendency to take part in the trading system at all, depends on institutional quality and access to transport and communications infrastructure. Méon and Sekkat (2006) find that poor institutional quality is related to low manufactured exports; that control of corruption is the most significantly related to manufactured exports, compared to the rule of law or government effectiveness. In another study such as by Anderson and Marcoulier (2002), who use data on contractual enforcement and corruption find that lower institutional quality is associated with negative effect on trade. Other empirical evidence can be found in Depken and Sonora (2005) and Levchenko (2007). A number of studies have pointed towards other forms of institutions quality such as contract enforcement procedures, investor protection, and the rule of law on international trade. Ranjan and Lee (2007) employed a gravity model to examine the link between trade volumes and contract enforcement. The study suggests that trade volumes were affected by the efficiency of contract enforcement. This finding is consistent with that of Duval and Utoktham (2009). Duval and Utoktham (2009) show that in developing Asia, simplifying domestic contract enforcement procedures to that of the average of member countries of the Organisation for Economic Co-operation and Development (OECD) can boost merchandise exports by up to 27%. Hur et. al., (2006) find that improving investor protection can raise export shares and trade balances of countries with relatively more intangible assets. Several studies have tested on the effect of transparency in custom administration and trade policy. For

instance, Helble et. al., (2009) focused their studies on transparency in the trading environment for the Asia-Pacific Economic Cooperation (APEC) members. By using predictability and simplification measures to develop new measurement of transparency, the study concludes that improving transparency in trade policy can reduce trade costs and subsequently boosting intra-regional trade amongst APEC members. In another study, Sadikov (2007) uses a gravity model for a sample of 126 countries and shows that burdensome business registration procedures and export signature requirements can have a detrimental effect on exports, more so with differentiated products than homogeneous goods. There are also some studies examines the link between trading time and trade flows. Study done by Djankov et. al., (2010) on the extent the time of delivering products from the factory to the ship affects trade in a sample of 126 countries find that in general, a delay of one day lowers trade by 1%, with a larger impact on time-sensitive products such as agricultural and manufactured goods. Another study on the relationship between delivery cost and trade was carried out by Duval and Utoktham (2009). By using a sample of Asia- Pacific countries, their study shows a negative relationship between delivery cost and export where a decrease in 5% delivery cost for a good to the closest port can increase exports at least by 4%. A number of recent studies have argued that the level of financial development or access to finance, which is a major part of the overall domestic business or investment environment, can potentially affect international trade. For instance, Duval and Utoktham (2009) find that improving credit information can raise exports of merchandise goods by up to 16%, which is consistent with earlier results by

Hur et. al., (2006). Hur et al. (2006) found that the level of financial development was positively associated with export shares and trade balances in industries with more intangible assets. Beck (2002) provides evidence for a sample of 65 countries indicating that financial development has a large causal effect on exports and trade balances of manufactured products. Although the impacts of trade facilitation on trade flows have been examined extensively, it remains limited in the specific context of hard and soft infrastructure. A study by Khan and Weiss (2006) focus on the link between regional co-operation, infrastructure (hard and soft) and trading cost. Khan (2008) extends Khan and Weiss (2006) with a specific focus on various aspects of soft infrastructure particularly governance. This study explicitly examined on how soft infrastructure can contribute to the process of regional co-operation in the Asia region. In a similar study framework, Weiss (2008) considers the role of infrastructure in regional cooperation. Both hard and soft infrastructure investments and interventions can be the tools to reduce trade costs and thereby accelerate the process of regional co-operation. Overall, the recent literature suggests that trade facilitation measures have a significant effect on trade development. However, most of past studies tend to either include one specific indicator for trade facilitation or infrastructure in their models (see Nordås and Piermartini, 2004). There are also some studies that aggregate a large number of indicators into an overall index (see Helble et. al., 2007 and Portugal-Perez and Wilson, 2010). With this backdrop, this study makes new contributions to the existing body of literature on the impact of infrastructure on trade. First, this study makes a clear distinction between hard and soft infrastructure measures and

provides estimates of how these two types of infrastructure affect trade in ASEAN countries. Second, this study will use sectoral data along with aggregate data. The use of disaggregate data will allow policymakers to prioritize policy options. Third, this study also departs from previous studies as this study estimates gravity model by using fixed effect vector decomposition (FEVD). To our knowledge, FEVD has not been used to examine the impact of infrastructure on trade in ASEAN countries.