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The Influence of Regional Trade Agreements on Trade Flows - The Review of BIC-Countries

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THE INFLUENCE OF REGIONAL TRADE AGREEMENTS ON TRADE FLOWS

– THE REVIEW OF BIC - COUNTRIES

The target in this thesis is to study the influence of the regional trade agreements of the BIC-countries (Brazil, India and China) on trade flows by using a gravity model. In this thesis it is investigated how much BIC-countries' regional trade agreements explain of the bilateral trade flows during the time period 2001-2008 and whether there is trade diversion. In addition, the characteristics of the countries influencing on trade creation and diversion are studied.

In the empirical part the gravity model is used. Normally, the gravity model is used to explain the variation in the country pairs' trade flows and the influence of regional trade agreements on possible trade creation and diversion. The influence of regional trade agreements on trade is estimated by using the OLS and Instrumental Variable (IV) estimations. Four cultural variables were chosen to be instruments for a regional trade agreement variable.

The estimation results indicate that the bilateral trade flows in the BIC-countries increased 76 % during the time period 2001-2008. In addition to trade creation, a large trade diversion was found. The post-estimation tests revealed that the OLS-model gives more reliable results than IV-method when the language was included in cultural instruments. Opposite results were achieved when language was excluded from the instruments. From eight country characteristics that were studied distance, common border and common continent had a positive impact on the trade creation, but negative impact on trade diversion. The impacts of cultural variables on trade creation and diversion were mostly in line with the theory of natural trading partners.

Keywords: international trade, integration, regional trade area, emerging countries, gravity model, instrumental variable –estimation.

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Definition of Essential Concepts

Regional Trade Agreement (RTA)

Regional Trade Agreement is a trade agreement between two or more countries and is one form of economic co-operation and integration. In RTA, only the trade barriers of the member countries are reduced. Therefore, it is discriminatory. The countries that belong to the same regional trade area do not have to be geographically close. (Sawyer & Sprinkle 2004, 205.) World Trade Organization (WTO a) uses the term RTA when discussing regional trade agreements in general. In this thesis, I will use the term RTA as the main concept when discussing trade agreements of any kind mentioned below in general even though the countries would be geographically distant.

Preferential Trade Agreement (PTA)

The loosest version of the regional trade agreement is Preferential Trade Agreement, which is commonly an agreement between at least two countries. In PTA, the tariffs have not been removed. Instead, the tariffs have been lowered on goods produced in the member countries. (Panagariya 2000, 288.) Preferential trade agreement is the first stage of economic integration, which usually leads to free trade agreement.

Free Trade Area (FTA)

In the free trade area, all the tariffs are removed between the member countries. However, the countries have their own external trade policies meaning that they still have their own tariffs to non-FTA countries. (Freund & Ornelas 2010, 141; Urata & Okabe 2007, 2.)

Custom Union (CU)

The countries that belong to the same CU, which is a form of RTA, remove the trade barriers between the members and have the same external tariff structure (Urata & Okabe 2007, 2). Within the CU, the good can move tariff free (Freund & Ornelas 2010, 141).

1Introduction

1.1 Background and motivation

When discussing the regional trade agreements, the focus often is, what kind of influence the establishment of the regional trade agreements has on the member countries. Usually the interest is in modeling and predicting foreign trade flows, which has been an important subject in international economics. The influence of trade liberalization on trade has been researched from the viewpoint of developing and developed countries. However, there is lack of information, how the trade of emerging countries reacts on trade liberalization. Not many researchers have concentrated on emerging countries, like BIC-countries (Brazil, India and China), as a group so far. Though, some studies about the trade liberalization of single emerging countries have been made. In most of the research, the regional trade agreements have influenced positively on trade flows. Mainly these researches have concentrated on the largest and most known regional trade agreements such as EU, Mercosur and Nafta and general regional trade agreement effect.

There are reasons why more research has been done about the largest regional trade areas instead of regional trade agreements to which emerging countries belong to. On the one hand the reason for this has been the protectionist measures that the emerging countries that are still categorized into developing countries use to protect their domestic industries. On the other hand the non-membership of the World Trade Organization (WTO). The aim in this thesis is to study in the literature review and empirical part the influence of the regional trade agreements on trade and welfare and discuss possible trade creation and diversion effects. In the empirical part, the analysis is done by using emerging country group BIC (Brazil, India and China) and their trading partners as a review group.

The emerging country group, BIC, is chosen to be the target because recent years these countries have received attention the most among emerging countries. As a country group BIC is interesting to study, because of the increasing power the countries have in the world economy as well as in the politics, due to China's becoming the second largest economy in the world in August 2010 based on the second-quarter GDP (China overtakes Japan-- 2010). Above all, the large share of their GDPs and exports in the world total has increased the influence of the economies in the world economy. Their GDPs represent 13.5 % of the world

GDP and exports 11 % of the total world exports (The World Bank b, 28.1.2011).[1] For these reasons the investment bank Goldman Sachs gave the name BRIC-countries to these economies including Russia in the report in 2003. However, by comparing countries with their GDP per capita, all these countries are still categorized as developing countries or emerging countries[2] (IMF 2010, 2.)

The influence of regional trade agreements can be modeled with various trade liberalization theories that underline the role of the government in the decision making. With the gravity model framework it is tried to find out in the empirical part, whether the influence of regional trade agreements on trade in a case of BIC-countries is in line with the theories, and what is the trade effect of the regional trade agreements. It is important to make clear that BICs as such are not a regional trade area.[3]

There are many reasons to think over, why the increasing number of emerging country group BIC's regional trade agreements, is significant. First of all, the establishment of regional trade areas has been significant for the world economy because the globalization has developed via trade integration. Second, by studying this, it is possible to find out what kind of influence the trade liberalization has had on this fast growing country group's trade and especially exports. In general, developing countries are known in their export-led growth strategies. According to the export-led growth theory, the increase in exports as a consequence of regional trade agreements may have played an important role in the growth of the countries. This is because the domestic industries have boosted the productivity to meet the demand for the increased exports. (Crawford & Fiorentino 2005, 2.) Third, if it is known how much regional trade agreements have influenced on BIC's export growth and other possible factors that have influenced on trade flows, it is easier to analyze and predict the effects of trade policies. Especially, in the interest here is the growing importance of the BIC-countries in the world economy.

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[1] Author's calculations are based on the World Bank data. Data are in current U.S. dollars for GDP and exports.
[2] World Bank categorizes Brazil, China and India developing countries. In the categorization of the World Bank Atlas method, which is another way to make a difference between the relative size of economies in terms of gross national income. In addition the World Bank Atlas method is used to classify countries in low, middle and high-income categories and to set lending eligibilities. In this categorization India and China belongs to lower middle income and Brazil into upper middle income. (The World Bank a, 14.05.2011)

[3] BIC-countries (Brazil, India and China) as such are not a regional trade area. Actually, all of them are not members in any certain regional trade area. (WTO c)

In addition to the influence on exports, the trade liberalization may have significant influence on BIC-countries and the rest of the world to survive from the recent financial crisis. In the recent discussion about the regionalism the subject under review has been, whether we should carry on regionalism or try to slow it down. Especially during the financial crisis 2008-2009, under the discussion was that which one is better for countries to survive from the crisis - protectionism or trade liberalization? Liberalization of trade was the answer according to Freytag and Voll (2009) in their research based policy analysis. Freytag and Voll (2009) underlined the importance of emerging countries in this after crisis liberalization and re-regulation process. The efforts to avoid protectionism could help the BRICs and the rest of the world to survive from the recent financial crisis. (OECD 2009, 1.) Even though the globalization through the trade integration has already come a long way, there is still need for it, which supports the importance of the trade liberalization as a topic. Therefore the role of the emerging countries in the trade liberalization should be reviewed.

1.2 Research problem, method and main results

The aim in the thesis is to study the influence of the regional trade agreements on trade flows by using a gravity model. Specifically, the goal is to find out how much the regional trade agreements of the BIC-countries explain of the bilateral trade flows during the period 2001-2008 and whether there is trade diversion. In addition, the country characteristics influencing on trade creation and diversion are studied. The results are also compared with the previous studies and considered whether the results are in line with the previous research. Differently from previous studies an emerging country group is the target group. I extend the previous studies by concentrating only on emerging countries and their trade flows and trying to minimize the bias by instrumenting the RTA variable.

The model that is used in the empirical part is the gravity model, which is used to explain the variation in the country pairs' trade flows and the influence of regional trade agreements on possible trade creation and diversion. In addition to an OLS-estimation, I also use an econometric method, the Instrumental Variable estimation (IV). Commonly problems such as endogeneity, omitted variables and measurement errors appear in the linear regression for different reasons. Anyhow, at least the endogeneity problem can be solved by using instrumental variable estimation. (Baum 2006, 185.) In addition, IV-estimation enables me to

avoid the biased and inconsistent estimates that may occur with panel data on the standard OLS-estimation. Most of the studies that have previously estimated the gravity model use the ordinary least square (OLS) method to cross section data or other than IV-estimation.

My estimation results indicate that the bilateral trade flows in the BIC-countries increased 76 % during the time period 2001-2008 when the model was estimated with the OLS-model. OLS-model turned out to give more reliable results than IV-method when language variable was included in cultural instruments. Opposite results were achieved when language was excluded from the instruments. In addition, a large trade diversion was found. From eight characteristics that were studied distance, common border and common continent had a positive impact on the trade creation and opposite negative impact on trade diversion in the case of BIC-countries. In addition, the impacts of cultural variables on trade creation and diversion were mostly in line with the theory of natural trading partners.

1.3 Limitations of the Study

There are some limitations in my study. In the empirical part, I study only the regional trade agreements of the emerging countries. From the emerging country group BRICs, I will concentrate on Brazil, India and China. Because Russia is not a member of WTO, it is excluded from the study. In this way, the emerging country group under review becomes more homogenous. According to the WTO's definition, the regional trade agreements include both free trade areas and custom unions. Also preferential trading agreements (PTA) are included in the study, because they develop to be regional trade agreements at a later date and WTO categorizes preferential trade agreement to be one form of the regional trade agreements. In addition, I limit the data period to end before the latest financial crisis, because only China among some other countries was growing during that exceptional time. The world total growth was actually diminishing (The World Bank b, 28.1.2011).[4] Therefore we may avoid some bias in the data. I concentrate only on discriminatory tariff reduction meaning that I exclude the multilateral liberalization from my study. In addition, I will not pay too much attention to Common Market and Economic Union as forms of trade integration.

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[4] According to the World Bank Development Indicators, the annual percentage growth rate of GDP of the world was -1.95% in 2009. The annual percentage growth rate of GDP is calculated at market prices based on constant local currency by author.

1.4 Structure of the Study

The structure of the study is following. In the first chapter, introduction, the research problem and the motivation for the study are described. The second chapter consists of explanation of the development of trade liberalization and the recent trends. In the third chapter, it is discussed, how tariff reduction affects the member countries in terms of trade and welfare and the possible consequences on non-member countries are discussed. Also it is discussed the characteristics of the countries that make regional trade agreements more trade creating or diverting. Chapter 4 is the review of the empirical literature. First, it is discussed the general empirical studies about the trade liberalization and then the focus is moved to the studies of the emerging economies. In the fifth chapter, the gravity model framework that is used in the empirical part is explained in detail. Also the instrumental variable -methodology is gone through. Chapter 6 concentrates on describing the data and possible limitations to the empirical part. The results of the empirical part are represented in Chapter 7. Therefore, the study is concluded in Chapter 8 and possible ideas for the future research represented.

2 Trade Liberalization

In this chapter, I will discuss trade liberalization more deeply and consider how the regional trade agreements have developed during the years. This chapter, as the thesis, concentrates on discriminatory tariff reduction. First, I will present the features of the trade liberalization to be able to understand the context of this thesis.

2.1 Description

Economic co-operation and integration have a long history. Formal and informal trade agreements have existed wherever people have traded. (Plant & Taghian 2008, 1.) In the half –century before World War I some countries already enjoyed free trade in Europe. Though, this system of free trade did not emerge from any continent-wide agreement. Instead, mainly the series of bilateral treaties were established. (De Melo & Panagariya 1996, 122.) Later broader trade liberalization began when the European integration started to develop in the 1950 in the form of European Economic Community (EEC) that nowadays is known as European Union. (Berry & Hargreaves 2007, 1-8.) The European integration led through contagion and imitation effects on the trade liberalization continue steadily. (Pomfret 2007, 924.) Since the early 1990s regional trade integration has been the main form of trade liberalization. (Calvo-Pardo, Freund & Ornelas 2009, 2). These days, the most known regional trade agreements are EU (European Union), NAFTA (North American Free Trade Agreement), MERCOSUR (Southern Common Market), ASEAN (The Association of Southeast Asian Nations) and COMESA (The Common Market for Eastern and Southern Africa) (WTO a, 30.1.2011).

Trade liberalization is a form of trade policy. In the trade liberalization, the countries that have opened their trade to international trade remove both tariff barriers and non-tariff barriers to trade. The trade liberalization increases by the formation of new trade areas or by the expansion of the existing trade areas.

In the trade liberalization, the agreement can be (Crawford & Fiorentino 2005, 4):

> i) Between two countries (bilateral)
>
> ii) Between a country and already existing regional trade area (bilateral) or
>
> iii) Between many countries (plurilateral).

The trade liberalization is implemented through regional trade agreements and the aim is to remove both tariffs and non-tariff barriers (import quotas, export restraints, and export subsidies) to trade. A tariff is a tax on either imported or exported good. The effect of import tax is symmetrical to the effect of export tax. (Sawyer & Sprinkle 2004, 132-133.) A tariff is the oldest form of trade policy and traditionally it has been a source of government income, even though the main purpose has usually been to protect domestic industries (Krugman & Obstfeld, 2009, 183). There are different types of tariffs as specific tariffs, ad valorem tariffs and compound tariffs (Sawyer & Sprinkle 2004, 132-133). The importance of tariffs has decreased recently and governments prefer to protect domestic industries through a variety of nontariff barriers (Krugman & Obstfeld 2009, 183). The reasons to establish regional trade agreements and the benefits of forming RTA have been defined mostly by economic terms that will be gone through in Chapter 3. (Plant & Taghian 2008, 1.)

2.2 The Levels of Integration

There are different levels of integration. Economic integration can apply to only product markets as well as the integration can be deepened to the markets of production (labor and capital) and services as it is done in the custom union such as European Union where there is a free move of goods, services, labor and capital (Berry & Hargreaves 2007, 4-5). When the first trade liberalization, the establishment of ECC, took place, only tariffs and quotas were removed. This was the lowest level of integration. The ECC is the origin of European Union. (Berry & Hargreaves 2007, 6.)

When discussing the trading blocs, the main concept is regional trading agreements (RTA). In the literature terms preferential trade area (PTA), free trade area (FTA) and custom union (CU) are often used. Both Free Trade Area (FTA) and Custom Union (CU) are forms of regional trade agreements. From the regional trade agreements, approximately 90 % are free

trade areas and 10 % are custom unions. (WTO a, 30.1.2011.) From Figure 1 below the levels and typical characteristics of economic integration can be observed for different levels of economic integration.
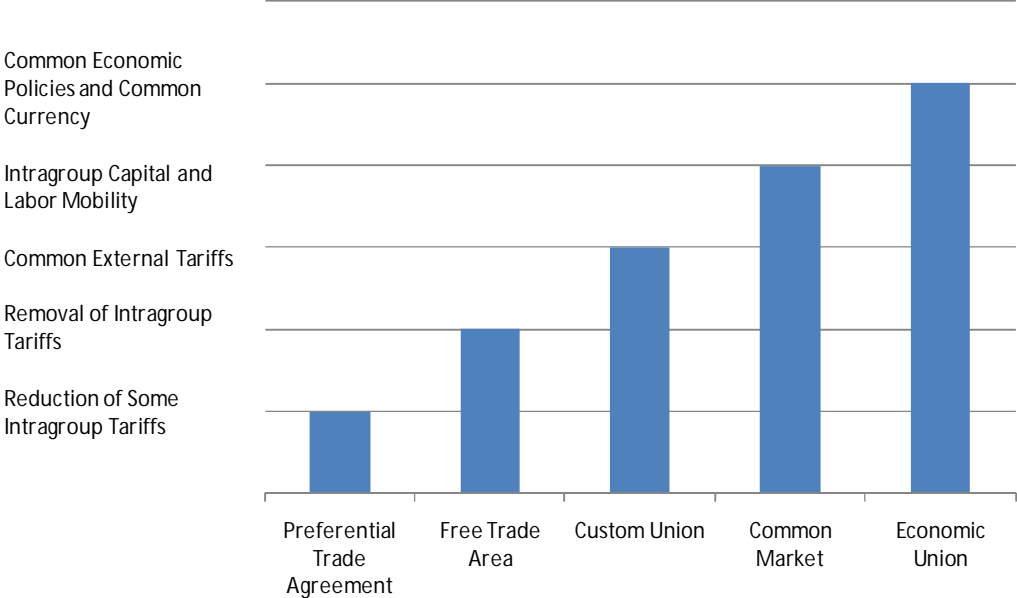
Figure 1: Levels of Economic Integration (Sawyer & Sprinkle 2004, 207)

The differences between the levels of economic integration can be noted in the vertical axis from Figure 1 above. In the horizontal axis, there are the different levels of economic integration. The economic union is the deepest form of economic integration when the preferential trade agreement is the loosest. The economic union includes all the looser forms of economic integration. European Union is an excellent example of the economic union. In preferential trade agreement only some tariffs are removed, but in custom union all the intragroup tariffs are removed and countries in the bloc set a common external tariff. (Sawyer & Sprinkle 2004, 207.) Therefore, depending on the level of economic integration, different characteristics are typical for the agreement. This thesis concentrates in both literature review and empirical part only the three least restrictive levels of economic integration known as PTAs, FTAs and CUs.

2.3 The Development of the Regional Trade Liberalization

One of the main international developments in recent years has been the growth of regional trade agreements (RTA). WTO announced there were overall 283[5] regional trade agreements that include either or both goods and services, in force and 191 under negotiation in July 2010 (WTO a, 30.1.2011). As Figure 2 below depicts, the number of RTAs has increased constantly. It is interesting to perceive that the world trade has grown in the same pace. The figure is based on the agreements that can include either goods or both goods and services and are in force according to WTO.
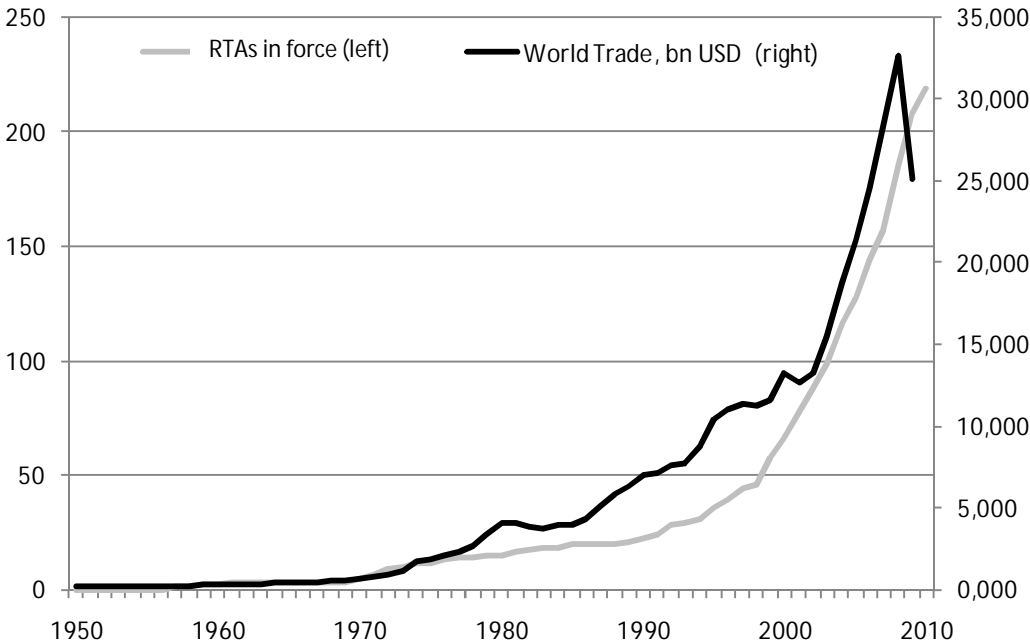
Figure 2: The Development of the World Trade and Regional Trade Agreements (WTO d, 21.9.2010)

It can be noted from the above Figure 2 that there have been three peaks in the development of the regional trade areas that are gone through in the following paragraphs. The trade liberalization expanded to developing countries in the 1970s when the Generalised System of Preferences (GSTP) was established in 1971. Therefore, the extensions of tariff preferences for developing countries become possible. (Pomfret 2007, 924.) Since 1970 the amount of RTAs has been on the increase.

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[5] This list includes either or both goods and services. Divergences in RTA numbers are due to different methods used to count agreements. A complete list of RTAs notified by the GATT or WTO is in the webpage: http://www.wto.org/english/tratop_e/region_e/region_e.htm.

Therefore, the first peak of agreements was before the 1980s. (OECD 2009, 2.) In the 90s, the amount of agreements again started to rise remarkably (2nd peak). This trade integration has increased the globalization in terms of trade integration meaning that more and more countries belong to at least one trading bloc. In addition to that, countries have reached bilateral agreements. However, skepticism about trade liberalization came in the picture late 1990s and some signals of decreasing trade liberalization were noticed. (OECD 2009, 4.) Still, the growth of regional trade agreements and world trade has always correlated strongly.

In the early 2000s, the trade liberalization in Asia can be seen as a third wave of agreements (Pomfret 2007, 925). In East Asia, the regional integration started to increase in the year of 1985. The integration was more market driven than policy driven. (Pomfret 2007, 936.) Despite the ASEAN free trade area (AFTA) there were not many significant bilateral or plurilateral agreements before to 2000. However, in Asia, there are currently at least dozen major free trade areas.

Significant changes were noticed when the trade liberalization took place in Asia. For instance, the countries started to establish more bilateral agreements compared to plurilateral. Besides, the bilateral agreements were no more formed with countries in the same geographical area which is the reason for the decrease of regionalism. (Plummer 2007, 1772.) China, for example established regional trade agreement with Peru and India with Chile. Despite the crisis in the 2008-2009, the trend of the increasing regional trade agreements continued. As Figure 2 above represented, the trend in the world trade has followed the trend in regional trade agreements. Except during the financial crisis while the world trade in total was decreasing.

2.4 The Trade Liberalization of the BIC-countries

In addition to Asia's trade liberalization, also other significant changes were noticed in the integration during past two decades. Since the 1980s the emerging economies Brazil, China and India among other six of the largest non-OECD-countries, BRIICS (Brazil, Russia, India, Indonesia, China and South Africa), started to integrate rapidly to the world markets. The integration of these countries became an important component of globalization. These countries reduced trade barriers in the borders remarkably. For example, they reduced the

average applied tariffs on non-agricultural products, even though the pace varied across the countries. (OECD 2009, 2.)

From the emerging economies, especially all of the BICs have liberalized their trade significantly in recent decades. Brazil was the first of BIC-countries that started to reduce its protection. This took part in the late 1980s and mid-1990 during the second wave of trade liberalization when protection was also globally reduced significantly as it is possible see from Figure 2 in Chapter 2.3. Instead, China still had in the 1990s relatively high import tariffs even though certain specially designated economic zones in China had already enjoyed more liberal regimes since the late 1970s. Thus, the tariffs in China were more than halved at the beginning of the 1990s. The reduction continued in 2001 when China became a member of WTO. From BIC-countries, India had the highest tariffs among BICs in the late 1980s. Therefore, the country implemented significant tariff cuts in the 1990s and 2000s[6].

According to the analysis of OECD, the countries and sectors that have opened the most, have also enjoyed the largest growth meaning that the liberalization of trade influences the growth.[7] China, for example and its openness to foreign direct investments in the manufacturing sector has had positive effect on trade and growth. (OECD 2009, 3.) The BICs have become more integrated with world intermediate inputs, final goods and service markets, which can be seen as a result in their increased share of the world trade.

2.5 The Recent Trends

As it has already been discussed the trade liberalization in Asia and emerging economies brought significant changes to the trade liberalization. Around the year 2005, four trends

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[6] However, there has been debate about the timing of India's trade liberalization. Actually, India cut the tariffs of capital and intermediate goods already in the 1980s, which was a decade before the consumer goods that were effectively banned. Actually, it was not until 2001 that all consumer goods' imports were liberalized. This early liberalization of capital and intermediate goods has had significant influences on India according to some researchers. This may be because the capital account liberalization should normally follow, not precede, the liberalization of trade, because the large inflows of capital that generally follow the freeing of the capital account could cause a large appreciation of the real exchange rate, leading to large import surges that destabilize domestic industries and the balance of payments. (Zagha & Nankani. 2005, 142)

[7] Rodrigues and Rodrik (2001) started the discussion about this causal relationship and they found mixing results. However, Greenway, Morgan and Wright (2002, 229) found that trade liberalization has a positive impact on growth, albeit with a lag. In addition, Sala-i-Martin (2007, 7-10) found out that the economic integration has positive influence on growth. Sala-i-Martin (2007, 7-10) lists various channels through which integration can affect the overall growth rate, e.g. increased specialization and the effect of trade liberalization on institutions, policies and the political process itself.

related to regional trade agreements were noticed (Crawford & Fiorentino 2005, 2). First, countries started to make regional trade agreements the centerpiece of their commercial policy. Second, the complexity of regional trade agreements started to increase because of the increased amount of agreements, both bilateral and plurilateral. Third, reciprocal preferential trade agreements between developed and developing countries began to increase. Also the agreements between key developing countries started to increase which meant that the so called South-South trading patterns began strengthening. Fourth, the number of cross-regional regional trade agreements started enhancing, but also the regional trading areas on a continent wide were on the rise. (Crawford & Fiorentino 2005, 2). Some of these trends and the underlying reasons can be noticed also in practice.

The signs of more diverse and complex RTAs can be noticed in the configuration of the agreements. The overlapping agreements and networks of regional trade areas have been reaching within and across continents at the regional and subregional levels. In addition, compared with plurilateral agreements more bilateral agreements are nowadays established. This change can be seen especially in the agreements of India and China (WTO b, 12.8.2011).

The complexity of the RTAs originates in the intersecting agreements. Both China and India, for instance are at the center of systems of bilateral RTAs. In addition to SAFTA membership India has for instance bilateral regional trade agreements with Nepal, Bhutan and Afghanistan and India has signed regional trade agreements with Japan and EFTA, for instance (WTO b, 12.8.2011). This kind of system of arrangements that India and China have, is known as "hub and spoke" RTA, where India and China are the hub nations and the partner countries in the bilateral agreements are spoke nations as it can be seen from Figure 3 below.
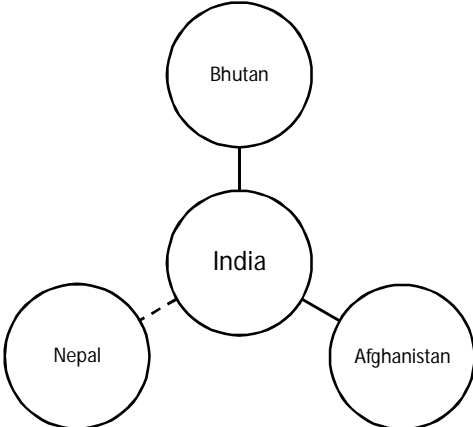
Figure 3: Hub and Spoke Regional Trade Agreements (Baldwin & Venables 1995, 1636)

In general, the role of the increased amount of bilateral agreements is a significant trend because of the trade effects of the "hub and spoke" –system. Researchers have suggested that the benefits of the hub nations are greater than the benefits of the spoke nation. This is because a hub country, India, forms a hub and spoke system with Afghanistan and Bhutan. This may lead to trade diversion for spoke countries Afghanistan and Bhutan, but not for hub country India. If the model is extended to include more spoke countries such as Nepal, each new spoke country leads more trade creation for the hub, India. However, the welfare implications for existing spoke countries depend upon whether the exports of the new spoke, Nepal, are complements or substitutes to those of old members, Afghanistan and Bhutan. If they are substitutes, the old spoke nations can be harmed by erosion of their degree of preference in the system. In a case of complements, the initial member countries also tend to gain. (Baldwin & Venables 1995, 1634-1635.) These kind of hub and spoke arrangements have increased the complexity in the system and as well have changed some typical characteristics of the trading partners such as geographical distance.

3 The Economic Impacts of Trade Liberalization

The goal of this thesis is to study in the empirical part the trade effects of the regional trade agreements by using data from the emerging economies. Within the researchers, there is significant disagreement about the consequences of the trade liberalization (Ornelas 2005b, 472). Viner was the first researcher who presented his theory on general trade effects dividing the effects into two: trade creation and diversion in the traditional, static welfare analysis "The Custom Union Issue". After Viner trade creation has been represented by many researchers as well as the overall positive effects of the regional trade agreements have been questioned. (See Bhagwati, Krishna, & Panagariya 1999, 105-118.)

In general, as Viner (See Bhagwati, Krishna, & Panagariya 1999, 105-118) discovered, both trade creation and diversion are possible consequences of the trade liberalization. Therefore in this chapter both of them are carefully gone through. The main goal is to consider the effects of the trade liberalization on the trade of the member countries. The factors that are taken into the consideration when establishing the agreement operate a base of the analysis. In addition, at the end of this chapter, in Chapter 3.3, I talk through the relationship between nondiscriminatory and discriminatory tariff reduction. This causal relationship functions as a base for the influences of RTA on trade flows and is also one of the consequences of the trade liberalization in the model of Ornelas. In addition, the influence of partner country characteristics on trade creation and diversion is reviewed, because some of the researchers suggest that these may have influence on what kind of trade effects the established RTA may have.

3.1 Trade Creation

In the trade creation, a low-cost RTA member country replaces the high-cost domestic producers and each country produces a good to which they have comparative advantage (Yamarik & Ghosh 2004, 370). It is a creation of trade that would have not happened if the tariff had not fallen. Trade creation always increases both the world and national welfare. (Sawyer & Sprinkle 2004, 211.)

Viner's custom union theory that examines trade creation is based on perfect competition in commodity and factor markets in a partial equilibrium framework. He examines the effects on both small and large countries. In the model, the tariff reduction increases the trade between the members of the union and the trade flows between members and non-members stay unchanged if the union is trade creating. Therefore, the welfare of the members and of the world increases. (See Bhagwati, Krishna, & Panagariya 1999, 105-118.) Viner's theory explains the trade effects well in a perfect competition. However, the model does not take into the consideration the role of the government in the decision making or other factors that may influence the end result in the imperfect competition framework.

Differently, Emanuel Ornelas (2005b, 475) developed a model that explains the general trade effects of the regional trade agreements in an imperfect competition framework. The main idea in his theory is based on the influence of special interest groups on government decision making, which is essential part in the theory as governments are the ones who decide whether to join RTA. Ornelas (2005b, 473) uses the distributive and strategic effects to describe the relationship between internal and external tariffs. The positive relationship between internal and external tariffs leads to trade creation within the members and between members and non-members. In his study, as a strategic effect it is meant the decrease of the motive for protection among the members of RTA. This is because the member government's ability to shift profits from foreign firms to domestic is reduced and under the rules of RTA the firms of the member countries are allowed to capture the market shares from the firms outside the RTA. Therefore, this reduces the incentives of the governments to raise external tariffs. As distributive effect Ornelas (2005b, 473) means the political reasons for the trade protection. Some of the lobbies demand more trade protection, which causes that the government raises the price in the RTA. In this way, the governments are able to shift the surplus from consumers to domestic producers and use tariffs as a distributive device. However, RTA makes this form of protection weak, because the removal of internal tariffs among members shifts the share of a home market from the domestic firms to the firms in the other member countries. This leads to the reduction of the capability of the RTA governments to shift surplus from consumers to producers via high external tariffs, because part of the surplus of the consumers goes now to partner's firms. This then leads the RTA governments to lower their external tariffs. (Ornelas 2005b, 473.) The conclusions of Ornelas (2005b) model are slightly different in comparison with Viner. This is because Ornelas (2005b, 483-484) model depicts that the trading block creates trade both within a bloc and with the non-members. In

this thesis, Ornelas (2005b) model is used as a theoretical basis to explain the possibility to RTA to be trade creating, as it widely takes into the consideration the role of the government in the decision making and determines external tariffs endogenously. Both of these factors are essential when forming regional trade agreements.

3.1.1 The Idea of the Model

The basic idea of this Ornelas' (2005b, 471) oligopolistic-political-economy model is to analyze in a unified framework the direct impact of RTAs on world trade flows and welfare and their effect on the incentives for further liberalization on a non-discriminatory basis by treating the trade policy as endogenous decision. The model is represented in its original form expect term FTA is changed to be RTA so that the terms in theory would be consistent with the other parts of the study. The model takes into the consideration the role of the government in the trade liberalization and with the model it is easy to review the possible trade effects of the regional trade agreements. In Chapter 3.1, I will concentrate on the trade creation effect, but I will also discuss the effect of discriminatory tariffs on further liberalization on a non-discriminatory basis, because it operates as a base for the direct impact of RTAs on world trade flows and welfare. Though, I will go it through more precisely in Chapter 3.4.

The idea of the model is to show with the help of proposition 3 of Ornelas' study that if the fall in external tariffs is deep enough trade creation will appear between the members of the trade bloc. Also, as a consequence the trade creation will be found between RTA members and non-members. (Ornelas 2005b, 483-484.) This means that overall trade creation occurs and no trade diversion takes place in this case.[8]

3.1.2 The Trade Creation in the Oligopolistic Model

In the model, Ornelas (2005b) suggests that governments that are more easily influenced by special interest groups such as industries, are more protectionists. However, those governments as members of RTAs are also more willing to reduce external tariffs under an

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[8] The influence of internal tariff reduction on external tariffs is discussed more detailed in the Chapter 3.4.

RTA.[9] (Ornelas 2005b, 482.) Therefore, the estimation of the change in external tariffs is critical to evaluate the RTA impact on trade flows.

The model is built by first explaining the influence of RTA on nondiscriminatory tariff reduction that operates as a base for the theory of trade effects. In the model, the decision to form a regional trade agreement is endogenously determined which is in line with the empirical part. In addition to be able to explain the formation of regional trade agreements endogenously, also the choice of external tariffs has to be endogenous. (Ornelas 2005b, 491.) This detail creates a clear contrast between the results of this model and previous literature (See Krishna 1998).

In the model it is assumed that the regional trade agreement in question includes $M \geq 2$ countries that are divided into two groups: $M \in [2, N-1]$ prospective members of the agreement and N-M outsiders. In the model in each country there are two sectors of which another is competitive (X) and another oligopolistic (Q). Both of the goods are homogenous and produced under constant returns to scale. Technologies are identical across countries and labour (L) as an only input is inelastically supplied in each country. Therefore, the trade results only from the oligopolistic behavior in sector (Q). (Ornelas 2005b, 475-480.)

Both internal and external tariffs have essential roles in the model. Internal (t_{int}) and external tariffs (t_e) represent the government's tariff on imports from its prospective (M-1) trading partners and from the (N-M) excluded countries. (Ornelas 2005b, 479.) In the Ornelas' model the external tariff is endogenously determined, which is why the model has some different features compared to models where the external tariffs are taken as given (See Krishna 1998).

In the nonexistence of RTA, the government chooses both internal (t_{int}) and external tariffs (t_e). Thus the cost symmetry implies that $t_{int} = t_e = \mathfrak{t}^p$ in equilibrium. Instead, under a RTA $t_e = \mathfrak{t}_M^p$ in equilibrium, because $t_{int} = \mathbf{0}$ and only t_e is chosen freely. As political tariffs, $\mathfrak{t}^p$ and $\mathfrak{t}_M^p$, it is meant the external tariff when the oligopolistic industry payoff is constant and export profits are unaffected by the choice of local tariff. In addition, the political tariff ensures the efficiency in the bargaining process between industry and government. The political tariffs are solved in the absence of RTA and under RTA later in this chapter to be able to solve the trade effects. (Ornelas 2005b, 478-479.)

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[9] The governments are willing to reduce external tariffs, because a regional trade agreement makes any increase in the external tariffs less effective in enhancing the domestic firm's profits. This is also supported by the strategic and distributive effects. Therefore, the government and the oligopolistic industry find it optimal to settle for a lower tariff, relative to the situation before RTA.

The theory of Ornelas (2005b, 480) assumes that if we take any two country pairs that are members of a RTA, the sales of every firm j in the home market depend both on internal tariffs (t_{int}) and external tariffs (t_e). That is why the sales of the domestic market under a RTA ((t_{int} **= 0)** can be defined as:

$$q_M^i(t_e) = q^j(t_e, \mathbf{0}) \tag{8}$$

By using an imperfect competition framework the theory assumes that the trade creation effect is explained by using the choices of each oligopolistic firm. To make choices about the sales in the home market, each oligopolistic firm choice satisfies the following conditions by assuming that under RTA t_{int} **= 0** and otherwise $t_{int} = t_e$. (Ornelas 2005b, 492.)

$$
\begin{cases}
\dfrac{d\pi^h}{dq^h} = p - c - q^h \mathbf{= 0} \\[2mm]
\dfrac{d\pi^m}{dq^m} = p - c - q^m - t_{int} \mathbf{= 0} \\[2mm]
\dfrac{d\pi^f}{dq^f} = p - c - q^f - t_e \mathbf{= 0}
\end{cases}
\tag{9}
$$

To be able to find out how regional trade agreements influence on trade, the first-order conditions above are summed for each domestic firms, for each of the n(M-1) partner firms and for each of the n(N-M) firms outside the RTA. Thus the trade effect of the RTA can be defined as:

$$\mathbf{nN}(p - \mathbf{c}) - Q - \mathbf{n}(M - \mathbf{1})t_{int} - \mathbf{n}(N - \mathbf{M})t_e \mathbf{= 0} \tag{10}$$

To be able to obtain the equilibrium price as a function of tariffs and parameters in the equation (13), the linear demand for the oligopolistic good is needed:

$$P(Q) = A - Q \tag{11}$$

$$\leftrightarrow Q = A - P \tag{12}$$

In the equations (11) and (12), Q denotes aggregate consumption, P(Q) represents the market's inverse demand for the oligopolistic good and A > c. Therefore, by substituting the equation (12) to equation (10), the equilibrium price as a function of tariffs and parameters will be gained and it will be used later to find out the levels of pre and post RTA sales.

$$\mathbf{p}(t_e, t_{int}) = \{\mathbf{A + n}[\mathbf{cN} + (M - \mathbf{1})t_{int} + (N - \mathbf{M})t_e]\}/(\mathbf{1 + nN}) \tag{13}$$

Before the RTA is established, $t_{int} = t_e$, and under the RTA $t_{int} = 0$. (Ornelas 2005b, 481.) To be able to solve the trade effect of the RTA, it is important to solve the political tariff t^p in the absence of RTA (equation 14) and under RTA (equation (15). It can be solved as a function of t_{int} by using the equation that tells the influence of internal tariff to external tariff.[10]

$$t^p = \frac{\left[\frac{1}{2} + n(1+b)\right] q^h(t^p)}{1+n} \qquad (14)$$

$$t_M^p = \frac{\left[\frac{1}{2} + n(1+b)\right] q_M^h(t_M^p)}{1+nM} \qquad (15)$$

In the equations, b represents the extent of the government's predilection for contributions (Ornelas 2005b, 477). The political tariff is strictly increasing in b. Nevertheless if b is too high, a prohibitive tariff obtains. Anyhow, the model is restricted so that b < 1/2n, when the political tariff is non-prohibitive, which means that the external tariff does not overprotect domestic industries. In the model M ≥ 2. Therefore it can be discovered that the denominator of the equation (15) is greater than in the equation (14). Therefore the political tariff under RTA is smaller than before RTA ($t_M^p < t^p$), which means that the external tariff decreases as a consequence of RTA. (Ornelas 2005b, 480-481.)

In addition, as a consequence of trade liberalization, the sales from one partner country to another change from $nq^f(t^p)$ to $nq_M^f(t_M^p)$. To find out if the trade flows increase when the regional trade agreement is established, the following equation has to hold:

$$nq_M^f(t_M^p) > nq^f(t^p) \qquad (16)$$

To solve the levels of pre- and post-RTA sales in the equation (16), the equilibrium price equation (13) is used after taking the first order conditions of the firms[11]. Therefore, the equation (17) explains the amount of trade when the RTA is not operative and therefore

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[10]The influence of the internal tariff to external tariff is solved from this equation:
$$\frac{dt_e}{dt_i} = \frac{n(M-1) + [1/2 + n(1+b)] \partial q^h(t_e, t_{int})/\partial t_{int}}{(1+nM) - [1/2 + n(1+b)] \partial q^h(t_e, t_{int})/\partial t_{int}}$$
Because in the equation the numerator is positive and denominator is positive, if the following equation holds:
$$(1 + nN)(1 + nM) > \left[\frac{1}{2} + n(1+b)\right] n(N - M)$$
The latter inequality is used to find out the trade effects of the trade liberalization.

[11] $q^h(t_e, t_{int}) = q^m(t_e, t_{int}) + t_{int} = q^f(t^e, t_{int}) + t_e = \frac{\{A - c + n[(M-1)t_{int} + (N-M)t_e]\}}{1+nN}$

$t_{int} = t_e$. Respectively the equation (18) explains the situation under the RTA, when $t_{int} = 0$.

$$q^h(t_e) = q^m(t_e) + t_e = q^f(t^e) + t_e = \frac{[A-c+n(N-1)t_e]}{(1+nN)} \qquad (17)$$

$$q^f_M(t_e) = q^f_M(t_e) = q^f_M(t_e) + t_e = \frac{[A-c+n(N-M)t_e]}{(1+nN)} \qquad (18)$$

By deducting the equation (17) from the (18), the equation (19) is followed.

$$q^f_M(t^p_M) - q^f(t^p) = \frac{[(n+1)t^p - (1+nM)t^p_M]}{1+nN} \qquad (19)$$

The trade flows have increased as a consequence of the trade liberalization if the equation (16) holds. The equation (16) holds if the left side of the equation (19) is positive. Because the denominator of the right side is always positive, the nominator has to be positive so that equation (16) holds. The nominator is positive if:

$$t^p_M/t^p < (1+n)/(1+nM) \qquad (20)$$

By substituting the political tariff equations (14) and (15) to the equation (20), the inequality holds if:

$$\frac{(1+n)q^h_M(t^p_M)}{(1+nM)q^h(t^p)} < \frac{1+n}{1+nM} \qquad (21)$$

$$\leftrightarrow q^f_M(t^p_M) > q^f(t^p) \qquad (22)$$

The last inequality can be expressed more generally as $q^f_M(t^p_M, 0) > q^f(t^p, t^p)$. Therefore, the trade due to trade liberalization has increased, if equation (22)[12] holds. Because $q^f(t_e, t_{int})$ is increasing in (17) and (18) and $t^p_M < t^p$, the inequality of equation (22) must hold. Therefore, the trade creation in the bloc is a consequence of the trade liberalization. (Ornelas 2005b, 483.)

The same assumptions as in the trade creation hypothesis can be used to prove the increase in trade between RTA members and non-members, because of $q^h(t_e) = q^m(t_e) + t_e = q^f(t^e) + t_e$. In addition, according to the model since the tariffs do not change outside the RTA, the trade flows stays constant among RTA non-members.

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[12] The equation (22) is equal to equation (16).

Even though, the trade creation effect of the trading bloc was relatively straightforward to conclude, there are some other factors that influence on the trade flows between RTA members and non-members.

The equation (19) can be rewritten in a way that two opposite forces affect the imports from non-members.

$$q_M^f\left(t_M^p\right) - q^f\left(t^p\right) = \frac{\left[(1+n)(t^p - t_M^p) - n(M-1)t_M^p\right]}{1+nN} \tag{23}$$

On the right side, the first element in the square brackets corresponds the positive effect due to lower external tariffs and the second represents the negative effect due to discrimination. According to the theory of Ornelas (2005b,483), the positive effect exceeds the negative effect, which means that trade flows between members and non-members strictly increase. In addition, another important fact can be discovered from the equation (23). In the equation (23), the positive effect due to the lower external tariffs is greater than the negative effect due to the discrimination. This finding is in contrast to all the studies where an external tariff has been exogenously determined. This difference proves the fact that if the external tariff is endogenously determined, no trade diversion exists. However, in the case of exogenously determined external tariffs, the regional trade agreements are trade diverting at least to some extent (See Krishna 1998). (Ornelas 2005b, 483-484.) The case of exogenously determined external tariffs is analyzed more profoundly in Chapter 3.2 and more comparison between these two models is done.

Finally, it is possible to conclude the basic relation between trade liberalization and trade in Ornelas' model. Let's assume that in the imperfect market a regional trade agreement is established. This RTA is decided by the governments of the member countries. Governments only want to become a member of the RTA if RTA improves welfare in their own countries meaning that the trade flows have to increase as a consequence of the agreement. This trade creation inside the trading bloc partly increases the welfare. Because of the strategic and distributive effects the endogenously determined external tariffs decrease in the model as a consequence of the decrease of internal tariffs, also non-members' welfare increases. Therefore, if an RTA is actually established it will increase welfare in every country. Hence, in the paper of Ornelas (2005b, 474) it is suggested that at least from the "static" standpoint the recent increase of regional trade agreements should be regarded as a blessing for the world trading system because of the lack of trade diversion. It is important to pay attention that this

oligopolistic-political-economy model is only suitable when analyzing the trade effects of the agreements where the government supports the agreements that are welfare improving and when the external tariffs are treated endogenously fixed. (Ornelas 2005b.)

3.2 Trade Diversion

It is important to examine the trade diversion effect to find out the overall impact of regional trade agreements on world trade and welfare. The trade diversion is known as a negative outcome of regional trade agreements, because of the export losses the non-member may face. The trade diversion occurs when the members of trade union substitute an efficient non-member country with less efficient, but under RTA less costly member country (Calvo-Pardo, Freund & Ornelas 2009, 5). Of course, the trade inside the trading bloc increases but at the expense of non-members.

In the oligopolistic-political-economy model explained in Chapter 3.1, it was assumed that the establishment of the regional trade agreements depends on the government and that the governments only support the welfare-improving trade agreements in spite of their political motivations. However, the governments have other than welfare improving motivations even though they are influenced by other interest groups. For this reason, it is not unambiguous that governments only seek the trade-creating regional trade agreements as it was assumed in Ornelas (2005b) study. (Freund & Ornelas 2010, 142.) However, if governments were primarily interested in the national welfare in their countries, only trade-creating and welfare-improving regional trade agreements would come into force as it was shown in the previous Chapter 3.1.

Also the impact of regional trade agreements on trade diversion has been widely studied by using a framework, where the role of the government is essential. The aim of this chapter is to shed light on how the establishing of the regional trade agreements depends on the government's objectives and the influence of this on the agreement's trade effects.

Grossman and Helpman (1995) developed a framework about the influence of governments on regional trade agreements. Later Krishna (1998) followed them. In the political-economy frameworks of both of these studies, governments seek primarily trade diverting regional trade agreements instead of trade creating. Both of the studies keep an external tariff

exogenously fixed, if they are influenced by special interest group. Therefore, the assumptions of the determination of the external tariff and trade effect are already different in the beginning compared with Ornelas (2005b). Though, the government is influenced by special interest groups also in Ornelas (2005b) study. The requirement for the political feasibility of a RTA holds in Krishna's model, but not in Ornelas, because external tariffs are obtained endogenously in Ornelas study (Ornelas 2005b, 474). Next, I will represent Krishna's simple oligopolistic model that describes a situation where the government is influenced by a special interest group and the influence of this on the agreement's trade effects. In addition the differences between the model of Ornelas (2005b) and Krishna (1998) are discussed.

3.2.1 The Idea of the Model

The basic idea of this political economy approach of Krishna (1998) is based on the imperfect competition with oligopolistic firms that produce goods that are perfect substitutes for each other. The markets, where governments establish RTAs, are segmented. In the model, the decision of the government is based only on their impact on the profits of the domestic firms. (Krishna 1998, 229.)

In the model, the role of the producers is decisive in determining to which bilateral tariff reducing arrangements are entered into. Therefore, the trade policy is chosen by considering the gains or the losses of the domestic firms under the different regional trade agreements being considered. With these assumptions, if the regional trade agreement does not generate trade diversion, firms in every member country just obtain higher market shares and profits on the other member's market but lose domestic profits. This implies only little or no net profits to them and therefore the membership of the RTA is not attractive. (Krishna 1998, 229.) In this chapter, I will concentrate on explaining the possible reasons for trade diversion and concentrate on the factors that lead to different results compared to the model of Ornelas that was analyzed in the previous Chapter 3.1. With this trade diversion model the idea is to show that the regional trade area has to be trade diverting so that the government will support the agreements which is opposite assumption to the model of Ornelas'. Also it is discussed the possibilities to establish regional trade agreement without trade diversion.

3.2.2 The Trade Diversion in the Political Economy Approach

In the model, Krishna (1998, 229) suggests that governments are more supportive towards the RTAs with the trade diverting feature. This is because the profits gained of the possible member countries have to be larger under the bilateral agreement in order to governments to support the agreement. This makes the establishment of the agreements more challenging and brings out the possibility of trade diversion, because only seldom larger profits are gained by increasing the market shares in other member's market. However, if the regional trade agreement allows firms in the member countries to displace the firms from non-member countries in each other's markets, the RTA surely enhances profits for all members' firms. Of course, this happens at the expense of outsiders.

In the model it is assumed that X and Y are potential member countries of the agreement and Z is the rest of the world. To facilitate the analysis, it is assumed that: i= X, Y, Z and j=X, Y, Z to country indices. The regional trade agreement is supported by X and Y if equation (1) holds for X and equation (2) for Y:

$$[q_x^x + {}_Bq_x^x]n_y < [q_y^x + {}_Bq_y^x](1 + n_z + n_y) \qquad (1)$$

$$[q_y^y + {}_Bq_y^y]n_x < [q_x^y + {}_Bq_x^y](1 + n_z + n_x) \qquad (2)$$

In the equations q_j^i denotes the equilibrium quantities to be sold without regional trade agreement, ${}_Bq_j^i$ denotes the equilibrium quantities sold under the agreement, and n_i denotes the amount of firms in i. Therefore, by using these two equations, it is possible to find out the change in sales as a consequence of bilateral agreement. (Krishna 1998, 230-234.)

To be exact, the equations (1) and (2) above can be interpreted so that the sales in the partner country have to be adequately large relative to home country the agreement to be supported by the home country. This is because the only thing that is lost under the agreement is the share in the home market. Therefore, if two equations above hold, it is known that with a bilateral agreement a better access to partner's market is gained. Thus the larger the partner's market, the greater the gains, because the gains depend on the size of the market. (Krishna 1998, 234-235.)

From two equations above, it can be perceived that the gains in Y's market come from two sources: First, direct effect that results from the reduction of tariffs imposed by Y against X.

This reduces the effective marginal costs in Y from c+t to c. The direct effect is expressed as "1" on the right-hand side of the equations (1) and (2) above. Second, strategic effect is a competitive advantage that firms from X gain over the firms from Y and Z. The competitive advantage is gained because the marginal costs of X's firms relative to firms from Y and Z shifts the equilibrium conditions in X's favor. The strategic effect is the part $(n_y + n_z)$ in the equations (1) and (2) above. Therefore, the larger the number of firms in the foreign market or rest of the world, the greater the strategic effect. The condition (2) that can be interpreted exactly the same way as (1) needs to hold for Y to support the bilateral agreement. (Krishna 1998, 234-235.)

In Figure 4, a political economy approach for the trade diversion is represented. The idea of Figure 4 is to shows how the trade diversion relaxes the conditions that the sales in the partner country have to be sufficiently large relative to home country sales so that the agreement is supported by the home country. This is because the chance for trade diversion makes it easier to gain within the RTA. The line XX represents the conditions where the sales in the partner country Y are sufficiently large relative to home X in a situation where YY represents the conditions where the sales in the partner country X are sufficiently large relative to home Y. Mathematically the conditions that support the agreement can be expressed for X as:

$$\alpha_x < \frac{1}{2n_y}\alpha_y(2 + 2n_y + 2n_x) - 2tn_yn_z + t(n_z)^2 - t(n_y)^2 - t(1 - n_y)^2 \qquad (3)$$

And for Y:

$$\alpha_y < \frac{1}{2n_x}\alpha_x(2 + 2n_x + 2n_z) - 2tn_xn_z + t(n_z)^2 - t(n_x)^2 - t(1 - n_x)^2 \qquad (4)$$

Next, let's consider Figure 4 how the change in the trade diversion influences on the regional trade agreement to be supported in the model. As it has already been discussed the more the RTA increases gains, the more willing the government is to join the RTA.
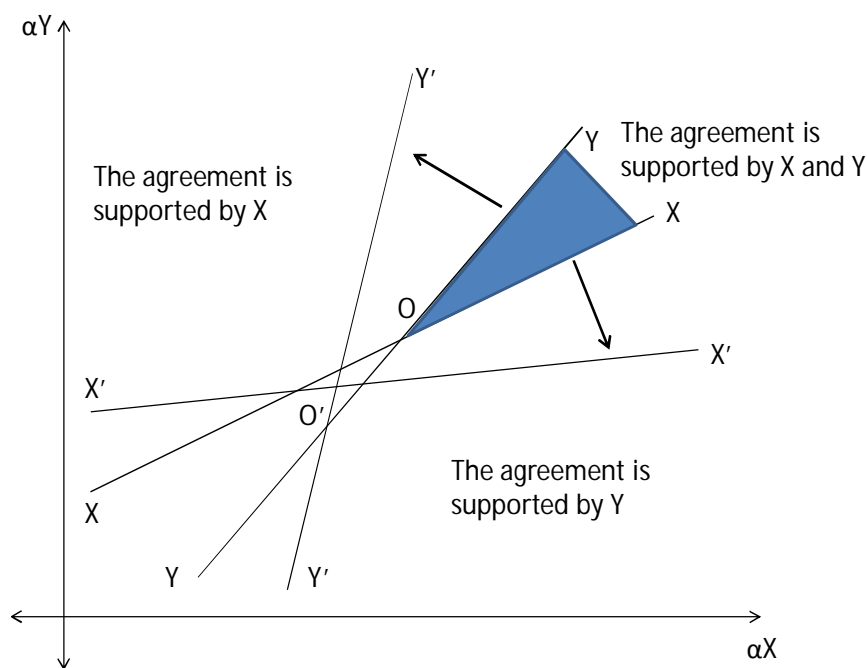
Figure 4 The Trade Diversion (Source: Krishna 1998, 238)

In Figure 4 above, when the number of firms in the rest of the world is n_Z, the bilateral agreement is supported by X at all points above the line XX. The agreement is supported by Y at all points below YY. Therefore, the area XOY is where both of the member countries support the bilateral agreement.

Because the number of firms in Z can be anything, it is important to consider a situation, where the n_Z increases to n_z'. Because the right-hand sides of the equations (3) and (4) are increasing in n_Z, also the number of firms gaining strategic competitive advantage from X (in Y) and from Y (in X) is larger. Therefore, the strategic effect that causes a larger trade diversion is larger for both of the firms from X selling in Y and for firms from Y selling in X. Therefore, the larger the number of firms in Z, the greater the trade diversion is. Thus the more likely it is that the agreement is supported by the partner countries when n_Z increases. (Krishna 1998, 236.)

Therefore, when the amount of firms in the rest of the world increases to n_z', the area where both countries would support the agreement increases in Figure 4 to X'O'Y'. The area XOY is contained entirely to this area. This is possible to depict by expressing the equality from the equation (3) as

$$\alpha_y > \alpha_x f(n_z) + n_z \tag{5}$$

In the equation (5), $f'(n_z) < 0$. Therefore we know that line XX shifts down and the slope decreases. In addition, when n_z increases the right-hand side of the equation (5) increases. Consequently, for equation (3) to hold with equality, also α_x has to increase. This leads the line XX to shift lower as it was shown in Figure 4. (Krishna 1998, 238.)

According to Krishna's theory some trade diversion is needed for the bilateral agreement to benefit both X and Y. The larger the number of firms from the rest of the world, the larger the trade diversion can be. To be able to define the amount of diverting trade it is crucial to define X's initial volume of imports from the rest of the world Z:

$$\frac{n_z}{(n+1)}(\alpha_x - (1 + n_x)t \tag{6}$$

With a bilateral agreement the volume of imports is:

$$\frac{n_z}{(n+1)}(\alpha_x - (1 + n_x + n_y)t \tag{7}$$

Therefore, it is known that, the volume diverting trade is:

$$\frac{n_y n_z}{(n+1)}(n+1)t \tag{8}$$

The equation (8) is increasing in n_z. So when the amount of firms in Z increases to n'_z, the curve XX shifts to down to X'X' and YY up to Y'Y' in Figure 4 above. (Krishna 1998, 247.) Consequently the area where both of the countries X and Y support the agreement increases with the trade diversion as Figure 4 shows from XOY to X'O'Y'. The area XOY is entirely included in this larger area. (Krishna 1998, 238.)

With this framework Krishna (1998) reaches two conclusions: first, the regional trade agreements, that are trade diverting, are more likely to be supported by member countries and therefore also politically. This is because the firms from each member country under the regional trade agreement gain preferential access to the partner's market. In the partner's market, they gain both against the partner country's firms and by diverting trade away from the rest of the world's firms. The protection in the domestic market is lost only against partner country firms. Therefore, if no trade is diverted away from firms from the rest of the world, member countries only gain in their partner's market and lose in their own market against partner's firms. Thus the regional trade agreement is a zero-sum game. Therefore without trade diversion it is less likely that firms from both member countries would gain under the

agreement when external tariffs are determined exogenously. Therefore, trade agreement without trade diversion is less likely supported in this model.

Second, if the trade followed by the regional trade agreement, is diverted away in both of the partner country markets from the rest of the world, both member countries gain. Therefore, the bilateral agreement is more likely to be supported politically. In addition, the larger the trade diversion is, the more likely it is that both member countries would support the agreement as Figure 4 depicts.

An interesting difference in the models of Krishna (1998) and Ornelas (2005b) is the determination of an external tariff. As it has already been discussed, Ornelas (2005b) treats external tariffs endogenously fixed. If Ornelas determined the external tariffs exogenously as Krishna (1998) does in the model, some trade diversion would also exist in Ornelas' (2005b) model as the equation (23) in Ornelas' model depicts.

The second main difference in Ornelas' model appears in the part where the partner firms capture under the agreement the market shares that are taken away from the outside firms through higher tariffs. After the partner firms have taken the market shares away from the outside firms in Ornelas model (2005b), the member countries are no longer able to improve the comparative advantage of their countries via own trade policies. As the partner firms (special interest groups) are aware of this, they start giving less compensation to governments. This decrease of compensation encourages the governments to decrease the external tariffs and become less protectionist, because governments that are less influenced by special interest groups are less protectionists (Ornelas 2005b). Contrary in Krishna's model, the partner firms (special interest group) determine the trade policy despite the consequences of the regional trade agreement. They do not act as the special interest groups in Ornelas (2005b) model. In Ornelas' model the reason why special interest group loses its interest on giving compensation to the government is the capability to improve comparative advantage. This way the special interest group resigns the right to decide about the trade policy in the model of Ornelas. However, in the model of Krishna the special interest groups continue to influence the decisions of the government. Therefore, these differences lead to different outcomes in the case of external tariffs and trade effects as well as in the case of multilateral liberalization.

As the trade policy change in Ornelas' model decreases the external tariffs also the multilateral trade liberalization becomes favorable. Therefore, in Ornelas (2005b) model, the regional trade agreements support multilateral trade liberalization, while in the model of

Krishna free trade agreements reduce the incentives for multilateral trade liberalization. This is because in Krishna's model the rents for producers from the trade-diverting preferential agreements are tied to preferences granted by the bilateral agreement and the rents are lost in the case of multilateral liberalization. Therefore, the preferential agreements may be preferred over multilateral trade agreements in the model of Krishna (1998). Behind this difference is the determination of external tariffs, which is the main difference in these two models.

3.2.3 How to Avoid Trade Diversion?

Even though Krishna (1998) keeps the idea of trade diversion as a starting point for the trade liberalization, some researchers have concentrated on how to establish a regional trade agreement so that the trade diversion is avoided. Among others Kemp and Wan (1976) created a model where it is possible to form a custom union and avoid trade diversion. Later on Panagariya and Krishna (2002) applied it to free trade areas where members have their own external tariffs. Before Panagariya and Krishna (2002), the progress in the literature about this subject has been minimal. The problem that arises with these models if they are applied to the model of Krishna is the non-supportive attitude of the governments towards lack of trade diversion.

In the custom union model, it is possible to avoid trade diversion by freezing their net external trade vector with the rest of the world through a set of common external tariffs and remove the barriers to trade in the union. The common tariff vector is consistent with pre-union world prices as well as pre-union trade patterns and levels of welfare for non-members. As a consequence, the welfare of the union in the aggregate necessarily improves without letting the welfare of the rest of the world to fall. (Kemp & Wan 1976, 95-97.) By setting the combined, extra-union trade vector of member countries at its pre-union level, it can be ensured that the welfare of the non-members stays at the original level and the trade diversion that was explained in Chapter 3.2 will not occur. Of course, this may lead to the situation where the RTA is not at all supported by the government and therefore it will not be established. Especially, if the special interest groups behave as in Krishna's (1998) model. This setting without trade diversion would make the regional trade agreements in Krishna's (1998) model non-profitable. However, interesting in the proposition is that it does not limit the size or number of countries which belong to the union, their pre- or post-union trading

relationships, the relative states of development, levels of average income, the geographical distance, or transportation costs. (Kemp & Wan 1976, 95-97.)

Later Panagariya and Krishna (2002) applied the theory of Kemp and Wan (1976) to also cover free trade areas. They assumed that two countries, Home and Foreign, form a regional trade area and instead of common external tariff vector, the members have member-specific external tariff vectors. Member countries adopt the rules of origin, which means that goods consumed in Foreign are not permitted to be imported via Home at lower tariff and vice versa. In the regional trade area equilibrium, the prices of the imported goods that are not produced within the union are different between the partner countries. The reasons for this are the different external tariff rates and the fact that rules of origin prohibit the low-tariff member (Home) from importing goods from outside the RTA in the high-tariff country (Foreign). (Panagariya & Krishna 2002, 356.) Because the post-RTA tariffs are higher in Foreign than Home, the output produced within the regional trade area is sold in Foreign. If the post-union tariffs were equal in Home and Foreign, the situation would be as in the custom union and the internal supply is sold to both countries. (Panagariya & Krishna 2002, 358.) To conclude, according to Panagariya and Krishna (2002) it is possible to establish a welfare-improving FTA if each member country individually imports the same vector of quantities from the rest of the world in the post-FTA equilibrium as in the pre-FTA equilibrium and follows the rules of origin. Also in a case where bilateral tariffs are reduced only on imports from countries that already are the lowest-cost supplier, trade diversion does not occur (Baldwin & Venables 1995, 1603). This model does not take into the consideration the role of the government in the trade liberalization which is why the model keeps the trade diversion as a negative consequence of the regionalism. That is why there is a chance that the RTA will not be established if there is a doubt of trade diversion to take place.

3.4 The Influence of Discriminatory Tariff Reduction Broader Liberalization

As Ornelas (2005b, 471) model for trade creation drops a hint of the positive relationship of discriminatory and nondiscriminatory tariff reduction also other researchers have paid attention to that. In this chapter it is shortly reviewed some viewpoints within this issue.

In general one of the three goals of the World Trade Organization (WTO), the successors of GATT (General Agreement of Tariffs and Trade), is the trade opening via multilateral trading

system[13]. However, countries are establishing RTAs themselves and removing bilateral tariffs. Because these two actions take place at the same time, the question under review has been, whether one helps another?

Baldwin and Venables (1995, 1636) studied, if the membership of a RTA leads the countries to set higher external trade barriers which may cause a breakdown of the multilateral trading system. They pointed out that external tariffs are set to maximize the welfare of the countries or region. By using this idea, Ornelas (2005b) in his oligopolistic-political economy model that was used in Chapter 3.1 to explain trade creation suggested that the reduction of discriminatory tariffs enhances the reduction of external tariffs. In addition Ornelas (2005b, 480) depicts that the larger the RTA in question, the larger are the reductions of external tariffs. Therefore, Ornelas (2005b, 474) concludes that the regionalism can be regarded as a blessing for the world trading system because of the trade creation effect and decrease of external tariffs.

The study of Estevadeordal, Freund and Ornelas (2008, 1532-1537) supports the fact that RTAs lead to a decrease in nondiscriminatory tariffs. They justify this with the empirical result. In addition they state three facts why the RTAs are positively correlated with external trade liberalization having their stress on developing countries. First, RTAs are seen to have greater impact on multilateral tariff reduction in the developing countries because thus far the impact of multilateral system on tariff reduction has been small in developing countries to which BIC-countries are still categorized according to IMF. Second, as the theory predicts high external tariffs gives more motivation to reduce external tariffs and this way the political interest moves away from protectionism and multilateralism spreads. Third, some products may be easier to liberalize than others which means that trade in these products is often liberalized both regionally and multilaterally.

In their studies Richardson (1993) and Bagwell and Staiger (2001) obtain results that are in line with Ornelas' (2005b) proposition of the relationship. One difference in the models is that their results were obtained in a competitive framework. According to their studies, the tariff revenue and terms of trade enforces governments to lower external tariffs under a RTA.

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[13] In the multilateral trading system tariffs and other barriers to trade are reduced for all countries that are members of the WTO. Therefore, the multilateral agreements differ from the regional trade agreements where the negotiations of the tariffs only relate to the members of the agreement. (Sawyer & Sprinkle 2004, 205)

Ornelas (2005a) sheds light to a viewpoint of a negative relationship of nondiscriminatory and discriminatory tariff reduction. Ornelas (2005a, 1717) suggests that the reduction of protection against the non-members is done to generate overall trade creation. This causes the access of non-member countries to integrating markets to increase. In unison, the extra gains from multilateral liberalization decrease because the costs of multilateralism are kept constant. Therefore, this trade creation may reverse the support of the excluded countries to multilateral liberalization. This means that RTAs may cause harm to multilateral trading system by causing the non-members to hinder multilateralism.

To conclude, the opinions of this relationship between trade liberalization and multilateralism fluctuate. No unambiguous conclusion is possible to drawn in this topic. However, a common factor that connects the opposite viewpoints is the reduction of external tariffs that occurs in both of the situations.

3.5 The Role of the Characteristics of the Country pairs in Trade Liberalization

The role of the characteristics of the partner countries in the regional trade agreement is significant. The characteristics influence on both the probability of the establishment of the agreements and the influence of the agreement on non-member countries. Since Viner, the theoretical studies have shown that the welfare effects of the regional trade agreements can be positive or negative depending on the countries involved in the trade bloc. (Magee 2003, 1.) In this chapter, the importance of characteristics is reviewed as a base for the empirical part.

When a term optimal partner country is mentioned in the context of regional trade agreements, it is meant that it is more likely that countries with specific characteristics, either economic or non-economic, sign on an agreement. Many researchers have tried to find out which characteristics of partner countries make more likely to reach the regional trade agreement. Bair and Bergstrand (2004), Krueger (1999) and Lee and Shin (2006) concentrated on economic factors. Magee (2003) studied the role of both the economic and non-economic factors. I discuss each approach in turn, with my focus on non-economic factors.

There are some explanations for the use of the economic factors of the partner countries in determining regional trade agreements. In their study Baier and Bergstrand (2004), examined

econometrically the key economic factors influencing the likelihood of country pairs forming a free trade agreement. According to their study, country pairs tend to have particular economic characteristics that according to theory should foster the country pair's net trade creation and welfare. They divided the economic determinants of trade creation and diversion into three groups. The first is the economic geography factors. Trade creation is larger the closer two countries are, and trade diversion is less the further two continental trading partners are from the ROW. The second category is intra-industry determinants. The trade creation is greater the larger and more similar are the economic sizes of the two countries and trade diversion is less the smaller is the economic size of the ROW. The third category is the inter-industry trade determinants. Trade creation is greater the wider are the relative factor endowments between two countries, and trade diversion is less the smaller the difference between the relative factor endowments of the pair and that of ROW. (Baier & Bergstrand 2004, 33.) They found empirical support for all three groups of characteristics predicting FTAs.[14] The economic characteristics can predict correctly 85 % of the 286 FTAs existing among 1431 country pairs in 1996. (Baier & Bergstrand 2004, 50.)

Magee (2003) also studied which countries are expected to establish regional trade agreements having the same assumption about the endogeneity of bilateral trade flows and regional trade agreements with Baier and Bergstrand (2004). In addition to economic factors, he concentrated on political factors. Magee (2003, 7) found out that countries are more likely to form RTA if they already have significant bilateral trade, are similar in capital-labor ratios, are similar in size as well as are both democracies. Therefore, the results indicate that both economic and political factors are important in shaping the agreements. The findings of Magee (2003) about the economic size of the countries are in line with the findings of Baier and Bergstrand (2004). In addition, Magee (2003, 14) assumes that countries that have large bilateral trade flows are considered natural trading partners.

As Baier and Bergstrand, Krueger (1999, 116) studied how the economic similarity influences on regional trade agreements. He states that regional trade agreements between a developed and developing country are more probable to improve welfare than an agreement between two developing or two developed countries. The reason for this assumption is that in the

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[14] Baier and Bergstrand found that the likelihood of FTA between a country pair is higher (1) the closer in distance the countries are; (2) the further a natural pair is from ROW; (3) the larger and more similar country pair is economically; (4) the greater the difference in capital-labor endowment ratios between two countries; and (5) the less is the difference in capital-labor endowment ratios of the member countries relative to that of the ROW due to less inter-industry trade diversion. All these factors were economically and statistically significant effects on the probability of an FTA.

international trade theories, such as Ricardian and Heckscher-Ohlin, countries with alike technologies and capital-labor ratios receive no gains from trade with each other. Therefore, similar countries have less possibilities for gains from trade based comparative advantage, which is opposite to the findings of Magee (2003).

There are few explanations for the use of the non-economic factors of the partner countries in determining regional trade agreements. (Magee, 2003) In general, culture is thought to have influence on economic outcomes by affecting personal traits such as honesty, thrift, willingness to work hard, and openness to strangers. (Barro & McCleary 2003, 2.) Therefore, it can be assumed that similar culture has positive influence on determining regional trade areas. In addition to Magee (2003), Rose (2000) underlines that the existences of regional trade agreements have to be explained by non-economic factors, even though he does not specify non-economic factors more carefully.

In previous research cultural variables are as well used as instruments for trust, which is seen to correlate with the regional trade agreements. Among others Rose (2000) and Baldwin (2006) support the fact that cultural factors can be used as instruments for regional trade agreements. Rose (2000) finds that historically regional trade agreements have increased trade by 235% by studying countries that have very close cultural roots. Baldwin (2006) instead only finds an increase of 9 % in trade as a consequence of regional trade agreements. In his study, the countries were not as culturally close. Therefore, from the non-economic factors similar culture enhances the born of regional trade agreements, which is why cultural variables could be excellent instruments for RTAs in the IV-estimation.

Other researchers have also had attempts to find out the characteristics that make regional trade agreements more trade creating or more trade diverting.[15] For this Frankel (1997) created the idea of natural trading partners, countries that already trade significantly. By natural trading partners it was meant the geographically close countries that may have the same culture that often leads to trade creation. In his theory, Frankel (1997, 40) lists characteristics of the countries that usually encouraged countries to trade. Features are such as geographically close countries and countries that share cultural characteristics. According to Frankel (1997) if two countries have these features the trade will be trade creating, which is also a consequence of trade unions. Lee and Shin (2006, 284) used geographical proximity as an indicator to trade creation and diversion. They created variable that show how much

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[15] See e.g. Calvo-Pardo, Freund & Ornelas 2009; Lee & Shin, 2006

common language, geographical distance, land border between the member countries and area influence on trade creation and diversion. As a result, they found that if countries share the border and language and are geographically close the possibility of trade creation increases and trade diversion decreases. In Chapter 6, the country characteristics that influence on trade creation and diversion are studied in a case of BIC-countries.

4 Review of the Empirical Literature

The literature and research about regional trade agreement started to develop in the 1950. In the 1960s as a consequence of the European integration, the research started to increase. Among others Bela Balassa studied integration from many perspectives.[16] Furthermore, the wave of regionalization in the eighties increased the amount of research of regionalization in the theoretical and empirical literature. (Caporale, Rault, Sova & Sova 2008, 1.) From the economics point of view, the most common topics of research in regional trade agreements have been the influence of different regional trade agreements on trade.

The increase in regionalism and the development of the regional trade agreements started to increase interest and significance among economists. Also the interest among other sciences appeared. Researchers of social science studied the topic trying to find out which countries are expected to form regional trade agreements (See Magee 2003).

However, the empirical research about regional trade agreements started to increase in the beginning of the 1960s, when Tinbergen (1962) applied the gravity model to study international trade flows. He included the RTA dummy variable in the gravity equation and was the first to estimate the effects of regional trade areas on trade. In his first study, he found significant positive effects among members of British Commonwealth although insignificant for Benelux RTA. After Tinbergen (1962) various results about the influence of RTA have been found out. After Tinbergen (1962) numerous empirical analysis has used the gravity model and conducted to provide various verifications and conclusions to international trade.[17]

Since the 1990s important changes in the research were noticed when the gravity model gained a lot of attention in the analysis of international trade. This was as a result of renewed interest in economic geography and increased interest on other kinds of factors of economic activities as well as the rapid expansion of free trade agreements in the 1990s. (Urata & Okabe 2007, 7.)

The researches made in the 2000s have still mainly concentrated on major trade blocs. New aspects have been the interest in new members to European Union as well as the regional

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[16] E.g. Balassa studied the trade creation and diversion in the European common market as well as the economic integration among developing countries.
[17] See e.g. Calvo-Pardo, Freund & Ornelas (2009); Baier & Bergstrand (2007); Caporale, Rault, Sova & Sova (2008); Lee & Shin (2006); Urata & Okabe (2007); Hellvin & Nilsson (2000);

trade areas in Asia.[18] This was partly because trade liberalization took place in Asia later compared to other continents. (Pomfret 2007, 925.) Also new aspects such as the effect of regional trade areas in different sectors have appeared.

Overall, the previous literature has concentrated mainly on the largest regional trade areas such as European Union, Mercosur, Nafta and ASEAN and most of them have used the gravity model as a research method. It is actually surprising that the trade liberalization of emerging countries has not been analyzed more profoundly in terms of trade integration within last few years, as it would obviously provide a rather profitable and exceptional framework for research. The number of empirical analyses of China, India and Brazil are modest as well.

The first part of this chapter presents the most important studies related essentially to trade liberalization. Literature about the relationship of discriminatory and nondiscriminatory tariff reduction is excluded from the review. Despite the studies, where the relationship is analyzed along with the trade effects of the regional trade agreements, are expectations though. Second part of this chapter then covers empirical studies on trade liberalization that deal with emerging countries, specifically with BIC-countries. Most of the emerging country studies have concentrated predicting the trade potential of the countries.

4.1 Empirical Studies on Trade Liberalization

The study performed by Calvo-Pardo, Freund and Ornelas (2009) represents one of the most interesting ones in the category of trade liberalization. Even though the scope of this study is in the trade effects of the ASEAN Free Trade Agreement, its findings appear rather interesting also from the nondiscriminatory viewpoint of trade liberalization. Specifically, Calvo-Pardo et al. examined how the ASEAN Free Trade Agreement influenced the trade with non-members and external tariffs facing non-members. They studied the influences during the period of 1992-2007 across HS 6-digit level industries by dividing the yearly data into six three-year periods. As a result, they found a positive influence of the ASEAN free trade agreement (AFTA) on imports inside the bloc. In addition, it seems that tariff reduction does not have lower import growth from non-members. Therefore, AFTA has had positive impact on trade

[18] Among others Calvo-Pardo, Freund and Ornelas (2009) studied the impact of ASEAN free trade agreement on trade flows.

among members without trade diversion. Also as a consequence of the lower internal tariff, the members of AFTA have lowered their external tariffs. This means that a causal relationship between preferential and MFN tariff reduction is found. Therefore, the preferential tariff reduction in AFTA has influenced on broader liberalization.

Another interesting study on trade liberalization is provided by Baier and Bergstrand (2007). Baier and Bergstrand (2007) studied the influence of free trade agreements on trade in a new way. In their study, they criticize the assumption that free trade area is exogeneous variable. Therefore, they were the first ones to address the endogeneity of free trade agreements. The panel data that they use from 1969-2000 adjusts the endogeneity well. With this assumption Baier and Bergstrand (2007) found that after ten years free trade area has approximately doubled the trade between two members, which is seven times the effect estimated using OLS. Therefore, if regional trade agreements are assumed to be endogenous, most of the previous studies of the effects of RTAs on trade flows may be biased. (Baier & Bergstrand 2007, 74.)

Also, Caporale, Rault, Sova and Sova (2008) shed light on the endogeneity of the free trade variable. They focused in their study free trade agreements between European Union (EU-15) and the Central Eastern European countries (CEEC-4 i.e. Bulgaria, Hungary, Poland and Romania). To address these issues a dummy variable that represents the association agreement is introduced. In addition, the robustness of the agreement variable is studied in two different ways. First, an extended sample of countries including three countries (Belarus, Russian Federation and Ukraine) that did not sign the FTA with EU-15 even though countries belonged to the Communist bloc is considered. Second, different estimation methods are used. As a method, they used the fixed effect vector decomposition (FEVD) technique to be able to isolate and eliminate the potential endogeneity bias of the agreement variables and to obtain more robust results. The sample period spans the period 1987-2005. When Caporale et al. examined the bilateral trade effects between EU-15 and CEEC-4 countries, the positive and significant effect of regional trade agreements on trade. Countries that signed the FTA with EU-15 exceeded the trade growth by 14 % of the control group of countries which did not become members.

The study performed by Lee and Shin (2006) also represents an interesting aspect to the trade liberalization. Even though the scope of this study is to examine the possible trade creation and diversion effects in East Asia, Lee and Shin (2006) also pay attention to the country

characteristics that influence the RTA more likely to be trade-creating or trade-diverting. To be able to study the trade diversion effects, Lee and Shin (2006) introduce RTA dummy that gets value unity if another of the countries belongs to some regional trade area. With the same method both Urata and Okabe (2007) and Lee and Shin (2006) were able to capture the trade creation and diversion effects in their studies. The panel data covers 175 countries from 1948-1999. To be able to capture how the characteristics of member countries affect trade creation and diversion, Lee and Shin (2006) define interaction terms between intra- and extra-bloc RTA dummies and variables such as distance, border, and language. Lee and Shin (2006) found in their study that in East Asia the regional trade agreements tend to be more trade creating than diverting. In line with the natural trading partner theory, Lee and Shin (2006) were able to show that country characteristics have significant impacts on trade creation and diversion. According to their findings, the countries that are located close and share a land border are more probably trade creating and less trade diverting.

The study performed by Urata and Okabe (2007) is one of the most relevant studies about the impacts of free trade agreements on trade flows. They examined the impacts of free trade agreements on trade using two approaches. The first approach is to study the changes in trade patterns before and after an FTA by using the indicators of intra-FTA interdependence. Specifically, they measure the extent of dependency on foreign trade between and among FTA members. The second approach is to estimate the gravity equation to determine the impacts of FTA, such as trade creation and trade diversion, on trade flows. To be able to study this, they add two additional FTA dummies to the equation: FTAtononFTA and NonFTAtoFTA. Urata and Okabe (2007) extend the previous studies in the second approach by enlarging the sample size in terms of time-period and they also disaggregate the trade data to different sectors, because they assume that the impact of FTA is different for different sectors. Urata and Okabe (2007) found that FTA increased the trade in almost all the cases. By using the aggregate data, they found trade creation effect, but the trade diversion effect was limited. Both of these effects depended on the regional trade agreement in question. The positive trade creation was found for NAFTA, AFTA and MERCOSUR. Therefore, the trade diversion effect was found for all FTAs except MERCOSUR, EU-Mexico, and Japan-Mexico FTAs. With the disaggregated data, trade diversion was found only in EU, MERCOSUR and NAFTA.

In the interest of researchers has also been how integrated two trading blocs are. Hellvin and Nilsson (2000) in their study examined the level of integration between EU, Asia and NAFTA

and possible extra-regional bias in the trade between the blocs. In the study, the actual trade flows were compared with projected trade based on gravity model estimation using OECD countries as a reference group. The estimation is done using the average of the years 1995 and 1996 to be able to avoid possible temporary shocks. As a result, it was found that EU's and NAFTA's trade trade integration with Asia is above the average level of integration among the OECD countries. Instead, the integration is the weakest between EU and NAFTA and strongest between Asia and NAFTA. The integration between EU and Asia has been strengthened with the ASEM (Asia-Europe Meeting) meetings every two years.

In the interest of Martinez-Zarzoso and Nowak Lehmann (2003) has also been the trade between two trading blocs, Mercosur and European Union. They use a panel data analysis to disentangle the time-invariant country specific effects and to capture the relationships between the relevant variables over time. The time period under study goes from 1988 to 1996. They found that the fixed effect model is preferred over the random effect model. As a result, it was discovered that belonging to one of the two regional trade area fosters trade.

4.2 Empirical Studies on Trade Liberalization in Emerging Economies

Emerging economies have not been the subject for many studies, which is surprising because of their importance in the world economy. Existing empirical studies have examined either the integration of these countries with the rest of the world, global trade potential or the general RTA-effect. The use of gravity model is common for these studies.

Mun Heng and Gayathri (2004) study how the regional trade agreements would influence on emerging countries by using Vietnam as an example country. The study provides an appraisal of Vietnam's regionalist integration strategy of trade liberalization. Mun Heng and Gayathri (2004) simulate four different RTA scenarios and study the effects of each among others on international trade and economic growth. They simulate Vietnam's possibility to join the ASEAN free trade area, the ASEAN-China free trade agreement, and the ASEAN-Japan free trade agreement. By using a method of computable general equilibrium (CGE) model they explore and quantify the economic benefits and losses resulting from the participation of Vietnam in regional trade agreements. CGE has been used widely to study the changes in trade policy such as regional trade agreements. The advantage of this method is its ability to take into the consideration the economic interdepency among multiple sectors and multiple

trading partners in measuring the quantitative impact of policy changes. They found out that further trade liberalization beyond AFTA would benefit Vietnam in terms of welfare and trade. Trade liberalization could bring better economic advantage and lower adjustment costs for Vietnam's efforts at industrialization and fostering structural economic change in all the scenarios.

The role of China in the world economy has been studied and the integration with the rest of the world. In the study, Bussiére and Schnatz (2006, 99-100) measure the intensity in a new way by including many more factors than traditional openness ratios to trade integration. As indicators they use the share of certain countries in China's trade, the share of China's trade of the trade of certain countries, China's trade flows by trading partners, the openness ratio (Trade/GDP), the share of China in world trade and trade concentration. They try to present an empirical assessment of China's natural place in the world economy by using a gravity model for the period 1980-2003. Differently from other studies Bussiére and Schnatz aim to develop a new set of trade integration indicators instead of studying only the effect of policy variables such as regional trade integration. They estimate the model with a two-step panel framework, which takes country heterogeneity properly into consideration. According to the study China is already well integrated into the world markets, especially with North America, several Latin American and East Asian emerging markets and most euro area countries.

Tianshu Liu (2007) studied the impact of regional trade agreements on China's trade during the time period 1980-2004. The studied regional trade agreements were ASEAN, CER, CUSTFA, NAFTA, MERCOSUR, EU and APEC. Liu adds in the study to the gravity equation three RTA variables to be able to capture the influences on intraregional trade (trade creation), extra regional trade (trade diversion) and outside regional trade. Outside regional trade means that non-members have possibility to find other solutions to enlarge their trade and to reduce the negative impact of the RTA. Liu found that China's formation of regional trade agreements has had both negative and positive influences on China's trade with other trading partners, when they are not members of a bloc. China's membership in APEC improves China's trade with other members. Instead, trade diversion is found with CER, NAFTA, CUSTFA, and MERCOSUR. However, ASEAN does not slow down its members' trade with China. The influence of EU on China's imports is not obvious in this research. The R-square in the study ranged from 0.8880 to 0.9517 reflecting the strong fit of the gravity model.

Amitra Batra (2004) studied India's global trade potential using the gravity model approach. In the study, an augmented gravity model equation is used with the maximum possible geographical coverage of world trade flows. The study consists of two parts. In the first part, the gravity model is used to analyze the world trade flows and the impact of RTAs on trade flows using the OLS technique. Thus the coefficients obtained from the estimation are used to predict the trade potential of India in the second part. This is done by keeping in mind the prospective preferential trade agreements that are in offering in the near future or have already been established. Especially the trade potential is studied with SAARC, ASEAN and GCC. The cross-section data is for the year 2000. As a dependent variable total merchandise trade flows is used. Batra (2004) found out that the coefficient for regional trade agreements is 0.87 meaning that RTAs can lead the trade to increase over twice as much as it would be otherwise possible for a country pair. However, in the second part the trade potential of India is considered the highest with the Asia-Pacific region followed by Western Europe and North America.

5 Gravity Model and Methodology

This part of the thesis concentrates on explaining the gravity model that is used in the empirical part. First, the aim is to explain what gravity model is and to which theories it is based on. Second, the instrumental variable method is talked through. The instrumental variable method has recently become a popular method because in the model it is assumed the regional trade agreements to be endogeneous as in Ornelas (2005b) theory.

5.1 Gravity Model

Modeling and predicting foreign trade flows has long been an essential task in international economics (Mátyás 1997 363). Normally, the gravity model is used to explain cross-sectional variation in country pairs' trade flows. (Baier & Bergstrand 2007, 73.) Gravity model has also used to understand the determinants of bilateral trade flows across countries and later on it has been used to analyze commercial policy measures (Sanso, Cuairan & Sanz 1993, 266). The positive correlation between the level and similarity of GDP and bilateral trade flows based on the macroeconomic theory has also been found in the previous research (Wang, Wei & Liu 2010, 898). The general view is that the higher the levels of GDP and the lower the transaction costs, which are usually measured as bilateral distance, the higher the trade flows between trade partners. The gravity model has been used to both cross section and panel data estimation. Jan Tinbergen (1962) and Pentti Pöyhönen (1963) were the first researchers who published econometric studies using the gravity model for international trade flows in the early 1960s. In his study, Tinbergen evaluated the effects of the free trade area on trade flows.

In the beginning, the model was based on Newton's Laws of Gravitation and it was stated that the gravity equation was without theoretical foundation. However, later it has been derived from the international trade theories including Richardian-, Heckscher-Ohlin (H-O)-, and increasing returns to scale (IRS) models.[19] The derivation of the gravity model from the framework where firms in monopolistic competition maximize profits is briefly reviewed in the next chapter as all international trade theories end up to the same gravity model.

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[19] See Evenett and Keller (2002),

A common way to use the gravity model is to divide the countries into pairs, then form a sample of their yearly trade data and last estimate the gravity equation on the formed sample. In the original form of gravity model, there are only two core variables (Wang, Weng & Liu 2010, 894). Later, the model was extended and explanatory variables such as geographical variables and language were added. Various researchers have extended the original model by adding variables such as border effects, historical or colonial ties, exchange rate or currency risk, trade or economic policy, economic development and other dummy variables such as language[20].

The gravity equation is equally applicable to any pair of countries and it has symmetric character which means that it provides the trade flows in both directions by changing the variables of country i for country j (Sanso, Cuairan & Sanz 1993, 267). One difficulty in estimating the gravity equation is that the trade variable becomes undefined if bilateral trade flows are zero. As a result presented in this thesis, the country pairs with zero bilateral trade are dropped from the analysis following Frankel (1997) and Magee (2003). Another option would be to use all country pairs and put $ln\,TF_{ijt} = 0$ when there are no bilateral flows. In addition, with the Tobit estimation method the possible bias of the latter method could be avoided.

Currently, there is a wide consensus about some characteristics of the gravity model. At both, empirical and theoretical levels, it is agreed about the great usefulness of gravity models basic formulation as an instrument for bilateral trade flows' modeling and its adequacy to each particular situation by adding the suitable variables. In addition, it is agreed that the log linear form is the correct specification for it. (Sanso, Cuairan & Sanz 1993, 266.) In this thesis I agree with these characteristics. There has also been some criticism about the model. Polak (1996) in his study has criticized the significant role of regional trade agreements in explaining the volume of exports.

The success of gravity model to be the dominant empirical method of analyzing bilateral trade flows is in the model's strong explanatory power. In their study, Baier and Bergstrand (2007, 77) have concluded that the gravity model's explanatory power (R^2) has ranged from 60-80 %. Therefore, the model is particularly fitting since it focuses on barriers to trade. (Melitz

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[20] See: Frankel & Rose, 2002; de Groot, Linders, Rietweld & Subramanian, 2004; ''', 2004; Melitz, 2008; Frankel & Wei, 1993; Longo & Sekkat, 2004; Baier & Bergstrand, 2009

2008, 674.) The advantages of the gravity model are also, that the model has been exclusive in similar research.

5.1.1 The Gravity Model Framework

The derivation of gravity equation from different international trade theories is very general. In this thesis, the generalized gravity model is derived from the framework where firms in monopolistic competition maximize profits and consumers maximize utility according to the Dixit-Stiglitz preferences of international trade theory as shown by Carrère (2006, 225). As it has already been mentioned in the previous chapter, all international trade theories end up to the same gravity model. Therefore, the Heckscher-Ohlin (H-O) -model among others can also generate gravity equation represented below.

Let's assume that the profit maximizing firms in country j set the product prices delivered to i according to the equation (1)

$$\textbf{(1)} \qquad p_{ij} = p_j \theta_{ij}$$

In the equation (1), θ_{ij} is a barrier to trade function between i and j to be developed later in this chapter.

Then we obtain the following equilibrium trade flow for each goods-producing firm in country j selling to market i:

$$\textbf{(2)} \qquad TF_{ij} = \left[\frac{\gamma}{\varphi \textbf{(1}-\sigma\textbf{)}}\right] \frac{Y^i Y^j}{p_j} \left[\frac{p_j \theta_{ij}}{P_i}\right]^{1-\sigma} \left[s_j \left(\textbf{1}+t_i\textbf{)(1}+t_{ij}\right)\right]^{-\sigma}$$

Equation (2) is the currently accepted theoretical foundation for the gravity equation in the presence of transportation costs and tariffs. In the equation:

TF_{ij} = the value of aggregate trade flow imported by country i from exporter j;

σ = the elasticity of substitution in consumption in goods (Dixit-Stiglitz preferences);

γ = the Cobb-Douglas preference parameter for goods;

φ = fixed costs facing each firm (including both capital and labour);

$\textbf{Y}_{i(j)}$ = gross domestic product of country i(j);

$\mathbf{p}_j$ = exporter (country j) price level of it representative good;

t_i = share of tariff revenue relative to income;

t_{ij} = ad-valorem tariff-rate by country i on the good produced in j ($t_{ii} = 0$ assumed)

To be able to derivate the gravity equation the multilateral resistance term is needed. The multilateral resistance term can be interpreted as an output-weighted measure of the remoteness in terms of the trade costs of country i. (Carrère 2006, 226.)

$$(3) \qquad P_i = \left[\sum_{k=1}^{N} n_k [p_k \theta_{ik} (1 + t_{ik})]^{1-\sigma} \right]^{1/1-\sigma}$$

If it is assumed that ad valorem tariff of country i on the good produced in j is equal to an ad valorem tariff of country j on the good produced in i ($t_{ij} = t_{ji}$) and the barriers to trade be equal $\theta_{ij} = \theta_{ji}$ the implicit solution to equations (1) and (3) is:

$$(4) \qquad p^*_j = \frac{p_j \theta_{ij}^*}{P_i} P_j^{-1}$$

When we substitute equation (4) into equation (2), we get equation (5):

$$(5) \qquad TF_{ij} = \left[\frac{\gamma}{\varphi(1-\sigma)} \right] \frac{1}{Y_w} s_j Y_i Y_j Y \theta_{ij}^{1-\sigma} (1 + t_{ij})^{-\sigma} [P_i P_j]^{\sigma-1}$$

This equation is remarkably close to the gravity model in the empirical literature. In the equation $\left[\frac{\gamma}{\varphi(1-\sigma)} \right] \frac{1}{Y_w}$ is later in the equation (7) absorbed to be constant term. Regarding to a barrier to trade, θ_{ij}, it is obvious that it is crucial to get the best handle possible on what constitutes the "barrier-to-trade" function, which is usually proxied either by distance between trading partners or sometimes with a price ratio. Because recent studies have shown that these variables are not the only determinants of trade costs, I model the barrier-to-trade function between countries i and j, as follows:

$$(6) \qquad \theta_{ij} = (GD_{ij})^{\beta 1} [e^{\beta_2 BOR_{ji} + \beta_3 DEV_{ij} + \beta_4 RTA_{ij}}]$$

In the equation above, GD_{ij} is the geographical distance of the countries i and j and BOR_{ji} express whether countries i and j are neighbor countries and share a border. In addition, Carrère (2006, 227) used in the barrier-to-trade function two other dummy variables: country i

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is landlocked and country j is landlocked. I replaced landlocked variables with the following variables as it can be noticed from the equation (6) above: DEV_{ij} express whether both of the pair countries are categorized as developing countries and RTA_{ij} is the regional trade agreement variable, which reveals whether the countries i and j belong to the same trading bloc. In this study, all the variables in the gravity model refer to those values in the given year, except dummy variables that are time invariant.

Next the equation (6) is substituted to the equation (5) and after some modifications the following gravity model equation is got:

(7) $\ln TF_{ijt} = \beta_0 + \beta_1 \ln GD_{ij} + \beta_2 BOR_{ji} + \beta_3 DEV_{ij} + \beta_4 RTA_{ij} + \beta_5 \ln GDP_{it}$
$+ \beta_6 \ln GDP_{jt} + u_{ij}$

In the equation $GD_{ij}, BOR_{ji}, DEV_{ij}$ and RTA_{ij} are the same as in the equation (6). In the equation (7) above, TF_{ijt} is the volume of trade from country i to country j at time t. In the existing literature, there is no agreement on whether the dependent variable should be exports or total trade (i.e. the total sum of export and imports) (Wang, Wei & Liu 2010, 904). β_0 is a coefficient, GDP_{it} is the GDP in country i at time t, GDP_{jt} is the same for country j.

In this thesis, I use this derived form for the gravity equation and I add to the equation (7) some necessary variables to my estimation. According to Wang et al. (2010, 895) in the literature it is not mentioned which other variables should be included in the extended model. In this study, the variables added follow economic theories, previous studies, and variables that are necessary for the study. However, there is a universal inclusion of the gravity variables and according to Baxter and Kouparitsas (2005 p. 4), the reason for this is the willingness to determine the variables that can explain the trade.

For instance, I add to the model the population of the country i at time t (POP_{it}) and the same for country j at time t (POP_{jt}). The logarithm is not taken from the dummy variables. To be able to capture possible trade diversion and creation effects in the first section of the empirical part, I use Urata's and Okabe's (2007) way. I add one more RTA variable, $RTA/Diversion$, in the estimation equation.[21] After adding the necessary variables to the model, the gravity equation takes the form:

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[21] Urata and Okabe (2007) actually added two RTA-variables. They studied two trade diversion effects: how the trade flows have changed from member of RTA to non-member and from non-member to member of RTA.

$$\textbf{(8)} \quad \ln TF_{ijt} = \beta_0 + \beta_1 \ln GD_{ij} + \beta_2 RTA_{ij} + \beta_3 \ln GDP_{it} + \beta_4 \ln GDP_{jt} + \beta_5 \ln POP_{it}$$
$$+ + \beta_6 \ln POP_{jt} + \beta_7 RTA/Diversion_{ij} + \beta_8 Dummy_{ij} + u_{ij}$$

In the equation (8), TF_{ijt}, GD_{ij}, GDP_{it}, GDP_{jt}, POP_{it}, POP_{jt} and RTA_{ij} are the same as in the equation (7). The $Dummy_{ij}$ variable includes possible dummies added to the equation such as common border and developing country. In addition there is a variable, RTA/Diversion_{ij}, that measures the change in trade flows if one country is a member of RTA, but the other is not. With the latter variable, the trade diversion effect is tried to capture. (Urata & Okabe 2007.) Variables capture the degree of trade diversion from non-members compared with normal bilateral trade (Lee & Shin 2006).

By using the equation (8) above, I am trying to discover the influences of RTA on international trade flows. First, the general trade creation and trade diversion effects are examined in general without considering any specific RTAs such as ASEAN or Mercosur. In this case, the RTA-variable is also instrumented by using IV-method that is explained later in Chapter 5.2.1. Second, the effects of specific RTA on bilateral trade are studied. This means that I will also separate what happened as a consequence of each RTA that BICs have formed; which RTAs were trade creating and which were trade diverting.

In this thesis, I will also study the impact of member country characteristics on trade diversion and to trade creation in the second section of the empirical part. In total I will construct 16 new variables that will capture the effects of country characteristics. This approach was utilized in the study of Lee and Shin (2006) on trade creation and trade diversion in the East Asia. They found evidence that countries located in close proximity and sharing a land border tend to create more trade and divert less trade. The next six new variables are the same as in the study of Lee and Shin (2006). First, I will construct a variable (RTA_Distance) that interacts the bilateral distance between country (i, j) with the intra-bloc dummy (RTA/Creation) to study the effect of distance between member countries on trade creation. Second, variables that interact the border and intra-bloc dummy (RTA_Border) and language and intra-bloc dummy (RTA_Language) are also created. The same is done for the extra-bloc dummies and three more variables are created: RTAD_Distance, RTAD_Border, RTA_Language. In addition, I decided to add ten other variables to study the impact of some other member country characteristics on both trade diversion and trade creation more precisely. Five new variables for both trade diversion and trade creation are created as above. The country characteristics used in the new variables are: common religion, common ex-

colonizer, common legal origin, common continent and both countries being developing countries.

5.2 Methodology

The aim of this thesis is to study whether the regional trade agreements create trade. To achieve this, the instrumental variable estimation is used in the gravity model. This section describes how the regional trade agreement is instrumented and when the method is used.

5.2.1 Instrumental variable method

In the empirical part of the thesis, the instrumental variable (IV) estimation is used. According to Dougherty (2007, 252), IV is a major variation on OLS. In IV, the purpose is to semi-replace a defective explanatory variable with another variable that is not correlating with the disturbance term. (Dougherty 2007, 252.) As mentioned in the previous chapter the regional trade area dummy is semi-replaced in this thesis with the cultural variables.

In the simple IV regression, the simple OLS equation is used:

$$Y_i = \beta_1 + \beta_2 X_i + u_i$$

From the equation above, the variable X_i is instrumented with Z. To be a good instrument Z (cultural variables) should be correlating with X_i (RTA), but not with the error term u_i. In this case, many instruments are used meaning that all of them have to correlate highly with the instrumented variable.

In addition, all the four instruments should influence on the likelihood a RTA will be signed as it was discovered in Chapter 4.5, but not directly influence bilateral trade levels. Therefore they are not direct determinants of bilateral trade. Though, the cultural variables do not completely fulfill the second requirement for the good instrument. For examples Melitz (2008) and Magee (2003) have important results related to this topic. Both Melitz (2008) and Magee (2003, 15) found that a common language promotes bilateral trade, which is against the second requirement of the good instrument. Still, many researchers such as Guiso,

Sapienza and Zingales (2009) have used cultural variables as instruments when trying to find out the influence of certain variable on trade.[22] Therefore, I will do it as well. Though, my aim is to do the IV-estimation two ways. First, include language in instruments and then exclude the language from the instruments to see if the language really has direct impact on trade.

It is possible to use each factor separately. However, the IV estimation becomes more efficient if all the instruments are used as a group rather than individually. To do this, all of them have to be included in the list of instruments in the regression command as it is done in this thesis. According to Verbeek (2001, 150), in the IV-estimation it is possible to use from one to arbitrary number of instruments. The asymptotic efficiency is positively correlated with the number of instruments. However, the finite sample bias increases with the amount of instruments. (Johnston & DiNardo 1997, 157.)

The most important thing in IV-estimation it is to choose instruments that meet the requirements of a good instrument. The requirements for good instruments are; the instrument should correlate with the variable and not to correlate with the variable's error term.

There is some criticism for the IV-method. Baier and Bergstrand (2007, 83) agree that the IV-method is not reliable for addressing endogeneity bias of the RTA binary variable in a gravity equation.

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[22] Guiso et al. (2009) studied the influence of trust on trade flows and they used cultural variables as instruments for trust. Though the instrumented variable is not regional trade agreement in the study of Guiso et al. (2009), the influence of cultural variables on trade is commensurate to my study.

6 Data and Variables

6.1 Formulating and description of the data

This chapter describes the panel data used in this thesis. The panel data consists of country pairs and years in the estimation. The dataset consists of 4744 country pairs over the period 2001-2008. BIC-countries (Brazil, India and China) are the target countries. See Country Table 9 for the full list of countries included in the study. Some of the country pairs were dropped because of the missing values.

During the crisis BIC countries were active at using protectionist measures and also the growth of the world was negative. Only China among some other countries gained positive growth. Therefore it is better to use the data only until 2008 to avoid the deviations caused by the financial crisis.

In addition, to the general gravity model variables, such as trade flows, distance and language, the challenge was to find instruments for the regional trade area to decrease the bias of the estimation. Differently from most of the previous studies the regional trade area variable is instrumented. The cultural variables (language, religion, legal system, common ex-colonizer) are used as instruments for regional trade area.

The data is collected from many sources. The main sources of the data are the CEIC and French CEPII Database, which are supplemented with data from other databases. CEPII Gravity Dataset is originally collected by Keith Head, Thierry Mayer and John Ries. The data for bilateral trade flows is found the CEIC which is a database for emerging and developed markets. The data of the instrumental variables is got from diverse sources. The data was collected as the currency of the United States and deflated in the prices of the year 2005.

6.2 Variables

6.2.1 Time variant variables

Trade Flow

In this thesis, the bilateral trade flow is the dependent variable that expresses the trade between the countries i and j. In period t the trade flow (TF) is determined as follows:

$$TF_{ijt} = \mathbf{ln}\big(X_{ijt} + X_{ijt}\big)$$

In the equation above, X_{ijt} represent exports from reporting country i to country j in period t, and X_{jit} represents the imports from country j to reporting country i (Baxter & Kouparitsas 2005, 3). Therefore, TF_{ijt} is the sum of exports. The data for bilateral trade flows is collected from the CEIC database.

GDP

GDP is one of the core variables in the gravity model. The levels of countries GDP's should positively affect influence on their bilateral trade. (Wang, Wei & Liu 2010, 895-898.) GDPs are from the World Bank's World Development Indicators (WDI) database.

Population

Population is one of the common variables used in the gravity model. Population data is got from the World Bank's WDI database.

Trade Diversion

The trade diversion variable is formulated in a new way in this thesis. This Michaely index measures to what extent the importing profile of a country is matched by the exporting profile of another country or group of countries. The index is developed by Michaely (1996). This index has been used among others by Aurora Mordonu (2006) and Otsubo and Umemura (1998).[23] The use of an index provides several advantages over the use of dummy variable. In a case of a high match, it is expected that the bilateral trade increases when they become members of the same bloc. The closer the value is to 1, the more exact the match is and a little

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[23] Aurora Mordonu (2006) studied in her study the exports of Russia. The index describes to what extent the exports structure of Russia matches the structure of the partner's country's demand for imports. The same index was also used by Otsubo and Umemura (1998). Though they used the Michaely index as a measure for trade complementarity in the gravity equation.

trade diversion can be expected. The closer the value is to 0, the more trade diversion can be expected. In period t, the index is determined as:

$$TD_{ijt} = 1 - \frac{\sum \left| \mathbf{m}_{ki} - \mathbf{x}_{kj} \right|}{2}$$

Where i is the reporting country (Brazil, India, China), j is the partner country, k is a good in a category, m is the share of the exports of product k in a country's in-category imports from the world and x is the share of the exports of product k in the country's in category exports to the world. After the indices are calculated per category, the indices are aggregated per importing country, using weighted averages. The weights are the shares of the partner country's category imports in partner country's total imports. (Mordonu 2006, 16.) The data is got from the UN Comtrade database.

6.2.2 Time invariant variables

Membership to a regional trade agreement

The membership to a regional trade agreement is a dummy variable. If two countries have joined the same trading bloc before or during the sample period 2001-2008, the dummy variable RTA gets value 1. If they are not members of the same trading bloc, the dummy variable gets value 0. This method of determining the RTA variable has been used by Caporale et al. (2008, p. 17) among others. Some researchers have determined RTA as a time variant variable[24]. Both methods may cause a biased variable, because there is the chicken-egg problem that was mentioned in the literature review chapter.

The general RTA variable consists of six RTAs and 13 bilateral trade agreements, which are notified to the GATT and the WTO up to December 2008. Of 13 bilateral agreements in two of the agreements, the other party is RTA.

Developing country

This variable gets value 1, if both trading partners are categorized to be developing countries. In other cases the dummy variable gets value 0. The data is got from the IMF database.

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[24] See Urata & Okabe (2007); Magee (2004)

Transaction costs

In this thesis, the weighted distance is used as proxy for transaction costs. The distance is assumed to reduce trade because the transaction costs are assumed to increase with the distance. The idea in formulating the distance is to calculate the distance between two countries based on the bilateral distance between the largest cities in two partner countries. The inter-city distances are weighted by the share of the city in the overall country's population. In their note Mayer and Zignago (2006) use Head's and Mayer's formula for the calculation of the weighted distance between countries i and j.

$$d_{ij} = \left(\sum_{k \in i} (pop_k/pop_i) \sum_{l \in j} (pop_l/pop_j) d_{kl}{}^{\theta} \right)^{1/\theta}$$

In the equation, **pop**$_k$ is the population of agglomeration k belonging to country i. The parameter θ measures the sensitivity of trade flows to bilateral distance d_{kl}. In the distance calculation θ is set to be 1. The data is got from the CEPII database.

Share a border

If two countries share a border, this variable gets value 1. If they are not neighbor countries sharing a border, this dummy variable gets value 0. Sharing a border is assumed to increase trade, because if countries do not have a common border there may be higher costs in trading with each other (Bussière & Schnatz 2006, 13). The data provided by Author.

6.2.3 Instrumental variables

In the empirical part, I apply the IV-method explained in the previous chapter, where the dummy variable RTA is instrumented. As instruments, the cultural factors are used though cultural variables do not fulfill the other condition for instruments as Melitz (2008, 15) finds that language has direct effect on trade. In the chapter about the characteristics of the trading partners, the explanation for the use was gone through.

The most challenging in the IV-estimation is to find proper instruments. The minimum number of instruments is one. Next, the formation of four chosen instruments, language, religion, legal system, common ex-colonizer, is explained. The instruments were chosen so

that these dimensions of culture may have influence on economic outcomes. Also the above mentioned four instruments have been used in recent research about culture.

Common ex-colonizer

The first variable used as an instrument is common ex-colonizer. The variable is determined so that the variable gets value 1 if countries have had a common colonizer after 1945. The colonizer variable is got from the CEPII database.

Language

The second instrument is language, which reflects various aspects of culture (Melitz 2008, 692). According to Bussière and Schnatz (2006, 13) countries that share the same language have lower transaction costs to trade. Also those countries tend to historically have more established trade ties. The language variable is got from the CEPII dataset. As a dummy variable language gets the value 1 if the countries share the same language; otherwise the dummy variable gets value 0.

Legal origin

The third instrument is a legal system. The variable gets value 1 if countries have the same legal origin. Otherwise the variable gets value 0. The data is got from the Professor Andrei Shleifer's database. He has categorized legal origins into British, French, socialist, German and Scandinavian. According to the database, the legal origin in Brazil is French, in China socialist and in India is British.

Religion

The fourth instrument, the religion, has been widely used as proxy for culture (Stulz & Williamson 2001). Therefore, it is considered a good instrument for regional trade area. In the data it is reported the major religions (over 20 % of the population) as well as religion groups to which 9 to 20% belong to. The data is got from CIA World Factbook.

6.3 Descriptive Analysis of the Data

Figure 1 below presents the development of the total trade flows, trade flows among the RTA members and trade flows from RTA member to non-member.
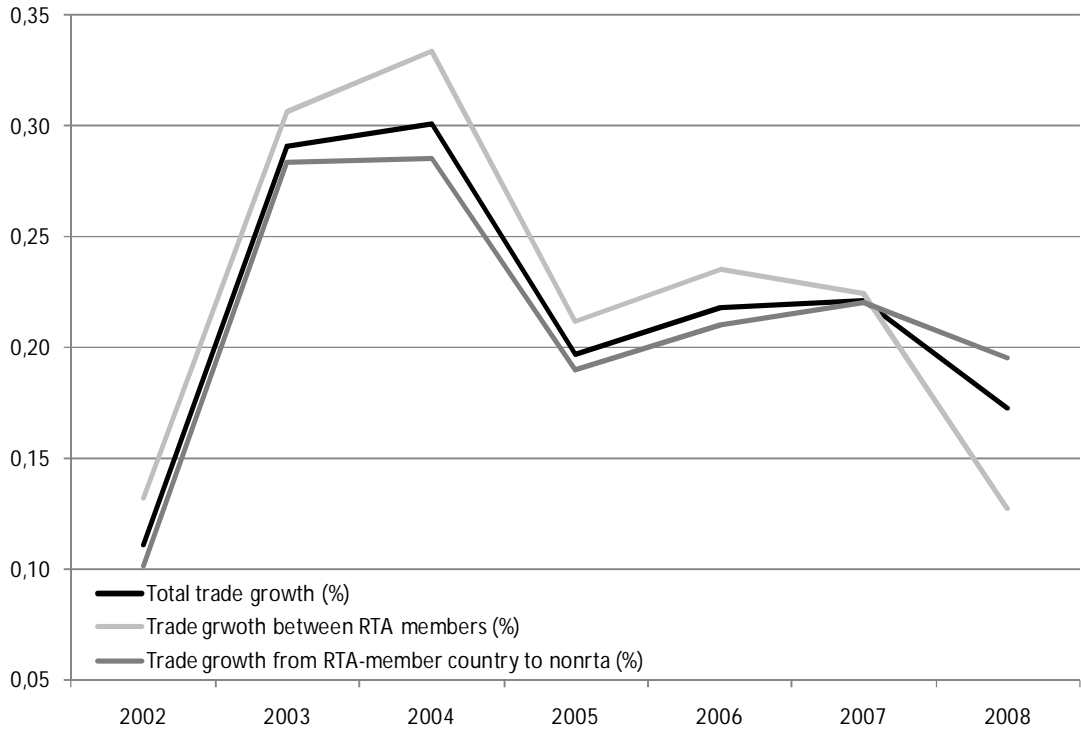

Figure 5 The Development of Trade Growth (Source: Author's own calculations)

As it is possible to see from Figure 1, the trade flow among members of the regional trade agreement has increased slightly faster than the trade flow between members and non-members. This reflects the fact that trade liberalization fosters the increase in trade. However, the increase in trade between members and non-members reveals that no obvious trade diversion exists.

Before the empirical results are represented, the overall characteristics of the data are gone through. Table 1 below represents the characteristics of the whole dataset as well as sample that consist of countries belonging to a regional trade agreement and countries that may be a target for trade diversion. The data is divided into two groups by using the trade creation and diversion dummy variables. Of all observations, 952 country pairs (20 %) belong to regional trade agreements and 3792 country pairs (80 %) belong to the member-non-member

relationship. The comparison of the samples already reveals that there are some desirable characteristics that lead to more trade creation.

Table 1: Summary Statistics (2001-2008)[25]

	(1) All (N=4744)		(2) Trade Creation (N=952)		(3) Trade Diversion (N=3792)	
	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
Year	2004.5	2.292	2004.5	2.292	2004.5	2.292
Log of trade	4.671	3.086	6.109	2.313	4.294	3.151
Log of distance	8.965	0.545	8.741	0.751	9.020	0.465
Log of GDPi	7.461	0.809	7.428	0.886	7.469	0.788
Log of GDPj	8.003	1.652	7.523	1.248	8.122	1.717
Log of population i	20.280	0.873	20.145	0.885	20.315	0.867
Log of population j	15.465	2.066	16.871	1.599	15.089	2.014
Log of GDP in pairs	51.244	2.466	51.942	1.855	51.071	2.566
Log of GDP per capita in pairs	1.435	0.066	1.406	0.056	1.442	0.067
Common border dummy	0.056	0.277	0.168	0.374	0.028	0.239
Continent	0.053	0.223	0.171	0.377	0.023	0.151
Common language dummy	0.124	0.329	0.128	0.334	0.123	0.328
Common ex-colonizer	0.100	0.300	0.128	0.334	0.093	0.291
Common religion	0.166	0.402	0.254	0.553	0.143	0.351
Common legal origin	0.292	0.455	0.378	0.485	0.270	0.444
Developing country	0.717	0.451	0.924	0.265	0.665	0.472

In Table 1 four important findings were found.[26] First the logarithmic mean of trade in column (2) is a lot higher than in the columns (1) and (3), which indicates that bilateral trade between members of the regional trade agreement is significantly higher than the average bilateral trade in the whole sample or between members and non-members. However, the logarithmic mean of trade in columns (1) and (3) is comparable which is a sign of the similarity of the trade volume in the whole sample and trade between members and non-members. On the basis of these figures it can be assumed that regional trade agreements in BIC-countries create more trade among members and do not divert trade from non-members.

Second, regional trade agreements have been formed among relatively large countries in terms of economic size. The logarithmic mean of GDP in the pairs in column (2) is somewhat

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[25] The summary statistics are based on bilateral variables for the whole sample (column 1), the members of the regional trade agreement sample (column 2), and the member-non-member of the regional trade agreement sample (column 3)

[26] Similar findings were also noted among others Lee and Shin (2005), while their sample consisted of 175 countries from 1948-1999.

larger than in columns (1) and (3). This implies that regional trade agreements have been formed among economically significant countries to which BIC-countries with their enormous growth rates belong to. This is confirmed with the column (3), where the logarithmic mean of GDP in the country pairs is much lower than in the column (2). Interestingly the logarithmic mean of per capita GDP in the pairs in column (2) is much lower than in the columns (1) or (3). Therefore regional trade agreements have been formed among relatively poorer countries, which indicate the fact that BIC-countries are still categorized as developing countries based on their per capita GDP as it was discovered in the introduction of this thesis. Also the developing country dummy is much larger in the column (2) suggesting that if both of the countries are developing countries it is more likely that they form regional trade agreement.

Third, the members of the regional trade agreements seem to have specific geographical characteristics. The logarithmic mean of distance is shorter in column (2) than in column (1). Instead the logarithmic mean of distance is significantly larger in column (3) than columns (1) and (2). Also member countries in column (2) are more likely to share a common land border or be located on the same continent. While in the column (3) border dummy and continent dummy get much lower values than in the columns (1) and (2). These characteristics suggest that there should be some specific country characteristics that naturally lead to regional trade integration. Countries that are close at distance, share a border or are in the same continent form more probable regional trade agreements.

Fourth, the members of the specific regional trade agreement seem to have specific cultural characteristics. The mean of dummy variables common language, common ex-colonizer, common religion and common legal origin are significantly larger in column (2) than in column (1) and (3). These characteristics suggest that countries with similar cultural roots are more likely to establish regional trade agreements. Instead, the values of these variables in column (3) suggest that the more different the cultural roots of the variables are the more likely it is that trade diversion will occur.

The interpretations above made about the BIC-countries and their trading partners are only suggestive. Before the influences of specific characteristics on trade creation and diversion is researched more closely, the results of the investigation, how the regional trade agreements of the BIC-countries have in general influenced on trade flows, are studied. Also, the trade creation and diversion impacts are studied for specific regional trade agreements.

7 Empirical results

This chapter will first present the estimation results of the influence of the regional trade agreements on trade in the emerging economies over the period 2001-2008. In my analysis, I use ordinary least squares regression and instrumental variable method. My analysis is twofold. First, I study what kind of influence the regional trade agreements have on trade, both among members and between members and non-members as well as the trade effects of specific regional trade agreements. Second, I interpret the member country characteristics that may influence on trade diversion and creation. The final part of this chapter will draw conclusions based on the results and some additional tests and discuss their implications.

In Chapter 3, I analyzed the impacts of the trade liberalization on trade with two theories. My results are mostly in line with the theories. However, the influence of RTA on non-members (trade diversion) is larger than expected. For this reason I have aimed to find possible explanations for this result. The dissection of the trade diversion variable gives potential solutions.

7.1 The General Impact of Regional Trade Agreements

I applied ordinary least squares (OLS) method to estimate the equation (8) for all country pairs for benchmark result (See Chapter 5.1.1). In all the OLS estimations the estimated coefficients of the standard set of variables that have generally been used in the gravity models, are statistically significant and the signs are in line with the model predictions as it is possible to observe from Table 2 below. Therefore, the amount of bilateral trade is promoted by the economic size (GDP), population size, and the development level of the countries and cultural similarities of the countries involved. However, the bilateral trade is reduced by the transportation costs measured by distance, common border, and the same continent of the countries. The estimated coefficient for log of distance implies that 1 percentage point increase in bilateral distance turns out to decrease bilateral trade by 89 percentage point (see Column 1, Table 2). The effect of distance is slightly smaller than in previous studies (see e.g. Urata & Okabe 2007; Baier & Bergstrand 2007). The estimated coefficients of common language of the countries involved are shown to change remarkably as the determinants of the gravity equation change. The coefficient of the language loses its significance the smaller the

coefficient for language becomes. The countries that have common language trade approximately 34 percent more than countries without common language. However, differently from many previous studies ex-common colonizer and common land border are not significant (See Hellvin & Nilsson, 2000; Urata & Okabe, 2007). A large part of the variation in the bilateral trade flows can be explained by the factors appealing in the original gravity model. Though, the impact of each determinant varies a bit between the models (1)-(8) as the Table 2 below depicts.

Table 2 The Influence of RTA on Trade

	(1) OLS	(2) IV	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS	(9) OLS
Log of distance	-0.886***	-0.428	-0.866***	-0.888***	-0.926***	-0.901***	-0.913***	-0.882***	-0.861***
	(0.10)	(0.36)	(0.11)	(0.10)	(0.10)	(0.11)	(0.10)	(0.10)	(0.11)
Log of GDPi	1.106***	1.119***	1.104***	1.111***	1.076***	1.075***	1.080***	1.070***	1.072***
	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Log of GDPj	0.840***	0.814***	0.841***	0.840***	0.891***	0.892***	0.889***	0.895***	0.893***
	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Log of population i	0.375***	0.568***	0.376***	0.350***	0.350***	0.351***	0.341***	0.392***	0.385***
	(0.06)	(0.15)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)
Log of population j	0.136***	-0.0313	0.135***	0.144***	0.121***	0.120***	0.127***	0.119***	0.121***
	(0.04)	(0.16)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
RTA/Creation	0.566***	4.004	0.553***	0.543***	0.358*	0.347*	0.353*	0.342*	0.334*
	(0.14)	(2.18)	(0.15)	(0.14)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Log of RTA/Diversion	-15.15***	-13.69***	-15.08***	-14.92***	-14.59***	-14.46***	-14.60***	-14.55***	-14.47***
	(2.78)	(2.88)	(2.78)	(2.78)	(2.77)	(2.78)	(2.77)	(2.77)	(2.78)
Common border			0.126						-0.0400
			(0.27)						(0.50)
Common language				0.344*	0.315*	0.319*	0.198	0.142	0.0906
				(0.16)	(0.16)	(0.16)	(0.20)	(0.18)	(0.21)
Developing country					0.493***	0.489***	0.475***	0.497***	0.484***
					(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Continent						0.145			0.132
						(0.26)			(0.50)
Common Ex-colonizer							0.221		0.123
							(0.23)		(0.23)
Common legal origin								0.277*	0.259*
								(0.12)	(0.13)
Constant	-47.59***	-53.42***	-47.76***	-47.37***	-47.21***	-47.42***	-47.26***	-48.39***	-48.49***
	(1.67)	(4.18)	(1.71)	(1.66)	(1.63)	(1.67)	(1.62)	(1.71)	(1.74)
Observations	3699	3698	3699	3698	3698	3698	3698	3698	3698

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Concerning the estimated coefficients of the general RTA effect, the estimated coefficients of the RTA dummy variable reveal that RTAs increase bilateral trade in almost all cases. This is an expected result that is in line with the theory of regional integration which states that the membership of the RTA enhances bilateral trade between the member countries (see Ornelas, 2005b; Krishna 1998). Even though the estimated RTA-coefficients from the IV-estimation tend to have upward bias, the coefficients of both OLS and IV-estimation are statistically significant (See Table 2, Column 2). Though, in IV-estimation the coefficient of the

RTA/Creation is significant only at 10 percent level.[27] In the OLS-estimation, the estimated RTA-coefficient is 0.566 (see Column 1, Table 2), which indicates that the regional trade agreement results in 76 percent increase[28] in trade between members. Therefore, there is a clear evidence that regional trade agreements have increased the trade among the BIC-countries and their partner countries in RTAs during the time period 2001-2008. Compared to previous studies the influence is larger as in the study of Baier and Bergstrand (2002) the trade increased as a consequence of regional trade agreements only by 19 % when the OLS-estimation was used.[29]

First of all, a reason for this large influence of RTA on trade flows may be the other factors that have boosted the economy of these emerging economies. For example, during this time period the export led growth strategy may have supported the influence of RTAs on trade flows as Crawford and Fiorentino (2005, 2) among others suppose. As it is known, China is known of its export-led strategy and during the past 25 years China's growth has mainly come from exports. By 2003, the exports already amounted to 60 % of GDP. (Koivu 2004, 4.) In addition, the large influence of RTAs on trade flows may be because of the 13 RTAs that were formed during the time period 2001-2008, 12 were bilateral agreements. Earlier the RTAs of BICs were mainly with neighbor countries and major trade partner countries. Therefore, as a consequence of the bilateral agreements, BIC-countries have become hub countries. This means that the regional trade agreements are likely to increase the trade flows of the hub countries (here Brazil, China and India) remarkably and cause trade diversion to non-members as it was already reviewed in Chapter 2.5. However, the trade creation in the hub and spoke systems normally happens at the expense of other countries which in the trade liberalization means trade diversion.

Therefore it is conceivable that trade diversion exists (Table 2). Definitely, it is no longer only the trade promotion that plays a significant role in the establishment of the RTAs. This is because trade creation has lost its first position in the establishment of RTAs and this way trade diversion has become more probable outcome than before. More precisely, the motivation behind the establishment of RTAs in recent years has changed and become more political as Urata and Okabe (2007, 12) also suggest and what the theory of Krishna (1998)

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[27] The Table 2 reports only significance levels that are smaller than 10 percent. However, the trade creation variable in IV-estimation is significant at 10 percent level as it is reported.
[28] ($\approx \exp(0.566) - 1$)
[29] See also studies Tadesse & White (2008), Magee (2003), Baier & Bergstrand (2007), Lee & Shin (2005)

suggests in Chapter 3.2. Therefore, also non-economic factors such as political factors have increasing importance in the establishment process which often leads to trade diversion as the results of the Table 2 also reveal.

The role of the political factors in the establishment of RTAs is shown in the coefficient of the trade diversion variables. The estimate for RTA/Diversion is negative, but statistically significant (Table 2). The absolute value of the estimate of the RTA/Diversion coefficient is more than 20 times larger compared to trade creation variable, which reflects the fact that the member's trade with non-members decreases significantly as a consequence of RTAs. Therefore, the regional trade agreements of the BIC-countries divert trade away from the rest of the world to the members of the regional trade agreements. However, the results related to the trade diversion should be taken with caution, since the proxy for the trade diversion may be biased as the largeness of the coefficient refers. However, the sign of the trade diversion coefficient is as it could have been expected from the trade liberalization theories. This means that in Krishna's (1998) theory there is some trade diversion as RTAs are assumed to be exogenous as in the basic form of OLS.

The influence of trade diversion is extremely large which is why it is interesting to take a closer look for the possible factors influencing on it. In all of the estimation results the trade diversion variable got significant but extremely large value. Normally the value of the coefficient has varied approximately between │0.063-3.00│ depending on the study, time period and country group where the dummy variable has been used (See Lee & Shin 2006; Urata & Okabe 2007). The reasons that may have led to this kind of unexpected result in this study are represented next. First, in this study instead of dummy variable for trade diversion a Michaely index explained in Chapter 6.2 was used. According to previous studies (see Mordonu 2006, 17), the index is the closer to value 1 the closer we are to the present. This is because the importing profiles of countries are better matched by the exporting profiles of countries these days. The reason why this influences this way in the thesis is the relatively short time period compared to the studies where the index has performed more reliable results. However, the possibility to use dummy variable is limited in this study because of the data consists of three target countries (i) and their trade partners (j) and in this kind of dataset when the RTA-variable gets value 0, it means trade diversion. That is why an index was created in the first place to be a proxy for this trade diversion variable.

When the attention is paid to the estimated coefficients of the general RTA variable in the IV-estimation, the results are parallel to OLS-estimation except some of the coefficients change remarkably including the coefficient of the trade creation (See Table 2, Column 2). The estimated coefficient for geographical distance is approximately only a half of the coefficient of the OLS while the estimated coefficient for log of population (i) increases from 0.38 to 0.57. In addition the coefficient for log of population (j) decreases from 0.14 to 0.03 and the sign of the coefficient changes from positive to negative and not significant. The coefficient of trade diversion falls from 16 to 14. Compared to OLS models the GDPs have similar influence on trade. Though, the largest change, as it was assumed, is in the trade creation variable. In the presence of these variables, the general RTA effect increases from 0.566 to 4.00 being significant only at 10 percent level while in the OLS-models the RTA variable was significant at 0.1 percent level. The trend of the general RTA variable is in line with the previous studies but the extent is extremely large compared to previous studies.[30] According to IV-estimation the coefficient of the regional trade agreements is over six times larger compared to OLS-estimation while in the study of Baier and Bergstrand the coefficient in the IV-estimation is only four times larger than in the OLS-estimation. The second IV-estimation was done by excluding the language variable from the instruments. However, the estimation results were equal to the IV-estimation where the language was included. Because the results of OLS and IV -estimation methods vary remarkably, it is important to test later in this chapter with post-estimation tests the superiority of these methods. Before that more detailed analysis of the results will not be done.

It is interesting to find out that the range of R-square is in line with the previous studies. The R-square (within) is around 59 % in the estimations above meaning that the regression line fits the observations relatively well. As mentioned earlier in Chapter 5.1 the gravity model's explanatory power (R^2) has normally ranged from 60-80 %. Therefore, the explanatory power of these models is in line with the explanatory power of the earlier gravity model studies. Perhaps more accurate proxy for trade diversion would have increased the fit. A reason for a slightly low (R^2) coefficient is that there are other determinants, different from the ones that are normally included in the analysis, which should have been investigated as well.

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[30] See Baier & Bergstrand (2002), Magee (2003)

7.1.1 Additional Tests

So far, the results of the instrumental variable method presented in Table 2 have not been analyzed more profoundly. As discussed earlier in Chapter 6.2.3 there is reason to believe RTA to be endogenous. Also some of the earlier studies point to this direction. Therefore in this chapter I will first discuss how the instrumental variables fulfill necessary conditions. Second I will test the weakness of the instruments and compare the OLS and IV methods with the post-estimation tests.

As discussed in the methodology chapter, there are two requirements for instruments. A correlation matrix below was calculated to observe how the chosen instrumental variables would fulfill the necessary conditions. First, it is possible to view from the Table 3 below that all the chosen cultural variables are positively correlated with the instrumented variable, RTA/Creation, but unfortunately the correlation seems to be low. The instrumental variables would be the better the closer the value is for the absolute value 1. Even though the instruments do not totally fulfill the first requirement for the good instrument, it might still be valuable to test the influence of RTA on trade by using IV-method. Therefore, I tested in Chapter 7.1 both the IV- and OLS methods and I will base my decision of an instrumental variable method on post-estimation tests.

Table 3 Correlation between RTAs and the Chosen Instrumental Variables

	Language	Ex-colonizer	Religion	Legal origin
RTA/Creation	0.0116	0.0372	0.1201	0.0996

The second requirement that all the four instruments should influence on the likelihood a RTA will be signed but not directly influence bilateral trade levels was discussed already in Chapter 5.2.1. Though, there cultural variables do not completely fulfill the second requirement for the good instrument as cultural variables, especially language, may influence directly on trade (Melitz 2008, 15).

Next the reliability of the IV-regression results is tested with Hausman specification test and reported the results of ordinary least squares (OLS) regressions for a comparison. The Hausman test will help in the evaluation of the data and how the model corresponds to the data.

Based on the first-stage regression only one of the instruments is individually significant because of the very high p-values. Because the first-stage regression reports only Chi-square, it is transformed into F-statistics to be able to test the joint significance of the instruments. The possibility of weak instruments is examined with the F-test of joint significance. To avoid the problem with weak instruments the coefficients of stage 1 regression should be jointly insignificant (F-stat > Fcrit). The reported Chi-square is 749. By dividing it with the degrees of freedom of the first stage, 10, the F-statistic gets the value 74.9. As the p-value is highly significant I know that the joint effect of the instrumental variables is significant as the instrumented RTA-variable also suggests.

After some estimations, I tested with the Durbin-Wu-Hausman test whether IV or OLS fits better in the estimation, because many econometrics tests have discussed this issue (Baum 2006, 211). Normally the test is used in order to check the endogeneity that is commonly related to the regression models. The test statistic is based on the differences between all the OLS and IV coefficients and the test has a chi-squared distribution and the degrees of freedom is equal to the number of instruments. According to Hausman, the IV estimator b will be consistent under both the null hypothesis and the alternative. The OLS estimator B will be consistent and unbiased, and more efficient than the IV estimator under the null hypothesis, but it will be inconsistent if the null hypothesis is false. Under the null hypothesis, the test statistic has a chi-squared distribution with the degrees of freedom usually equal to the number of coefficients being compared. In this case, the chi-squared test statistic summarizing the differences in coefficients is 46.54 which is remarkably high. Therefore, it is higher than 18.467, which is the critical value of chi-squared at the 0.1 percent significance level with four degrees of freedom. Thus the null hypothesis is rejected. Therefore in a case of four instruments there is no need to use IV method, because it is less efficient than OLS. In addition the fact that instruments did not totally fulfil the second requirement for a good instrument supports the use of OLS-method when analysing the results. However, when it was tested with Hausman test whether IV or OLS fits better in the estimation when the language was excluded from the instruments, interesting findings were found. In this case the chi-squared test statistic summarizing the differences in coefficients is 4.27 which is remarkably low compared to the former chi-square value. Because the chi-squre value is now lower than the critical value of chi-squared at 0.1 percent significance level with three degrees of freedom (16.27), the null hypothesis is not rejected. This means that IV-method is preferred over OLS-method in a case that language is not included in instruments. This

reveals that language obviously has direct influence on trade as Melitz (2008) and Magee (2003, 15) have found out. Though, the IV-method was preferred over OLS-method when language was excluded from the instruments, the OLS method is still used in the later parts of this thesis. Reasons for this are the mixed results of the Hausman tests when cultural variables were used as instruments, as well as the low correlation between RTA and instruments (see Table 3) and the uncertainty of the causality of cultural variables and trade.

7.2 The Influence of Specific RTA on Trade.

The previous analysis examined the impacts of RTAs in general without considering the impact of any specific RTA such as MERCOSUR or SAFTA. This section of this thesis analyses the impacts of specific RTAs on bilateral trade. The analysis includes both the trade creation and diversion effects of the specific RTAs. To be able to capture possible trade diversion effect a variable that takes value 1 if one country belongs to RTA but the other does not is added to the equation. So, the Michaely index that was used to capture the general trade diversion effect in the previous chapter is no longer used in this part of the thesis.

The estimation results are shown in Table 6. The standard variables of the gravity model such as GDP, population and distance have expected impacts with statistical significance. Though the influence of population i and population j is significantly higher than in the base estimation in Table 2 (column 1).

The estimated coefficients for only some of the RTAs seem to be significantly positive. RTAs, for which positive and significant trade creation are found, are GSTP, China-Chile and China-Hong Kong. It is interesting to observe that for many RTAs neither the trade creation or diversion effect is identified. Specifically, the estimated coefficients on non-RTA dummy are negative and statistically significant for only RTAs LAIA, APTA, India-Afghanistan, India-Bhutan, ASEAN-China and China-Pakistan. The analysis reveals that there is no trade creation in APTA, because of the negative, but significant coefficient as well as in the regional trade agreement between China and Hong Kong no trade diversion occurs (Table 6).

The analysis of the estimates of RTA country-pair dummies reveals interesting observations. First, the RTAs with positive coefficient (not necessarily significant) can be considered to include both natural trading partners, since they exhibit larger trade value compared to normal

or average levels as well as other partner countries that are e.g. not located close at distance or are culturally different (Table 6). Specifically countries in SAFTA and most of the bilateral trade agreements can be considered to be natural trading partners according to the definition of Frankel (1997). Second, the wide range of different countries that promote trade creation supports the significant role of the natural trade partners in the establishment of RTAs as well as the motivation of the other countries for boosting trade via regional trade agreements. Third, the changing landscape of regional trade agreements, which among others means that trade creation is no longer the main target of the regional trade agreement. This means that instead of trade promotion, the political factors are strong in the decision making process and naturally as a consequence the bilateral trade flows increase as the tariffs are removed. This is partly proved by the increased number of bilateral trade agreements among countries not being natural trade partners and the changing role of distance between the trade partners.

7.3 The Impact of Characteristics on Trade Creation and Diversion

This part of the thesis examines eight characteristics of member countries that may have impact on trade creation or trade diversion. The interaction terms between intra- and extra-bloc RTA dummies were already defined at the end of Chapter 5.1.1. As RTA dummies, I will use common border, common language and geographical distance as Lee and Shin (2006) did. In addition I use five additional dummies: common continent, common religion, common legal origin, and common ex-colonizer and if both countries are developing countries.

In general, the total additional trade that is created by regional trade agreements among common-border members is estimated by summing the coefficients of trade creation and the RTA-dummy for common border members. In this way it is possible to take into account the coefficient of trade creation of RTA members and that of common border which presents additional trade creation for member countries that share also common border. The same is done for other intra-bloc RTA dummies and also for the trade diversion -dummies. However, in the trade diversion the sum of coefficient of trade diversion and dummy for common border examines the trade diversion from non-member countries and additional trade diversion because of average number of common-border countries in the RTA.

Table 4 below reports the estimation results that include eight interaction terms and the intra-bloc dummy variable. The first four estimated coefficients (GDPi, GDPj, population_i and population_j) are surprisingly similar across the columns.

Table 4 The Effect of Characteristics on Trade Creation

	(1) Distance	(2) Border	(3) Continent	(4) Language	(5) Religion	(6) Legal origin	(7) Ex-colonizer	(8) Developing
Log of GDPi	1.088***	1.084***	1.085***	1.087***	1.087***	1.082***	1.088***	1.088***
	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.035)
Log of GDPj	0.844***	0.834***	0.831***	0.827***	0.829***	0.834***	0.828***	0.827***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Log of population i	0.412***	0.448***	0.449***	0.436***	0.444***	0.478***	0.434***	0.443***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Log of population j	0.146***	0.146***	0.149***	0.153***	0.153***	0.153***	0.151***	0.157***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
RTA/Creation	9.608***	0.594***	0.598***	0.756***	0.776***	0.345	0.758***	0.967
	(1.49)	(0.16)	(0.16)	(0.16)	(0.15)	(0.18)	(0.16)	(0.50)
Log of RTA/Diversion	-15.04***	-16.09***	-15.66***	-16.68***	-16.86***	-16.33***	-16.72***	-16.78***
	(2.80)	(2.81)	(2.82)	(2.81)	(2.81)	(2.80)	(2.81)	(2.81)
RTA_Distance	-1.010***							
	(0.17)							
RTA_Border		1.156***						
		(0.33)						
RTA_Continent			1.288***					
			(0.33)					
RTA_Language				0.415				
				(0.37)				
RTA_Religion					0.0350			
					(0.05)			
RTA_Legal origin						1.082***		
						(0.26)		
RTA_Ex-colonizer							0.476	
							(0.39)	
RTA_Developing								-0.198
								(0.52)
Constant	-56.06***	-56.46***	-56.48***	-56.24***	-56.44***	-57.10***	-56.22***	-56.45***
	(1.388)	(1.408)	(1.405)	(1.420)	(1.404)	(1.411)	(1.419)	(1.420)
Observations	3699	3736	3719	3719	3736	3736	3719	3736

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In column (1) the coefficients of the variables are similar compared to the baseline regression in column (1) in table (2). Surprisingly, the coefficient for the RTA/Creation has increased from 0.566 to 9.608. This is because the highly significant and negative interaction term, RTA_Distance (-1.010). This means that a 1 percentage point increase in the log of bilateral distance between RTA members leads to a 100 percent decline in trade creation. Also Lee and Shin (2006) had similar findings. When I use alternative measures for proximity, such as common border and continent the interaction terms are also positive and highly significant. The coefficients of column (2) suggest that trade creation between common border RTA members is more than 116 percent higher as that between members without common border. In a case of common continent, the trade creation between RTA members in the same continent 130 percent greater than that between members which are located in different

continents. These proxies for transportation costs support the fact that the lower the transportation costs are (the closer the countries are located), the more the regional trade agreements boost trade between the members.

In column (6) it is also found out that same legal origin plays important role in determining the influence of RTA on trade creation. The estimated coefficient of RTA/Creation is significantly lower than the estimate in Table 2, but the coefficient for common legal origin is highly significant and positive. However, this estimate is slightly lower than the estimates for proximity. This means that proximity of RTA members increases the trade creation of RTAs more than common legal origin. The same is with the common language, common religion, common ex-colonizer, and both being developing countries, except none of these variables is significant. If these variables were significant, they would boost the trade creation between member countries. Except if both of the countries are developing countries, because the coefficient of this variable is negative. This is in line with the findings of Krueger (1999, 16), who underlined that regional trade agreements between two developing countries are less probable to improve welfare as countries with alike technologies receive no gains from trade with each other.

In general, the estimation results reveal that the influence of RTAs may be larger for countries that have considerably lower transaction costs and have common legal origin which is in line with the idea of natural trading partner explained in Chapter 3.5.

It was also tested what kind of conclusion the eight interaction terms together as regressors give. Only three of the coefficients are statistically significant and not close to the values that were estimated separately. In addition the signs of the coefficients were not as expected. Because of most of the variables were not significant, the results are not reported more detailed.

Thus far, I have examined the influence of different characteristics on the trade creation of RTAs. Next, I will examine the influence of the same characteristics on trade diversion. According to the idea of natural trading partners that the results of the trade creation characteristics support, the proximity reduces trade diversion from non-members. However, in the case of BIC-countries I might have to question this because of the trend that regional trade agreements are nowadays established also with countries located geographically apart.

Table 5 below reports regression results of the influence of eight characteristics on trade diversion.

Table 5 The Effect of Characteristics on Trade Diversion

	(1) Distance	(2) Border	(3) Continent	(4) Language	(5) Religion	(6) Legal origin	(7) Ex-colonizer	(8) Developing
Log of GDPi	1.090***	1.087***	1.085***	1.086***	1.087***	1.086***	1.087***	1.089***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Log of GDPj	0.834***	0.824***	0.825***	0.826*	0.827***	0.828***	0.827***	0.825***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Log of population i	0.435***	0.442***	0.446***	0.443***	0.439***	0.445***	0.440***	0.443***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Log of population j	0.151***	0.155***	0.150***	0.151***	0.154***	0.155***	0.152***	0.155***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
RTA/Creation	0.746***	0.794***	0.832***	0.816***	0.792***	0.776***	0.813***	0.794***
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Log of RTA/Diversion	-132.8***	-20.44***	-19.72***	-16.86***	-18.97***	-14.63***	-15.31***	-21.59***
	(37.55)	(3.54)	(3.61)	(3.14)	(3.25)	(3.83)	(3.15)	(5.65)
RTAD_Distance	13.02**							
	(4.23)							
RTAD_Border		7.631						
		(5.64)						
RTAD_Continent			5.167					
			(5.54)					
RTAD_Language				-5.627				
				(7.54)				
RTAD_Religion					5.177			
					(5.91)			
RTAD_Legal origin						-6.696		
						(5.37)		
RTAD_Ex-colonizer							-15.62*	
							(7.56)	
RTAD_Developing								4.946
								(6.18)
Constant	76.41*	-35.89***	-36.59***	-39.46***	-37.32***	-41.81***	-40.99***	-34.81***
	(37.60)	(3.956)	(4.014)	(3.557)	(3.714)	(4.214)	(3.566)	(5.905)
Observations	3699	3736	3719	3719	3736	3736	3719	3736

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 reports the estimation results that involved eight interaction terms and the extra-bloc dummy variable. In all columns, an interaction term for each characteristic is added separately. In column (1) the coefficients of the variables are similar compared to the baseline regression in column (1) on Table (2). Surprisingly, the absolute value of the coefficient for the RTA/Diversion has changed remarkably, from -16 to -133.

In column (1) an interaction term for distance is included. The estimated coefficient for this interaction term RTAD/Distance is positive and significant. The remarkably large estimated coefficient means that the further the RTA members are at distance, the larger the trade diversion between non-members and members is. In columns (2) and (3) when two other interaction terms related to transaction costs, common border, and the same continent are estimated, it is possible to find out that if member countries border each other the common border and common continent decrease trade diversion from the rest of the world. However,

neither of these variables is significant. The findings of distance and two other interaction terms, common border and common continent, are conflicting and based on these results it is not possible to say whether geographical proximity contributes to increase or decrease trade diversion. In column (5) the positive coefficient for religion also indicates that a common religion between member countries decreases trade diversion while an opposite finding is found for a common language in column (4).

In columns (6)-(8), it is also found out that same legal origin, common ex-colonizer and both countries being developing countries play important role in determining the influence of RTA on trade diversion. However, none of the coefficients, except common ex-colonizer, is significant. Though the signs of the coefficients of common language and common legal origin have expected signs meaning that common language or legal origin contributes to raise trade diversion. This is opposed finding to that common language boosts trade creation in Table 4. This discrepancy is interesting and probably reflects the natural errors natural in the measurement of language proximity between member countries or the proxy for the trade diversion. However, also Lee and Shin (2005) had the same findings. Because of the non significant coefficients, the influence of these characteristics on trade diversion has to be taken with caution. From the eight variables mentioned in this paragraph, the common ex-colonizer has the greatest influence on trade diversion and both countries being developing countries the lowest.

In general, the estimation results reveal that the influence of RTAs on trade diversion may be larger for the member - nonmember relationships where countries partly have and partly not similar cultural roots and are not close at distance, which is mostly in line with the idea of a natural trading partner explained in Chapter 3.5. This means that the trade diversion is more probable for the countries that are not natural trade partners.

It was also tested what kind of conclusion the eight interaction terms together as regressors give. None of the coefficients are statistically significant and far away those that were estimated separately. Therefore the results are not reported more detailed.

7.4 The Impact of Characteristics on the RTAs of BIC-countries

In this chapter, I will analyze what kind of influence the country characteristics have on the trade creation and diversion of BIC's regional trade agreements. The empirical results of Chapter 7.3 revealed that the three characteristics of RTA members (geographical distance, common borders, and common continent) have significant impacts on trade creation. I found that RTAs among countries that are located close at distance, share a land border, or are located in the same continent tend to create more trade but less trade diversion. In the trade diversion none of the variables, except distance and common colonizer, was significant. This is why less attention is paid to analyze those variables in this chapter. In addition, some of the cultural variables had significant impacts on trade creation.

Table 7 summarizes the eight characteristics of member countries for the existing regional trade agreements of the BIC-countries. The average distance between member pairs is the smallest for the regional trade agreement SAFTA (7.317), which is higher than the average distance of member pairs in all existing regional trade agreements (6.760).[31] Overall, the average distance between the regional trade agreements of the BIC-countries is remarkably higher the average distance for RTA's in general. The members of the bilateral agreements China-Chile (9.846), Chile-India (9.717) and China-New Zealand (9.234) have the highest average distances.

Table 8 presents the trade creation estimates between the RTA-members of the BIC-countries. The variables in the table are constructed by combining three factors: 1) estimated coefficients on RTA/Creation of the gravity equation in column (1) of Table 4, 2) the estimated coefficient RTA/Creation_Distance and 3) the average distance of individual RTAs (Table 7). The estimated trade creation effects vary from -0.337 for bilateral agreement China-Chile to 2.214 for bilateral agreement India-Bhutan in terms of log of bilateral trade. China-Macao was an exception having the trade creation effect of 9.608 meaning that distance plays a significant role in the trade creation between member countries, especially in the trade between China and Macao.

In terms of other characteristics affecting transportation costs (common border and continent), there are few countries in total in the agreements that share a border or are located in the same

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[31] See study of Lee and Shin (2005, 34) and their calculations for average distance of the members of all regional trade agreements as an approximate value.

continent. For this reason, the transportation costs among BIC-countries and their trading partners are on average higher than for other RTA-members. This on the other hand gives unfavorable situation for only creating trade among members and between members and non-members, which supports the theory of Ornelas (2005b) that in addition to trade creation the main motivation in the RTAs is nowadays the political reasons, which is why the main priorities when establishing the agreements are not the low transportation costs or location of the member countries. This change in the landscape of regional trade agreements can be well seen in the case of these emerging economies.

The estimates for trade diversion (considering variables affecting transportation costs only) are presented in the right side of Table 8. The variables are constructed based on the estimated coefficients on the RTA/Diversion and RTA/Diversion distance of the gravity equation in column (1) - (3) in Table 5 and the average distance, common border and common continent of individual RTAs. It was found out that all the RTAs of the BIC-countries were located further of the average geographical distance which diverts trade away from non-members. The estimated (negative) trade diversion impacts were in all of the RTAs remarkably large, which is a consequence of the large estimate for trade diversion coefficient. This was found out and the reasons for this has already been discussed in Chapter 7.1. That is why the results related to trade diversion should be taken with caution. In addition, the estimated (negative) trade diversion impacts when considering common border and common continent were similar to distance; extremely large.

None of the regional trade agreements of the BIC-countries are located close enough to be able to create trade among member countries and among members and non-members. This can be proved with the results of the Table 8. Though, the results for trade diversion variables were significantly large (negative), the sign of these variables supports the idea of natural trading partners.

In addition to the transportation costs the interest in this thesis is in the cultural characteristics and their influence on trade creation and diversion. As the BIC-countries are culturally quite different compared to other countries, there are still few countries that have common language. Though, more countries have the same religion, common colonizer or their legal origin is the same. The variables to study the effect of cultural characteristics on trade creation and diversion are constructed as in the case of transportation costs. The estimated coefficient RTA/Creation of the gravity equation in column (1) in Table 4, the estimated coefficient for

RTA/Creation cultural variables and the average value of the cultural variables are combined. The estimated trade creation effects vary from 0.756 for most of the bilateral agreements not sharing the same language to 1.171 for the agreements between China-Hong Kong, China-Macao, China-Singapore and India-Singapore. The influence of common religion for trade creation effects vary from 0.776 for most of the bilateral RTAs to 0.811 to Mercosur and China-Hong Kong, China-Macao, China-Singapore and India-Bhutan. The influence of common legal origin on trade creation varies from 0.345 for most of the bilateral agreements to 1.427 to Mercosur, SAFTA, India-Sri Lanka and India-Bhutan. The influence of common ex-colonizer varies from 0.758 for most of the bilateral agreements to 1.234 to India-Sri Lanka, India-Singapore and China-Macao. Therefore, it is possible to conclude that both transportation costs and cultural variables influence significantly on trade creation. Member countries that have similar country characteristics in the regional trade agreements seem to make the regional trade agreement trade creating. In the case of cultural variables affecting trade diversion, the same trend can be noticed as in the case of variables affecting transportation costs: the impact is remarkably large and negative.

Last the influence of both countries being developing countries on trade creation varies from 0.769 for most of the bilateral agreements to 0.967 for most of the bilateral agreements with China. Which means that if both of the countries are at the same level of development it is more probable that the establishment of the regional trade agreement increases trade among members. Though, the case of members and non-members the same level of development decreases trade diversion, which supports the idea, how certain characteristics influence on trade flows.

The results show that the regional trade agreements of the BIC-countries seem to create trade with member countries, but also divert trade from non-members. During the time period 2001-2008 the trade of the BIC-countries has increased 76 % according to the study as a consequence of the regional trade agreements. During the same period, the trade is diverted away from the non-members of the regional trade agreements. It was found that possible reason for this trade diversion is that instead of dummy variable for trade diversion a Michaely index was used. The reason why trade diversion variable influences this way in the thesis is the relatively short time period compared to the studies where the index has performed more reliable results. The R-square (within) is around 59 % in the estimations, which means that the regression line fits its observations relatively well and the range of R-square is in line with the previous studies. The influence on regional trade agreements on

trade was also tested by using IV-estimation. Though, the post-estimation test, Hausman test, predicted that there is no need to use IV-method as it is less efficient than OLS when four cultural variables (language, religion, ex-colonizer, legal origin) were used as instruments. Reason for this may be the fact that the instruments used do not totally fulfil the other requirement for a good instrument. Therefore, the IV-estimation was done by excluding the language from the instruments. In this case, the Hausman test revealed that IV-estimation should be preferred over OLS. Last, the estimation results reflect the fact that the role of the natural trading partners in the regional trade agreements of the BIC-countries is no longer as distinct as before. However, the characteristics that influence on trade creation are mostly in line with the theory of natural trade partners meaning that RTAs among countries that are located close at distance, share a land border, or are located in the same continent tends to create more trade but less trade diversion. In addition, cultural variables had positive impacts on trade creation. However, the characteristics influencing on trade diversion do not support the theory as well. This is because of the extremely large and not significant absolute values. However, the signs of the variables are as the theory suggests.

8 Conclusions

The aim in this thesis has been to study the influence of BIC's regional trade agreements on the trade flows. In addition, in the thesis it was reviewed the previous research into which the results of the BIC-countries can be compared. Based on the results of the previous studies and this thesis it is clear that BIC's regional trade agreements have significant impact on trade flows. The number of regional trade agreements has increased recent years remarkably despite the recent financial crisis 2008-2009. Despite the increased number of regional trade agreements in the emerging economies, the research of these countries has not become common. For example, before this study no empirical study has been made, where the country group, BIC, has been the target.

The theoretical part concentrated on explaining the regional trade agreements' trade effects. The main finding from the theoretical part was that the regional trade agreements should increase the trade of the member countries. In addition, both Ornelas' (2005b) and Krishna's (1998) theories were analyzed and it was concluded that the government's role is essential in the establishment of the regional trade agreements. Above all, the determination of external tariffs has significant impact on the end result of the models. This means that if external tariffs are assumed to be endogenous, the regional trade agreement will benefit the whole world. If the external tariffs are determined to be exogenous, the member countries will not participate in the agreement without trade diversion in Krishna's model. This is because of the lack of benefits the member countries will get from the agreement without trade diversion. As the expectations of the models are quite unambiguous, it was possible to test the findings empirically by using the data of Brazil, India and China.

The research problems in the thesis were: 1) What is the influence of BIC-countries' regional trade agreements on trade flows? and 2) Does the member country characteristics have influence on trade creation and trade diversion? The results for the first research question reveal that the regional trade agreements have significant impact on trade flows among member countries. During the time period 2001-2008 the regional trade agreements increased the trade flows of the BIC-countries 76 percent. The first research question includes also the impact of the regional trade agreements on the trade flows between member and non-member countries. Though the increase in trade flows among the member countries is large, the results reveal that there is also large trade diversion. This implies that countries might have precautionary motives to establish RTAs and not just have overall welfare in their mind as

Krishna (1998) states. However, the results of second research question reveal that countries that have the same characteristics, as the natural trading partners, tend to form regional trade agreements that are trade creating. This means that countries that are located close at distance, share a border, have common language, and have the same legal origin certainly benefit from the regional trade agreements. Though, for the member countries that are not natural trading partners it is likely that they will face trade diversion as a consequence of the regional trade agreements that BICs establish.

The empirical findings of this thesis strongly support the earlier findings. In other words, BIC's regional trade agreements in its traditional form induce both trade creation and diversion. In the case of the emerging economies, the regional trade agreements have positive impact on trade which reflects the fact that trade liberalization is an excellent way to boost the trade in the BIC-countries as the theories of Ornelas (2005b) and Krishna (1998) also suggests for all the regional trade agreements. However, the regional trade agreements' large impact on trade diversion partly supports the theories and reveals two facts. First, this causal relationship reveals that trade creation is no longer the main goal of the regional trade agreements as the theories of Ornelas (2005b) and Krishna (1998) also states. The reason is that the role of the special interest groups in the establishment of the RTAs has increased. Second, the large trade diversion supports Krishna's (1998) theory. This is because Krishna determined the RTA and external tariffs exogenously fixed. In Krishna's model the exogenously fixed external tariffs lead to trade diversion as a consequence of the agreement. Otherwise, the agreement will not be established. In addition, if Ornelas also kept external tariffs exogenously fixed, some trade diversion would have also resulted from his model (Ornelas 2005b, 484). However, the inconsistent results of the trade diversion may also reflect the relatively short time period, the increased number of bilateral trade agreements and above all the probably biased proxy for the trade diversion. That is why it is rational to be cautious when making conclusions about the trade diversion.

The government's role in the establishment process cannot be underestimated. The role of the government is obvious in the case of BIC-countries as China belongs to the largest economies in the world and obviously has political motivations in its activities. Ornelas' (2005b) theory underlines the government's role in the establishment process and states the overall trade creation impacts. In the model, the government's decision power increases when the special interest groups lose the interest to influence the government and do not give any compensation any more. Krishna's (1998) model reviews the topic from the different

viewpoint. In Krishna's (1998) model, the special interest groups have large impact on government's actions as the special interest groups will not support the agreement if it will be a zero-sum game. As a result, Krishna suggests that the trade diversion is the prerequisite for the regional trade agreement to be established. This is the case where the members of the agreements see the benefits from the agreements to come only if there is some trade diversion. In other words, if there is no trade diversion in Krishna's (1998) model the governments do not see any benefits that they would get from the trade liberalization.

The normal estimation does not take into the consideration the impact of certain characteristics of the partner countries on trade creation and diversion, which is why the characteristics of the countries were studied more precisely. When a closer look was taken to how certain characteristics influence the trade creation and diversion, it was found out that the natural trade partners as member countries tend to create more trade than the others and at the same time less trade diversion exists among natural trade partners. These results suggest that if the trade creation was the main goal of the regional trade agreements, the agreements should be established with the natural trading partners. Though, the reality may turn out to be different in some cases because of the government's political motivations that are put in practice via bilateral agreements.

When we take a look the possible trends that may occur in the trade liberalization in the near future, we should pay attention to the changing landscape of regional trade agreements, especially the increased number of bilateral agreements. In addition, regional trade agreements' role may change, as many researchers have already found a positive relationship between discriminatory and nondiscriminatory trade liberalization. However, it may be quite challenging to predict how the role will change in the near future. I assume that the same trend in the establishment of the regional trade agreements continues, though the other underlying reasons may continue to change remarkably. More and more bilateral agreements are established, which reflects the increasing role of the government's political motivations in the establishment process. As the landscape of the regional trade agreements continues to change, also new geographical areas will start to liberalize their trade. The countries in Africa, for example, have already made a plan to develop their regional trade area, African Union. African Union was established in 2002 to have in some point relatively similar features to European Union. (Haavisto, 2002.) Also the Commonwealth of Independent States (CIS) has

recently announced similar plans (BOFIT Weekly 2011)[32]. These plans also supports the theory of natural trading partners as the countries in Africa and CIS are located geographically close and are culturally quite similar. In addition, it can also be expected that from the emerging economies at least China will make RTA with the countries in Africa as China already has started to co-operate other ways with the countries in that continent.[33] That on the other hand would suit perfectly on China's trade liberalization strategy meaning bilateral agreement and long geographical distance without forgetting political motivations.

To conclude with the study it was possible to perceive quite precisely the impact of the BIC-countries' regional trade agreements on the trade flows. On the other hand it was useful to get information about the reasons why trade creation or trade diversion exists. This information was got by identifying the characteristics of the member and non-member countries and analyzing which of the characteristics influence on trade creation, which on trade diversion. By studying this impact, it is possible to influence on the outcome of regional trade agreements and understand the outcome better. Recent years there have been discussions about the role of the regional trade agreements in the survival of the BIC-countries and rest of the world from the financial crisis in 2008-2009. Freytag and Voll (2009) proposed a solution for the countries to survive from the crisis by encouraging especially the emerging countries to continue to liberalize their trade as the countries have done. Also OECD (2009) suggested the same. However, it would be interesting to study if there is a real connection between the trade liberalization of the emerging economies and the survival from the crisis. Though, it is sure, that BIC-countries will continue to be the major economic powers with enormous growth rates in the future. Part of the emerging country group BRICS (Brazil, Russia, India, China and South Africa), BIC-countries have planned to find a way to help the world economy in the present European debt crisis. They have planned to buy the Euro bonds to relieve the crisis which again reflects the fact that emerging economies certainly have an important role in the survival from the crisis. (BRICS in talks to buy Euro bonds to help ease crisis ----2011.) If not via trade liberalization, it is possible through other channels. Overall, there are many topics related to the trade liberalization of the emerging economies to study, those were not possible to study within this study and therefore should be studied in the near future.

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[32] CIS-countries include 12 countries of which Russia, Belarus, Kazakhstan, Armenia, Kyrgyzstan, Moldova, Tajikistan and Ukraine have already signed the new free trade agreement (BOFIT Weekly 2011).
[33] E.g. China helps Nigeria, which is the largest oil producers in Africa, to develop its energy infrastructure. (BOFIT Weekly 2010)

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APPENDIXES

Appendix A

Table 6 The Effects of Specific RTAs on Trade Flows

	Coef.	Std. Err.	
GSTP	0.9992	0.34	**
GSTP to non member	0.2863	0.26	
LAIA	-0.5867	0.74	
LAIA to non member	-0.8770	0.43	*
PTN	0.5504	0.55	
PTN to non member	-0.0747	0.31	
Mercosur	-4.2729	6.76	
Mercosur to non member	-2.4399	3.34	
Mercosur - India	6.8839	6.60	
Mercosur - India to non member	3.7418	3.32	
APTA	-3.1183	1.17	**
APTA to non member	-1.6603	0.76	*
Chile - India	0.0631	2.02	
Chile - India to non member	-0.4892	0.39	
India - Afghanistan	-1.6712	1.52	
India - Afghanistan to non member	-1.8044	0.89	*
India - Bhutan	-1.9560	1.76	
India - Bhutan to non member	-3.1264	1.01	**
India - Singapore	2.2183	5.05	
India - Singapore to non member	1.1931	2.67	
India - Sri Lanka	2.3468	1.91	
India - Sri Lanka to non member	1.3346	1.07	
SAFTA	0.4757	0.96	
SAFTA to non member	-0.5606	0.52	
ASEAN - China	-0.0298	0.58	
ASEAN - China to non member	-0.6566	0.33	*
China - Chile	3.7107	2.02	+
China - Chile to non member	0.8137	1.40	
China - New Zealand	0.6648	1.49	
China - New Zealand to non member	0.0565	0.86	
China - Singapore	1.0929	5.03	
China - Singapore to non member	1.2385	2.37	
China - Pakistan	-2.6403	1.79	
China - Pakistan to non member	-2.3688	1.01	*
China - Hong Kong	4.0052	1.51	**
China - Hong Kong to non member	1.8982	0.86	*
China - Macao	(omitted)		
China - Macao to non member	(omitted)		
Log of population i	2.3292	0.36	***
Log of population j	1.0589	0.03	***
Log of GDP i	1.0834	0.05	***
Log of GDP j	0.8612	0.03	***
Log of distance	-0.9441	0.12	***
Constant	-65.1536	7.07	***
Observations 4106	R-Sq 0,5488		

+ p< 0.10, * p < 0.05, ** p< 0.01, *** p< 0.001

Appendix B

Table 7 The Characteristics of Regional Trade Agreements

RTAs	Formation	Countries	Distance	Continent	Language	Colonizer	Religion	Legal Origin	Developing	Border
PTN	1971	15	8.899	0.231	0	0	0.558	0.692	0.846	0.231
(std.err)			0.076	0.042	0	0	0.113	0.045	0.036	0.042
APTA	1975	6	7.929	0.400	0	0.200	0.300	0.300	0.900	0.400
(std.err)			0.056	0.055	0	0.045	0.052	0.052	0.034	0.055
LAIA	1980	12	8.141	0.636	0	0	0.319	0.909	1	0.636
(std.err)			0.047	0.052	0	0	0.114	0.031	0	0.052
GSTP	1988	44	8.908	0.098	0.134	0.159	0.198	0.402	0.939	0.098
(std.err)			0.026	0.012	0.013	0.014	0.022	0.019	0.009	0.012
MERCOSUR	1991	4	7.793	1	0	0	1	1	1	1
(std.err)			0.060	0	0	0	0	0	0	0
India-Sri Lanka	1998	2	7.448	0	0	1	0	1	1	0
(std.err)			0	0	0	0	0	0	0	0
India-Afghanistan	2003	2	7.462	0	0	0	0	0	1	1
(std.err)			0	0	0	0	0	0	0	0
China-Hong Kong	2003	2	7.385	1	1	0	1	0	1	0
(std.err)			0	0	0	0	0	0	0	0
China-Macao	2003	2		1	1	1	1	0	0	1
(std.err)			0	0	0	0	0	0	0	0
MSUR-India	2004	5	8.879	0.400	0	0	0.4	0.4	1	0.4
(std.err)			0.103	0.055	0	0	0.055	0.055	0	0.055
SAFTA	2004	7	7.317	0.667	0.167	0.667	0.333	1	1	0.667
(std.err)			0.030	0.069	0.054	0.069	0.069	0	0	0.069
ASEAN-China	2004	11	8.360	0.200	0.2	0	0.5	0.4	0.9	0.3
(std.err)			0.063	0.045	0.05	0	0.06	0.055	0.034	0.052
India-Singapore	2005	2	8.318	0	1	1	0	1	0	0
(std.err)			0	0	0	0	0	0	0	0
China-Chile	2005	2	9.846	0	0	0	0	0	1	0
(std.err)			0	0	0	0	0	0	0	0
Chile-India	2006	2	9.717	0	0	0	0	0	1	0
(std.err)			0	0	0	0	0	0	0	0
India-Bhutan	2006	2	7.321	1	0	0	1	1	1	1
(std.err)			0	0	0	0	0	0	0	0
China-Pakistan	2006	2	8.394	1	0	0	0	0	1	1
(std.err)			0	0	0	0	0	0	0	0
China-New Zealand	2008	2	9.234	0	0	0	0	0	0	0
(std.err)			0	0	0	0	0	0	0	0
China-Singapore	2008	2	8.227	0	1	0	1	0	0	0
(std.err)			0	0	0	0	0	0	0	0
All sample		4695	8.965	0.053	0.121	0.101	0.166	0.293	0.715	0.051
			0.008	0.003	0.005	0.004	0.006	0.007	0.007	0.003

Note: The full name of the RTAs is as following: Protocol on Trade Negotiations (PTN), Asia Pacific Trade Agreement (APTA), Latin American Integration Association (LAIA), Global System of Trade Preferences among Developing Countries (GSTP), Southern Common Market (MERCOSUR), South Asian Free Trade Agreement (SAFTA), Association of South East Asian Nations (ASEAN).

The standard deviation is reported in parenthesis. Out of 19 RTAs, even 13 are bilateral RTAs.

Appendix C

Table 8 The Characteristics and Trade Creation and Diversion Effects of BIC-countries' RTAs

RTAs of the BIC-countries	Trade Creation Effects by considering								Trade Diversion Effects by considering							
	Distance	Border	Continent	Language	Religion	Legal Origin	Colonizer	Developing	Distance	Border	Continent	Language	Religion	Legal Origin	Colonizer	Developing
PTN	0.620	0.861	0.895	0.756	0.796	1.094	0.758	0.799	-16.931	-18.679	-18.528	-16.860	-16.083	-19.266	-15.310	-17.405
APTA	1.600	1.056	1.113	0.756	0.787	0.670	0.853	0.789	-29.565	-17.388	-17.653	-16.860	-17.417	-16.639	-18.434	-17.139
LAIA	1.385	1.330	1.418	0.756	0.787	1.329	0.758	0.769	-26.800	-15.584	-16.432	-16.860	-17.320	-20.717	-15.310	-16.644
GSTP	0.611	0.707	0.724	0.812	0.783	0.780	0.833	0.781	-16.822	-19.696	-19.216	-17.615	-17.944	-17.325	-17.786	-16.946
MERCOSUR	1.737	1.750	1.886	0.756	0.811	1.427	0.758	0.769	-31.329	-12.809	-14.553	-16.860	-13.793	-21.326	-15.310	-16.644
SAFTA	2.218	1.365	1.457	0.825	0.788	1.427	1.075	0.769	-37.539	-15.353	-16.275	-17.798	-17.244	-21.326	-25.723	-16.644
MSUR-India	0.640	1.056	1.113	0.756	0.790	0.778	0.758	0.769	-17.192	-17.388	-17.653	-16.860	-16.899	-17.308	-15.310	-16.644
ASEAN-China	1.165	0.941	0.856	0.839	0.794	0.778	0.758	0.789	-23.956	-18.151	-18.687	-17.985	-16.382	-17.308	-15.310	-17.139
ASEAN-India	1.381	0.710	0.727	0.839	0.776	0.778	0.948	0.789	-26.743	-19.677	-19.203	-17.985	-18.970	-17.308	-21.558	-17.139
India-Sri Lanka	2.085	0.594	0.598	0.756	0.776	1.427	1.234	0.769	-35.826	-20.440	-19.720	-16.860	-18.970	-21.326	-30.930	-16.644
India-Afghanistan	2.071	1.750	0.598	0.756	0.776	0.345	0.758	0.769	-35.640	-12.809	-19.720	-16.860	-18.970	-14.630	-15.310	-16.644
China-Hong Kong	2.149	0.594	1.886	1.171	0.811	0.345	0.758	0.769	-36.641	-20.440	-14.553	-22.487	-13.793	-14.630	-15.310	-16.644
China-Macao	9.608	1.750	1.886	1.171	0.811	0.345	1.234	0.967	-132.800	-12.809	-14.553	-22.487	-13.793	-14.630	-30.930	-21.590
India-Singapore	1.207	0.594	0.598	1.171	0.776	1.427	1.234	0.967	-24.498	-20.440	-19.720	-22.487	-18.970	-21.326	-30.930	-21.590
China-Chile	-0.337	0.594	0.598	0.756	0.776	0.345	0.758	0.769	-4.604	-20.440	-19.720	-16.860	-18.970	-14.630	-15.310	-16.644
Chile-India	-0.206	0.594	0.598	0.756	0.776	0.345	0.758	0.769	-6.284	-20.440	-19.720	-16.860	-18.970	-14.630	-15.310	-16.644
India-Bhutan	2.214	1.750	1.886	0.756	0.811	1.427	0.758	0.769	-37.478	-12.809	-14.553	-16.860	-13.793	-21.326	-15.310	-16.644
China-Pakistan	1.130	1.750	1.886	0.756	0.776	0.345	0.758	0.769	-23.511	-12.809	-14.553	-16.860	-18.970	-14.630	-15.310	-16.644
China-New Zealand	0.282	0.594	0.598	0.756	0.776	0.345	0.758	0.967	-12.571	-20.440	-19.720	-16.860	-18.970	-14.630	-15.310	-21.590
China-Singapore	1.298	0.594	0.598	1.171	0.811	0.345	0.758	0.967	-25.679	-20.440	-19.720	-22.487	-13.793	-14.630	-15.310	-21.590
Reference: The average of all RTAs in BIC countries	0.554	0.659	0.666	0.807	0.782	0.661	0.806	0.825	-16.078	-20.009	-19.448	-17.556	-18.112	-16.583	-16.872	-18.045

Appendix D

Table 9 The Country Table

Afghanistan, Islamic Republic of	Dominican Republic	Lao People's Democratic Republic	Saint Kitts and Nevis
Albania	Ecuador	Latvia	Saint Lucia
Algeria	Egypt	Lebanon	Saint Pierre and Miquelon
Angola	El Salvador	Lesotho	Saint Vincent and the Grenadines
Antigua and Barbuda	Equatorial Guinea	Liberia	Samoa
Argentina	Eritrea	Libya	Sao Tome and Principe
Armenia	Estonia	Lithuania	Saudi Arabia
Aruba	Ethiopia	Luxembourg	Senegal
Australia	Falkland Islands	Macedonia, Former Yugoslav Republic	Serbia, the Republic of
Austria	Faroe Islands	Madagascar	Seychelles
Azerbaijan, Republic of	Fiji	Malawi	Sierra Leone
Bahamas	Finland	Malaysia	Singapore
Bahrain, Kingdom of	France	Maldives	Slovak Republic
Bangladesh	French Guiana	Mali	Slovakia
Barbados	French Polynesia	Malta	Slovenia
Belarus	Gabon	Martinique	Solomon Islands
Belgium	Gambia	Mauritania	Somalia
Belize	Georgia	Mauritius	South Africa
Benin	Germany	Mexico	Spain
Bermuda	Ghana	Moldova, Republic of	Sri Lanka
Bhutan	Gibraltar	Mongolia	Sudan
Bolivia (Plurinational State of)	Greece	Morocco	Suriname
Bosnia and Herzegovina	Greenland	Mozambique	Swaziland
Botswana	Grenada	Myanmar	Sweden
Brazil	Guadeloupe	Namibia	Switzerland
Brunei Darussalam	Guatemala	Nauru	Syrian Arab Republic
Bulgaria	Guinea	Nepal	Tajikistan
Burkina Faso	Guinea-Bissau	Netherlands	Tanzania, United Republic of
Burundi	Guyana	Netherlands Antilles	Thailand
Cambodia	Haiti	New Caledonia	Timor-Leste
Cameroon	Honduras	New Zealand	Togo
Canada	Hungary	Nicaragua	Tonga
Cape Verde	Iceland	Niger	Trinidad and Tobago
Central African Republic	India	Nigeria	Tunisia
Chad	Indonesia	Norway	Turkey
Chile	Iran, Islamic Republic of	Oman	Turkmenistan
China, People Republic: Hong Kong	Iraq	Pakistan	Tuvalu
China, People Republic: Macao	Ireland	Palau	Uganda
China, People Republic: Mainland	Israel	Panama	Ukraine
Colombia	Italy	Papua New Guinea	United Arab Emirates
Comoros	Jamaica	Paraguay	United Kingdom
Congo, Republic of	Japan	Peru	United States of America
Costa Rica	Jordan	Philippines	Uruguay
Côte d'Ivoire	Kazakhstan	Poland	Uzbekistan
Croatia	Kenya	Portugal	Wallis and Futuna Islands
Cuba	Kiribati	Qatar	Vanuatu
Cyprus	Korea, Democratic People's Republic of	Réunion	Venezuela, Bolivarian Republic of
Czech Republic	Korea, Republic of	Romania	Vietnam
Denmark	Kuwait	Russian Federation	Yemen, Republic of
Djibouti	Kyrgyz Republic	Rwanda	Zambia
Dominica	Kyrgyzstan	Saint Helena	Zimbabwe