The comparative advantages in the services sector of the developing economies

by

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Short Biography

Nuno Tiago Montenegro Cunha was born on the 26th August 1993 in Porto, Portugal. His college experience started in the Faculty of Economics in Oporto, where he had the chance to learn the principles of economics, management and finance. He developed a special interest in International Economics and when he finished his bachelor degree in 2014, he decided to deepen his knowledge in these matters by taking the International Business Master in the same institution.

Throughout his college experience he complemented his knowledge acquisition by being involved in an academic group (Exup) and with some summer internships (namely in Mota-Engil Serviços Partilhados, Seguros Tranquilidade and Banco de Portugal) which provided him a more realistic comprehension of the working world. He was also part of the monitoring committee of his master, where he was able to develop several projects to help his colleagues.

At present he is looking for an experience in the labor market that provides him insights about the international business environment and international business position.

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Abstract

It is widely accepted that international trade of goods and services plays an important role in the growth and development of the economies, particularly in the emergent and developing ones. However, in order to make this growth sustainable in the long run, it is important to understand in what goods or services countries have comparative advantage. Despite the significant interest of the literature concerning merchandise trade, the services sector has been neglected although it has presented more resilience in the recent financial turmoil and higher growth rates in the post-crisis time. Therefore, the present work aims to reveal the comparative advantages on the services sector of the ten biggest developing economies in terms of their world services exports share, as representative of the influence of the developing world in the global services trade. By analyzing the services trade data for each of these economies, ranging from 2000 to 2013, this work intends to clarify which are the main advantages in the service sector of the selected countries, highlighting their importance on a global scale. Obtained results reveal that India has a strong comparative advantage in computer and information services; Macao, Thailand and Turkey present a comparative advantage in travel services; China in other business services, and Korea in construction services. Singapore presents a comparative advantage in both financial and transport services. Hong Kong and Taiwan reveal a small comparative advantage in financial and other business services, respectively; Russia does not stand out in any service category. By extending the analysis to include the service trade balance in the different service categories, it was concluded that each country has an export specialization in its respective service with a comparative advantage.

Keywords: Exports, Trade, Comparative Advantage, Developing Countries, Services.

JEL-Codes: F11; F14.

Resumo

É amplamente aceite que o comércio internacional de bens e serviços desempenha um importante papel no crescimento e desenvolvimento das economias, em particular nas economias em desenvolvimento e emergentes. Contudo, para tornar este crescimento sustentável a longo prazo, é importante compreender quais as vantagens comparativas que um país apresenta na produção de determinados bens. Apesar do significativo interesse da literatura no comércio de bens, o setor dos serviços tem sido negligenciado, apesar deste último se apresentar mais resiliente face à recente crise financeira internacional e maiores taxas de crescimento no período de pós-crise. Assim, o presente trabalho visa revelar as vantagens comparativas no setor dos serviços nas dez maiores economias em desenvolvimento em termos do seu peso nas exportações mundiais de serviços, como representativas da influência dos países em desenvolvimento no comércio de serviços global. Ao analisar os dados do comércio para cada uma dessas economias, no período de 2000 a 2013, este trabalho pretende clarificar quais as principais vantagens no setor dos serviços para estas economias, realçando a sua importância à escala mundial. Os resultados revelam que a Índia possui uma forte vantagem comparativa em serviços de computação e informação; Macau, Tailândia e Turquia apresentam uma vantagem comparativa em serviços de viagens; a China em outros serviços empresariais, e a Coreia uma vantagem comparativa em serviços de construção. Singapura possuiu uma vantagem comparativa em serviços financeiros e serviços de transportes. Hong Kong e Taiwan apresentam uma pequena vantagem comparativa em serviços financeiros e outros serviços empresariais, respetivamente; a Rússia não se destaca em nenhuma das categorias analisadas. Ao estender a análise para incluir a balança comercial nas diferentes categorias de serviços, concluiu-se que cada país possuí uma especialização na exportação dos respetivos serviços em que possui vantagem comparativa.

Palavras-Chave: Exportações, Comércio, Vantagem Comparativa, Países em Desenvolvimento; Serviços

Códigos JEL: F11; F14.

Index of Contents

Index of Tables

Index of Figures

Abbreviations list

ARCA	Additive Revealed Comparative Advantage
ASEAN	Association of the Southeast Asian Nations
BI	Balassa Index
BPM	Balance of Payments Manual
BRIC(S)	Brazil, Russia, India, China (South Africa)
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HO	Heckscher-Ohlin
IMF	International Monetary Fund
MSITS	Manual on Statistics of International Trade in Services
NIE	Newly Industrialized Economies
NIS	New Independent States
NRCA	Normalized Revealed Comparative Advantage
OECD	Organization for the Economic Development
RCA	Revealed Comparative Advantage
SEE	Southeastern European Economies
SITC	Standard International Trade Classification
SRCA	Symmetrical Revealed Comparative Advantage
TBI	Trade Balance Index
UN	United Nations
UNCTAD	United Nations Cooperation for trade and Development
WTO	World Trade Organization
n.i.e.	not included elsewhere

1. Introduction

Strong economic changes have been taking place globally, highlighting the growing importance of the developing economies in international trade. The recognized convergence trend of the developing countries started to be uncovered in the beginning of the millennium (WTO, 2014) and it is registered in the academic field in 2001 with the use of the term BRIC - Brazil, Russian Federation, India and China - by O'Neill (2001) to indicate a group of "larger emerging market economies", able to change the global political and economic set.

The developing economies represented, in the beginning of the 21st century, around 21% of the world's gross domestic product (GDP) at current prices and current exchange rates and were responsible for 31% of the world's trade of goods and around 25% of trade of services. Since then, the developing economies have grown in importance on the world of political, economic and social affairs and in 2014 they were already responsible for more than one third (37,71%) of the world's GDP, accounted for 43% of the global trade of goods and about 33% of the global trade of services (UNCTAD, 2016).

According to Ramaswamy (1997) evidence shows that since 1960 developed economies have experienced a decreasing percentage of industrial GDP and employment, compensated by an increasing share of services in GDP and employment. Hoekman and Mattoo (2008) state as a stylized fact that as per capita income rises, the share of the services sector in GDP and employment will increase. In this way, it must be expected that the growth and development of the developing economies will follow the same path and services will become the most important sector for these economies. In fact, as stated by Nath, Liu and Tochkov (2015), for some small developing countries (such as Timor-Leste, Maldives or Liberia) services sector already has a relative weight in GDP, higher than in some developed countries.

One recent approach on the developing markets analysis focus on the BRIC economies, taking into account the work of O'Neill (2001) in forecasting Brazil, Russia, India and China among the biggest economies by 2050. Several other authors followed this approach (e.g.: Chen (2012), De Castro (2013) and more recently Kocourek (2015)), exploring the trade dynamics between the BRIC and the rest of the world. However academics, institutions and specialized journals started to unveil some

controversies in these economies. Kocourek (2015) states that divergent attitudes of these economies towards a number of international issues (such as global climate change, the war on Syria and the expansion of Russia into Ukraine, the fear of China's domination and competition) is challenging the sustainability of this group. A recent article of Johnson (2016) claims the death of the BRIC, sustained by the slower growth of Brazil and Russia' economies, the end of the Goldman Sachs' BRIC fund and the rise of other economies. Even the World Economic Forum describes some of the problems that limit the impact of these economies on the world economy, including the lack of mutual interests, the extreme cultural diversity among them and the dominance of the Chinese economy (Movchan, 2015). Therefore, their interest as a subject of study might be fallacious and a different approach is required.

Having into consideration the previous statements, the present research aims at analyzing the evolution of international trade in services of the developing countries, especially the ten largest and more expressive ones in service trade, in order to understand its increasing relevance in the world trade. In a similar line to Kocourek (2015) the revealed comparative advantages or disadvantages of each of the countries will be identified within the several categories of exported services. In this way, the research question that the present work intends to answer is the following:

"How have the comparative advantages in the services categories evolved in the developing countries?"

By answering this research question, this work aims to contribute for a better understanding of the international trade in services. In this way, the goals that follow were defined in order to structure and guide the present research:

- Investigate and discuss the appropriate indicator for measuring comparative advantages;
- Identify the biggest "players" of the developing world regarding trade in services.
- Explore the services export structure of the ten biggest and most representative developing economies;
- Understand the evolution of such structure;

This work is structured as follows. Section 2 is dedicated to the literature review, where it is defined and explained the basic concepts for this research such as the

definition of services, an explanation of comparative advantage, schools of thought on this topic and the measures usually used to identify comparative advantages. Section 3 is focused on the methodological considerations in order to define which developing countries will be analyzed, the relevance of each service category and the process used to explore these countries' service export structures. Section 4 addresses the empirical findings and results, with a discussion of the evolution of the comparative advantage in each of the service category. It also includes an analysis on each country service imports in order to understand their trade balance for each service category. Finally, section 5 addresses the main findings and conclusions of the present work, as well as the limitations and recommendations for future research in this area.

2. Review of the literature

In order to be able to identify in what service category a country possesses a comparative advantage it is important to understand how services are defined. This will be the goal of the first part of this review (Section 2.1). Next, in Section 2.2 it is addressed the concept of comparative advantage and its determinants. Section 2.3 will stress how a comparative advantage is measured and which are the limitations of such measures. Finally, Section 2.4 is intended to present empirical studies focused on measuring comparative advantages.

2.1.An approach on services

2.1.1. The definition of services

To distinguish goods from services is an important task, especially taking into account that the present research is interested in understanding comparative advantages in the services sector. In order to explore this important sector, the present section gives a more in depth expose of the concept of services, their key features and main characteristics.

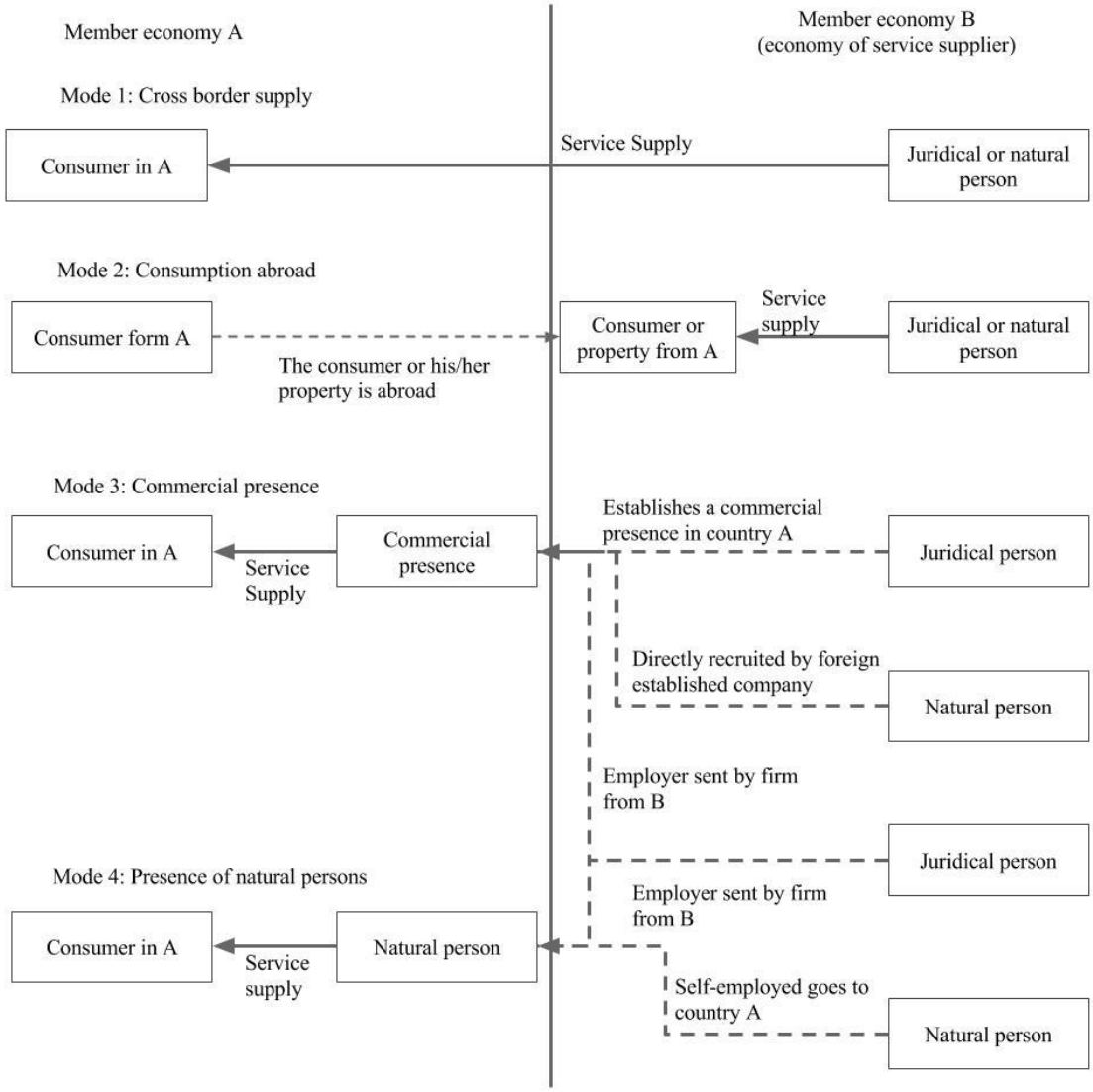
The distinction between goods and services is not a recent subject on the literature neither a peaceful one. Several authors (e.g.: Hill (1999), Gadrey (2000), Seyoum (2007)) and even the United Nations (2010) highlight the difficulties in defining services, their main features and the distinction from goods. According to Hill (1999) and Gadrey (2000) the definitions of goods and services are debated for over two centuries and their distinctions date back from Adam Smith's work that separated "productive" and "unproductive" labor in which services fall in the latter. However Jean-Baptiste Say refused this classification claiming services as "immaterial products" and stressing the idea that workers who provide services are productive (Hill, 1999). Many other classical authors (such as Nassau Senior, Stuart Mill or Alfred Marshall) discuss the distinction between commodities and services, but Say's classification (which he referred as the best term available for classifying services) remained and since then economists tend to separate goods from services based on their intangibility, i.e. goods are tangible products and services are intangible (Hill, 1999). Nevertheless, according to the same author, this distinction is not correct because it only differentiates

two kinds of goods: tangible and intangible products. Using the intangibility as a key characteristic to differentiate goods from services causes confusion and obscures the nature of intangible products. Hill (1999) explores the idea of three categories: tangible goods, intangible goods and services. What characterizes goods is the exchangeability: either tangible or intangible, goods can be separated from their producers or owners; their production, distribution or consumption can be made at different times, in different places. The intangible products are the originals created by film studios, architects, scientists, orchestras, software writers among others. These are intangible products because, in the view of the author, *"... have no physical dimensions or spatial co-ordinates of their own and have to be recorded and stored on physical media such as paper, films, tapes or disks"* (Hill, 1999, p. 427).

Regarding services, two major features emerge (Hill, 1999): first, services demand the prior agreement, cooperation or participation of the consuming unit in the production; no service can be made if the consuming unit does not consent. The second feature is that services do not exist independently from the producer or the consumer: they impinge the condition or status of the consuming unit and depend on the latter (Hill, 1999). More recently, Hoekman and Mattoo (2008) stated that services have a unique set of features that affect their tradability: (i) intangibility, which makes these international transactions difficult to measure, monitor and tax; (ii) non-storability, implying that production and consumption often occur at the same time; (iii) differentiation of the service for different customers; (iv) joint production, i.e. the need of customers participating in the production process (a similar feature highlighted by Hill (1999)). Hiziroglu, Hiziroglu and Kokcam (2012) talked about the heterogeneity of services and also referred the intangibility and non-storability reported by Hoekman and Mattoo (2008). In the view of Seyoum (2007) it is no easy task to define what services are because they only share the intangibility as a common feature. A similar idea is shared by the Manual on Statistics of International Trade in Services (MSITS), where it is stated the difficulties in defining such an heterogeneous group of intangible products and activities. However, the MSITS defines services as "*the result of a production activity that changes the conditions of the consuming units, or facilitates the exchange of products or financial assets*." (United Nations, 2010, p. 8).

According to the MSITS (United Nations, 2010) trade in services includes four categories of transactions (which are exemplified in figure 1): (1) cross-border supply, which corresponds to the traditional view on trade because both consumer and producer remain in their respective territories; (2) consumption abroad, which implies the movement of the consumer; this is typical of tourism activities and also ship repairing services; (3) commercial presence, which includes the situation when a company must acquire or establish an affiliate in another country, providing its services to the locals; (4) presence of natural persons, which implies a presence of a person in a foreign country in order to provide the service.

Figure 1: A synthetic view of modes of supplying services.



Source: Adapted from United Nations (2010, p. 15)

Summing up, despite the different views on the distinctiveness that defines a service (whether intangibility, coproduction, or even other feature) this is a growing sector both in countries exports and in academic literature.

2.1.2. The importance of services

Services trade accounts for a large share of international trade. According to the latest UNCTAD report on trade, exports of services represented 21% of global exports in 2014, which corresponded to more than 5 trillion dollars (UNCTAD, 2016). Furthermore, UNCTAD (2015) states that in 2014 services exports were the major driver of growth, registering an increase of about 5% compared with the previous year, while merchandise exports grew only 0,3%. This growth on services exports was almost equally distributed between developed and developing countries, although the first ones grew more intensively (5.1% compared with 4.8%, respectively).

From the 5 trillion dollars exports in 2014, developing countries account for almost 30% of total exports of services (UNCTAD, 2016). The growth of trade in services is not a recent trend: services trade has been recording higher growth rates compared with merchandise exports consistently over the years. According to Hisanaga (2008) this trend on services trade growth started to be unveiled in the mid-1980's, and is now known as one of the most important trends in the international economy. Fourie (2011) confirmed this trend at least in the last three decades, highlighting that the growth in services trade often surpassed the growth in merchandise trade. Moreover, Breinlich and Criscuolo (2011) confirmed that services trade grew on average 10% per year at least since the 1990's. On the institutional side, World Trade Organization (WTO) stated that services trade grew more intensively in the 1980' and 1990' but then the growth rate slowed down in the 2000's, recovering its path of growth after the 2007 financial crisis (WTO, 2013).

But what contributed for this growth? Literature seems to agree that the revolution of technology accelerated trade in services (Hisanaga, 2005) allowing for new ways of providing services across borders (De, 2013). Globalization and the uprising of knowledge-based economies also played an important role in accelerating trade in services (Hiziroglu *et al.*, 2012). Specifically studying the Indian case, Mitra, Ranjan, Eichengreen and Gupta (2013) stated that the improvement in technology reduced the cost of cross-border exchange, allowing trade in services that used to be considered

non-tradable. The authors also refer the trade reform and liberalization of the services sector as an important jump-start for this growth in India (showing the importance of an institutional positive environment). Furthermore, access to foreign technology and spillovers between merchandise and services exports are other reasons pointed out by Mitra *et al.* (2013) to explain the growth in services trade in India.

Services represent an increasing share of employment creation and GDP growth in both developed and developing countries and are considered crucial for the economic growth (Seyoum, 2007). Academic findings (e.g.: Seyoum (2007); Hoekman and Mattoo (2008); Evangelista, Lucchese and Meliciani (2015)) seem to agree that a well-established service sector is a key feature to guarantee growth, development and competitiveness of national firms and a country as a whole. Also Hiziroglu *et al.* (2012) claim that it is now a stylized fact that trade in services promotes economic growth and that services are the leading force of exports, particularly in the developing countries. The study of Evangelista *et al.* (2015) takes a step forward and states that Business Services (the main focus of the authors' work) generate externalities such as economic growth, and that Business services firms are responsible for diffusion of knowledge and new management process of firms. Ferro, Portugal-Perez and Wilson (2014) studied the aid in services that the least-developed countries received and the impact on goods exports. Their work concluded that aid to the services sector such as transportation, energy and banking services has a positive impact on the exports of these countries, suggesting that aid should be focused on services. According to De (2013) if a country is able to liberalize and reform its service sector in an appropriate way this will bring nothing but positive effects for the economy since the rise of competition will create more efficient services which are crucial for the competitiveness of both the firms and the overall economy. In short, not only services are important in an economy (whatever the state of development) but they also promote a country's growth and development.

2.2.Determinants of Comparative Advantage

2.2.1. Traditional views on Comparative Advantage

International trade theory is the economic field of study interested in understanding trade between countries, and the consequent effects on producers and consumers welfare (Greenaway & Winters, 1994). Among the different questions that are related with international trade, one has been particular teased in both traditional and recent works: which are the reasons that explain why some countries produce certain goods at different prices and exchange them with another country? – i.e.: who trades what with whom and at which prices? (Greenaway & Winters, 1994). One of the eldest (although not the first one) and most recognized author trying to answer this question was David Ricardo (Greenaway & Winters, 1994). A simple numerical example between Portugal and England became one of the most cited works in economics, even though the major part of Ricardo's book - *On the principles of Political Economy and taxation,* published in 1817- was intended to approach several different questions (King, 2013). Along with some other authors (such as Adam Smith and David Hume) David Ricardo created a paradigm that shift from mercantilism point of view to the classical trade theory, changing the way countries address trade with each other (Greenaway & Winters, 1994).

Ricardian's theory of international trade is considered a low dimensional model because it simply highlights the basic principles for trade (Greenaway & Winters, 1994). Still, it is an important construction for understanding basic concepts and results that stem from international trade. It starts with a set of standard assumptions (2 countries, 2 goods and one production factor) and in order to explain the differences in production efficiency (i.e. different costs of production in different countries) Ricardo also assumed that technology is different across countries and exogenous for the purposes of the model. In this basic scenario, there are two main conclusions to retain, according to Deardorff (2005): first, countries will specialize in producing the good in which they possess a comparative advantage (that is, they are relatively more efficient). Second, no country losses from voluntary trade, even if some countries might not win from being open to trade in the sense of getting lower prices. The openness to trade will

increase the world production and at least one of the countries will benefit from lower prices without the other being injured.

Almost 200 years past and Ricardo's work remains influential in international economic theories, despite the criticism and controversial interpretations of his findings (King, 2013). King (2013) compiled some of the critics pointed to the model throughout the years: the arbitrary price that appears in international markets (falling between the two autarky prices), the neglected influence of intermediate goods, ignoring the distributions of the gains from trade and not making clear if a country fully specializes its production. However, Costinot and Donaldson (2012) quoting Deardorff (1984), reveal that some authors have interpreted that the law of comparative advantage implies fully specialization. Despite the conclusions from the Ricardian model on the patterns of trade, the model presented several limitations in answering other interesting questions for international trade economists: since it was based on one-factor (labor) it was not possible to predict the factor's distribution of income that comes from trade. Furthermore, the explaining factor of why countries trade with each other (technological differences) is exogenously given by the model (Greenaway & Winters, 1994).

Further contributions have been made, most of which with the purpose of adapting the Ricardian model to the reality, making it more useful in predicting trade patterns or even absorbing different approaches to trade. Eaton and Kortum (2002) and Deardorff (2014) worked on incorporating the concept of distance by defining transportation costs which led to interesting conclusions. Deardorff (2014) found that when transportation costs are incorporated, countries may invert their expected pattern of trade exporting goods that were anticipated to be imported. The author then elaborates the concept of "*local comparative advantage*" defined as "*the comparative advantage that a country may have relative to countries that are close to it, either geographically or in other ways that reduce the costs of trade*." (Deardorff, 2014, p. 11). Therefore, comparative advantage may be considered locally instead of globally. On their seminal work Eaton and Kortum (2002) embodied a Ricardian framework in gravity models to show that distance reduce the gains from trade and when a country improves its technology the welfare is spread across neighboring countries. Yet the most influential work that has arisen since Ricardo was the Heckscher-Ohlin (HO) model published in 1919. The so-called neoclassical paradigm became broadly used not

only in international economics, but also in public finance, economic geography, labor economics and others (Fisher, 2011b).

The model constructed by Eli Heckscher and Bertin Ohlin – the HO model - drawn back the productivity differences, assuming instead identical technologies making possible to include more than one factor (typically labor and capital). The model remains a low dimensional one, but now it assumes 2 countries, 2 goods and 2 factors (Greenaway & Winters, 1994). The main conclusions achieved by such model are summed up by Fisher (2011a): the first conclusion is that countries have a comparative advantage in producing goods that use intensively the relatively abundant factor; second, international trade will bring factor prices close together which will benefit both countries (the Factor price equalization theorem developed by Samuelson); the third conclusion (the Stolper-Samuelson theorem) is that *"changes in goods prices magnify changes in factor prices"* (Fisher, 2011a, p. 1)*;* and finally, the fourth conclusion is evidenced by the Rybczynski Theorem*: "at fixed factor goods prices and thus fixed factor prices, changes in endowments magnify changes in outputs"* (Fisher, 2011a, p. 1).

Since its publication in 1919 and improved by Ohlin's dissertation in 1924 (Feenstra, 2015) the Heckscher-Ohlin's work has been scrutinized by its peers, either to improve it or to point out its flaws. Perhaps the most famous author applying the HO model to the real world was Leontief. As explained by Jones (1956), Leontief tried to use the model to predict the United States exports, but the results were the inverse of what was expected: United States were exporting labor-intensive products and importing capital-intensive goods. Deardorff (1982) also claimed that the HO model requires the specific set of original assumptions in order to get the results predicted which may limit the application of the model and therefore the necessity of improvements.

It seemed that in order to improve the HO theorem, differences in technology must be included which means taking a step back and including Ricardian's theory as stated by Feenstra (2015, p. 1): "[The Heckscher-Ohlin model] *performs very poorly in practice: (…), the Heckscher-Ohlin model is hopelessly inadequate as an explanation for historical or modern trade patterns unless we allow for technological differences across countries."*. Based on other contributions for international trade theory this

seems reasonable: Fisher (2011a) tries to incorporate technological differences in the HO model making proper adjustments. Morrow (2010) also combined classical and neoclassical perspectives into a single model, showing that when applying only one of the theories the results come biased (which might explain Leontief results). By using the developed model for studying exports of 20 economies (both developed and developing) for 11 years, Morrow (2010) concluded that no isolated model offers a complete vision of the patterns of trade. The author stressed that the HO forces are more significant to explain trade flows across countries, since "*one standard deviation increase in relative factor abundance is approximately twice as potent in affecting change in the commodity structure of the economy as a one standard deviation change in Ricardian productivity*" (Morrow, 2010, p. 2) which seems a little inconsistent with the statements of Feenstra (2015) highlighted above.

Nevertheless, authors have converged in incorporating both views of comparative advantage and as explained above there are advantages when we consider the classical and neoclassical theory, bringing a better explanation about the pattern of trade across countries. More recently a different approach on comparative advantage emerged on the literature. The analysis on comparative advantage is now centered on understanding the importance of the institutional environment. The next section will explore the exiting literature on this topic, the main authors and their contributions for the comprehension of comparative advantages.

2.2.2. Institutions as Comparative Advantages

Another source of comparative advantages has arisen in the literature on the subject. International economists are now focused on the role of institutions to determine and explain the patterns of trade around the world, reducing the inconsistency observed between traditional theoretical models' predictions and international trade between countries (Belloc, 2006). Institutions are defined as "*the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction*" (North, 1990, p. 3).

According to Belloc (2006) the theoretical base for the assumption that institutions play a role in international trade is constructed on the idea that institutions are not the same everywhere, so the political and legal systems are different from one country to another creating uncertainty on the relations with foreign partners. This

uncertainty associated with opportunistic behavior and asymmetric information increases transaction costs which in turn changes the predicted patterns of trade.

Since the definition of institutions is too broad, studies have spread out around which institutions create such advantages and the methods used to measure these advantages. Anderson and Marcouiller (2002) explored how the transparency of the governments' actions has an impact on the patterns of trade concluding that this insecurity associated with corrupt behavior works as an hidden tax, which in turn explains the low levels of trade between the developed countries and the developing ones. Some other studies (e.g. Nunn (2007) and Levchenko (2007)) highlight the role of contract enforcement and property rights for contract-intensive industries. Cuñat and Melitz (2007) studied the relationship between labor market flexibility and comparative advantages concluding that countries with greater labor market flexibility present a comparative advantage in high volatility sectors even when resources and technologies are similar across countries. This intensive research on distinct sources of comparative advantages under the same name - institutional diversity - led Chor (2010) to make a quantitative approach on these different sources in order to measure the importance of these determinants within a common framework as the well-established Ricardian and Heckscher-Ohlin forces. The author's motivation was to analyze such distinct determinants on a common framework using the previous works highlighted above. The author concluded that "*each of the stochastic Ricardian forces, Heckscher-Ohlin forces, and institutional determinants shares a comparable degree of importance...*" (Chor, 2010, p. 164). Therefore, associating different determinants of comparative advantage will allow a better explanation of the patterns of trade.

More recently, Ju and Wei (2011) explored how the quality of the financial system might influence a country's trade and if the development of the financial system might be a source of comparative advantage. By including a financial framework in the HO model the authors showed that for economies with low-quality institutions (typically the least developed ones) the financial system plays a key role since a reduction in financial intermediation costs increases the total use of capital that was unused in the country, raising the output of the capital intensive goods.

To sum up several works point out the importance of institutions as a new factor for comparative advantages. Although recent, some empirical approaches have been

made in order to prove the importance of these factors and to show their relevance in explaining trade among countries. The basic idea is that trade occurs within a legal and political framework that companies do not ignore and therefore understanding this framework will help to achieve better results in predicting patterns of trade and explaining the comparative advantages. Regardless the approach used to understand the comparative advantage all point to the existing differences between trade partners to explain why countries trade between each other.[1] The academic findings on comparative advantage are summarized in Table 1. It separates the three main theories of comparative advantage: the classical, the neoclassical and the institutional, and highlights some aspects that characterize them: the origins of the theory; the explanation for the comparative advantage and the main authors.

Table 1: Summary of the main theories of comparative advantage

Theory of Comparative Advantage	Origins	Source of Comparative advantage	Main authors	Further contributions	Concept embodied
Classical	XIX century	Technological differences	David Ricardo (1817)	Eaton and Kortum (2002)	Included the concept of distance
				Deardorff (2014)	Incorporated transportation costs
Neoclassical	XX century	Relative factor endowments	Heckscher-Olhin (1919)	Morrow (2010)	Both included technological differences in the HO model
				Fisher (2011)	
Institutional	XXI century	Institutional environment	Nathan Nunn; Anderson and Marcouiller (2002)	Chor (2010)	Incorporated the three different views in one model
				Ju and Wei (2011)	Included a financial framework in the neoclassical approach

Source: Own elaboration based on the literature review

Given that institutional view is a recent contribution (centered in the XXI century), it is not possible to completely determine one central author. The authors that were highlighted are the ones that have the most cited works.[2] Although this might not be the best way to measure their importance, it helps to understand the relevance of these works in the scientific community.

[1] Even in the absence of comparative advantages, countries might still trade between each other because other factors such as scale economies play a role in the specialization of industries and intra-industry trade will occur (Davis, 1995). However, a choice was made to analyze trade between economies based on their differences rather than their similarities.

[2] To find out the most cited works on the institutional theory of comparative advantage, it was used the Web of Science citations. On 29 of January of 2016, the number of references was: Anderson and Marcouiller (2002) (180 citations); Nathan Nunn (2007) (176 citations).

2.3.Measuring Comparative Advantages

As evidenced in the previous section, productivity differences, factor endowments or the institutional environment of countries allow to explain the existence of comparative advantages which enable them to produce one or several goods and services in a better position than their counterparts. In the present section it is addressed another topic that concerns international trade economists: how to measure comparative advantages. When we take a step forward from theory to empirical measurement of comparative advantages problems arise because *"Relative autarkic prices are unobservable variables, and this unobservability hampers the identification of true or shadow comparative advantages."* (De Benedictis & Tamberi, 2004).

Some of the indexes that have been used to measure comparative advantages are summarized in table 2 in which it is presented the author, the year of publication and the main feature of the index. Table 2 only provides information about the most commonly used indexes, because according to De Benedictis and Tamberi (2004, p. 324) *" (...) there can be as many RCA indexes as there are combinations and transformations of the variables (...) used to infer comparative advantage".*

Table 2: Synthesis of the main comparative advantages measures

Index	Author (year)	Equation	Main Features
Balassa Index (BI)	Balassa (1965)	(1) $BI_i^j = \frac{X_i^j / \sum_i X_i^j}{X_i^W / \sum_i X_i^W}$	The most widely used index
Hillman Condition	Hillman (1980)	(2) $1 - \frac{X_i^j}{X_i^w} > \frac{X_i^j}{\sum_i X_i^j}(1 - \frac{\sum_i X_i^j}{\sum_i X_i^W})$	Guarantees a concordance between the BI and pre-trade prices.
Symmetrical RCA (SRCA)	Laursen (1998)	(3) $SRCA_i^j = \frac{BI_i^j - 1}{BI_i^j + 1}$	Corrects the asymmetry of the BI
Additive RCA (ARCA)	Hoen and Oosterhaven (2006)	(4) $ARCA_i^j = \frac{X_i^j}{\sum_i X_i^j} - \frac{X_i^W}{\sum_i X_i^W}$	Corrects the asymmetry of the BI; allows comparing different commodities
Normalized RCA (NRCA)	Yu, Cai, and Leung (2009)	(5) $NRCA_i^j = \frac{X_i^j}{\sum_i X_i^w} - \frac{X_i^w * \sum_i X_i^j}{(\sum_i X_i^w)^2}$	A new measure that corrects several problems of the BI

Legend: X represents the exports; j, i and w represent, respectively, the country analyzed, the commodity/sector analyzed and the selected region of reference.

Source: Own elaboration

According to Laursen (2015) it became common practice on institutional reports and academic publications to use an ex-post measure proposed and disseminated by Balassa (1965) to measure the comparative advantages of a country. Despite the many shortcomings of the so-called Balassa index (BI) pointed out by several authors (ergo: Hoen and Oosterhaven (2006), Cai and Leung (2008), Leromain and Orefice (2014) and Laursen (2015)) it remains the most popular index (Yu, Cai & Leung, 2009) in providing information about the advantages that a country possesses in producing goods and services.

The Balassa Index measures the ratio between the exports of a given commodity on the total national exports ($X_i^j / \sum_i X_i^j$) and the same commodity exports on total exports of a reference region ($X_i^W / \sum_i X_i^W$) (Yu *et al.*, 2009). Equation (1) of table 2 presents the BI revealed comparative advantage (RCA). If BI is higher than 1 (which means the share of commodity *i* exports on the total exports of country *j* is higher than the share in the reference region) country *j* has a comparative advantage in producing *i*. If RCA falls below 1, then it denotes a comparative disadvantage of country *j* in sector *i*. The reference value for the BI is one which denotes a neutral situation (Yu *et al.*, 2009).

Although commonly used to investigate comparative advantages, the Balassa Index has several drawbacks that when not taken into consideration may skew the conclusions. This is particularly important because, as stated by Laursen (2015), some academic works use the Balassa index as a first approach to more complex topics and more dynamic relations between trade and development, compromising the conclusions.

One of the inaccuracies of the Balassa index is to work with ex-post data which means it might not reflect comparative advantages, as stated by Leromain and Orefice (2014, p. 3): "*The concept of Ricardian comparative advantage is based on the intrinsic (ex-ante) nature of the country in being relatively more efficient in the production of a given good; while the Balassa index, being based on the actual (ex-post) realization of bilateral sector's trade flows, blends exporter with importer and sector specific factors affecting trade."* . Oelgemöller (2013) also mentioned that the BI only works in a free trade assumption because otherwise it is affected by tariffs, taxes, subsidies and other external trade policies, not measuring correctly the comparative advantage.

To solve the problem of an ex-ante (unobservable) situation and ex-post data, Hinloopen and van Marrewijk (2008) recalled a necessary and sufficient condition - the Hillman Condition - given by the Equation (2) of Table 2. Although this condition is rarely tested by empirical works, once verified the problem is overcome and the Balassa index will reflect accurately the comparative advantage. By using a large dataset, the authors concluded that the probability of the Hillman condition being violated increases when we have countries with large market shares, countries with abundant natural resources, developing countries, or even a combination of these situations. Nevertheless, the authors also concluded that it is rare the case when it is not verified.

The lack of theoretical foundation is another flaw of the BI. For instance, Hinloopen and Van Marrewijk (2001) claim that because of this theoretical flaw it is not clear if the same value of revealed comparative advantage for two different countries represents the same advantage. Cai and Leung (2008) also indicate the lack of theoretical support and therefore an increase in the BI does not necessarily means a greater comparative advantage. Cai and Leung (2008) then proceed to a corrected way of interpreting the dynamics of the BI by including other issues on the analysis, such as admitting stable exports of the other countries. Another implication from this lack of theoretical foundation is that the distribution of the index strongly depends on the number of countries and the number of sectors considered (Hinloopen & Van Marrewijk, 2001).

Another weakness of the Balassa Index is its asymmetry. Since the index ranges between 0 and ∞, it is not symmetrical around the value of 1 (Hoen & Oosterhaven, 2006). Hinloopen and Van Marrewijk (2001) analyzed several European Union countries and showed that in all cases the mean and the median value of the comparative advantage index was above one which according to Hoen and Oosterhaven (2006) is strange because it would be expected that the comparative advantages values to be centered around the neutral value of one. The problem of asymmetry was approached several years before by Laursen (1998), suggesting a complementary step to transform the BI in a symmetrical measure - the symmetrical revealed comparative advantage. Given by equation 3 of table 2, this measure is also extremely common in several works. Other authors have also stressed the asymmetry problem proposing different ways of correcting this problem. In particular, Hoen and Oosterhaven (2006)

proposed an addictive revealed comparative advantage (ARCA – Equation (4) of table 2), symmetrical around zero. Laursen (2015) showed that this measure is better for measuring comparative advantages when compared with the Balassa Index.

Although the suggestions made by Hoen and Oosterhaven (2006) to correct the asymmetry of the index and the concerns of ex-ante theories and ex-post evidences the lack of theoretical foundation remains. As stated by Yu *et al.* (2009, p. 4): *"In summary, alternative RCA measures in the literature help to improve Balassa's RCA in one aspect or another, but none of them has satisfactorily overcome all its shortcomings."*. After exploring different measures of comparative advantages, the authors suggest a new way of measuring comparative advantages. They claim that this new measure solves several problems of the Balassa index making it possible to interpret and to compare results across time and countries. Equation (5) reflects the normalized revealed comparative advantage index (NRCA) proposed by Yu *et al.* (2009). According to the authors: "*The NRCA index measures the degree of deviation of a country's actual export from its comparative-advantage-neutral level in terms of its relative scale with respect to the world export market and thus provides a proper indication of the underlying comparative advantage*" (Yu *et al.*, 2009, p. 4).

The NRCA index allows the comparison of commodities within the same country. Furthermore, the sum of the NRCA for all countries is zero and the same happens when all commodities for the same country are added up. This index also has an addictive property: for instance, measuring the NRCA of the European Union as a whole will be the same as the sum of the NRCA of each country. In this sense, the index is independent of the number of countries or commodities considered. Ranging from -1/4 to 1/4, this index reveals a comparative advantage for positive values and the reverse otherwise (Yu *et al.*, 2009).

Considering the main differences between trade in goods and services addressed in the section 2.1, some authors have questioned if traditional theories would be equally relevant in explaining trade in services, or even if the measures constructed and applied to merchandise trade would fit the service trade data. According to Hisanaga (2008) this does not seem to be a problem since several other authors (i.e. Hindley and Smith, 1984; Deardorff, 1985 and Sazanami and Urata, 1990) showed that the law of comparative advantage is applicable to goods as well as services. Hiziroglu *et al.* (2012)

also studied this problem and concluded that there are several studies that show the applicability of existing measures (such as the Balassa Index) to the services trade.

In conclusion, the Balassa index was an important breakthrough as a measure of comparative advantage. However, given the problems associated with this measure (such as the asymmetry, the lack of theoretical foundation, among others) several complementary indexes were developed in order to fix these problems. The Normalized Revealed Comparative Advantage has several desired properties which make it a more reasonable index.

2.4. Empirical Studies of comparative advantages in developing countries

On the present section several empirical studies addressing the issue of comparative advantages are explored, mainly in the developing countries. The main goal of this section is to identify useful strategies as well as to distinguish what was made by the authors from what is intended to do in this work.

The process for retrieving studies regarding the comparative advantages of the developing economies was relatively simple. Using two of the most commonly known databases (Web of Science and SCOPUS), it was explored the results that came from the following keywords: "Revealed Comparative Advantage*" and "Developing Economies" OR "Developing Countries" OR "Emerging Economies" OR "Emerging Countries". To make sure the results were not skewed by the form, a second research was made, using only the singular form, which resulted in the same results. The research was also restricted to the "Business Economics" area of research in the Web of Science and in the SCOPUS database the results were limited to "Economics, Econometrics and Finance" and "Business, Management and Accounting", because these areas of research are the ones closest to the present work. On February 23rd of 2016 this process resulted in a total of 76 papers, 43 papers in the first database and 33 on the second. Table 3 explains the steps made in order to find the relevant papers for the present analysis.

Table 3: Steps for obtaining the empirical studies on comparative advantages

Process	Research made in Web of Science and Scopus	After eliminating repeated articles	After reading the abstracts	Retrieving available works	After a further analysis	Including other works
Remaining articles	76	48	29	22	21	25

Source: Own elaboration.

Following the process of research, repeated studies in the databases were eliminated, reducing the papers to only 48. Then, each abstract was read carefully in order to identify those that focused on the study of the comparative advantages of one or more economies. This process allowed eliminating 19 results thus reducing the number of articles to twenty-nine. However, it was not possible to obtain the full text of seven works even searching in different databases (namely Google Scholar). Within the 22 remaining works, there was one that was retracted by the responsible publisher (due to violation of the publisher's principles), therefore it was not analyzed. Four other empirical works were found in the Google Scholar (Mohammadi and Yaghoubi (2008), Chen (2012), Kocourek (2015) and Nath *et al.* (2015)) which were also included in the present analysis. In conclusion, after extracting and analyzing the existing studies, 25 were selected to carry a further analysis. These studies are synthetized in Table 4. Table 4 was constructed having in consideration the methodology used by the authors, consequently an emphasis was given in several features of the studies made, including the index used, the scope of analysis, the countries analyzed and some conclusions achieved by the authors. The works were organized chronologically.

Table 4: Summary of empirical studies on comparative advantages in developing countries

Author (Year)	Countries	Years	Indexes Used	Reference Area	Databases	Sectors	Main conclusions
Rana (1990)	14 Asian and Pacific Countries	1965; 1973; 1984	Balassa Index and Export-Import index	World	United Nations and OECD Databases	36 commodity groups	The NIEs (except Hong Kong) and the ASEAN-4 countries (except Indonesia) gained comparative advantage in exporting several labor intensive items
Worz (2005)	54 countries (spread in 6 regions)	1981-1997	Modified Revealed Comparative Advantage	54 Countries	UNIDO industrial database and UN commodity trade database	34 manufacturing industries	OECD North remains the only group in the sample with a competitive advantage RCA in exports of high-skill-intensive industries throughout the observation period
Vaidya, Bennett and Liu (2007)	China	1987- 2005	Balassa Index	World	UN International trade Statistics Yearbook	27 product groups	China gained RCA in selected medium-tech sectors and the high-tech telecommunications and automatic data processing equipment sectors
Seyoum (2007)	60 developing Countries	1998-2003	Three Indexes of RCA	World	IMF Balance of Payments	4 categories of services	Many Developing countries reveal a comparative advantage in travel/tourism and transport services
Ferto and Soos (2008)	30 European Countries	1995-2002	Balassa Index	European Union	UNCTAD Statistical Division	SITC at three digit disaggregation	Comparative advantages in Baltic countries are still largely based on natural resources, whereas in NIS are oriented towards human-capital and technology-intensive products
Wu and Lin (2008)	India	2000 to 2005	Balassa Index	World	IMF Balance of Payments	Transportation and Freight services	India presents a comparative advantage in the freight services between 2000 and 2003
Connolly (2008)	Russia and 23 other countries	1997; 2006	Balassa Index and Krugman specialization index.	World	UNcomtrade	4 categories of export products	The only high-technology manufacture in which Russia possesses RCA is: power-generating machinery, encompassing nuclear reactors and fuel elements
Mohammadi and Yaghoubi (2008)	59 Developing Economies	1998-2004	Balassa Index and Revealed Import Advantage	World	UNCTAD Statistical Division	4 services categories	About a third of the countries have a comparative advantage in financial services
Saboniene (2009)	Baltic States	2000-2007	Modified Revealed Comparative Advantage	Baltic States	Department of Statistics of Lithuania	22 merchandise groups	Lithuanian export is largely dependent on the export commodities of traditional industries
Wadud and Yasmeen (2009)	26 economies	1981-2005	Balassa Index, Grubel Lloyd index	World	World Trade Organization and UNIDO	Textile and Clothing	Half of the developed economies possess comparative disadvantage in textiles trade. Most of the developing economies recorded high RCA
Bojnec and Imre (2010)	6 South East European countries	1995-2007	Lafay Index	15 European Countries	Eurostat comext trade database	Agro food products	The SEE-6 agro food exports to the EU-15 markets are highly concentrated on a few of the most important products with trade specialization
Shafaeddin and Pizarro (2010)	China and Mexico	1992; 2000; 2004	Balassa Index and Revealed Import Advantage	World	UNcomtrade	SITC at three digit disaggregation	China improved its RCA in the production of capital/technology intensive products. Mexico's RCA in production for export oriented industries is limited
bin Abu-Hussin, Mohamad and Hussin (2011)	Malaysia	1998-2007	Balassa Index	World and GCC market	UNcomtrade	10 Merchandise categories	Malaysia has a consistent comparative advantage in 23 export products
Fourie (2011)	147 countries	2005; 1980-2006 for South Africa	Normalized Revealed Comparative Advantage	World	UNCTAD Statistical Division	10 Categories of Services	South Africa has a comparative advantage in travel services exports

Table 4 (Cont.)

Author (Year)	Countries	Years	Indexes Used	Reference Scope	Databases	Sectors	Main conclusions
Hiziroglu *et al.* (2012)	Turkey and selected EU countries	2000-2010	Balassa Index, Comparative Import Advantage and Relative Trade Advantage	World	World Bank and OECD International Databases	6 services sectors	Strong comparative advantages exist for Turkey in construction, tourism and transportation sectors
Phasuk and Wann (2012)	Thailand, Laos, Vietnam, Myanmar and China	1995-2010	Dynamic Revealed Trade Balance Comparative Advantage	South-East Asia	World Bank, OECD and UNCTAD reports	5 industries	Thailand has a stronger advantage than Laos, Cambodia and Myanmar for the role as an exporter of petroleum, plastic, iron and steel industries
du Toit and Fourie (2012)	50 African Countries	1980-2005	Normalized Revealed Comparative Advantage	World	UNCTAD Handbook of Statistics 2007	11 services categories	The results indicate that 29 of the 50 African countries in the dataset reveal a comparative advantage in travel service exports
Chen (2012)	BRIC	2010	Balassa Index	World	Uncomtrade	2 Merchandise classification systems	Comparative advantage products are still natural resource or unskilled labor based
De Castro (2013)	BRICS	2000-2010	Balassa Index and SRCA	World	UNcomtrade for merchandise; UNServiceTrade for services	SITC at three digit disaggregation	These countries presented Comparative advantages mainly in primary products and unskilled labor
Corovic, Jovanovic and Ristic (2013)	Serbia	2001-2011	Balassa Index	World	International Trade Centre, WTO and UNCTAD	Textile and Clothing	Serbia presents a Comparative advantage in Textile and Clothing sectors, however that advantage is declining
Pavličková (2013)	Slovak Republic	1999-2011	Balassa Index, SRCA and econometrical analysis and Constant Market Share Analysis	EU-27	Eurostat comext trade database	4 types of industry groups	Slovakia has recorded a comparative advantage in mainstream manufacturing, labor-intensive industry, and capital-intensive industry
Pilinkiene (2014)	Estonia, Latvia and Lithuania	1998-2012	Three Indexes of RCA	World	World Trade Organization	4 commodity groups	No clear competitive advantage to be distinguished among Estonian industries
Mahajan, Nauriyal and Singh (2015)	India	1995-2011	Balassa Index and Trade Specialization Index	World	UNCTAD Statistical Division, India Government reports and Bank of India.	Pharmaceutical industry	There is a stagnant RCA for India and dynamic improvement in the same industry for Ireland and Israel
Kocourek (2015)	BRICS	1995-2013	Symmetric revealed comparative advantage	World	UNCTAD statistical Division	SITC at three digit disaggregation	BRICS are leaving the low-added value merchandise to produce more sophisticated goods
Nath *et al.* (2015)	United States, India and China	1992-2010	Modified RCA, SRCA and Trade Balance Index	US, India and China	Bureau of Economic Activity	16 Services Categories	India and China present a comparative advantage in more traditional Services

Legend: NIE (Newly Industrialized Economies), includes Hong Kong, Korea, Singapore and Taiwan; ASEAN-4 (Association of the Southeast Asian Nations) includes Indonesia, Malaysia, Philippines and Thailand; Baltic Countries include Bulgaria, Croatia and Romania; NIS (New Independent States) include Belarus, Kazakhstan, Moldova, Russia and Ukraine; SEE-6 (Southeastern European countries) refers to Albania, Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Montenegro and Slovenia; GCC (Gulf Cooperation Council) refers to 6 economies: Saudi Arabia, Bahrain, Kuwait, Qatar, Oman and the United Arab Emirates. OLS – Ordinary Least Squares; SRCA – Symmetrical Revealed Comparative Advantage; SITC – Standard International Trade Classification

Source: Own elaboration

Analyzing Table 4 it is clear that the studies concerning the comparative advantages of the developing economies are a recent trend on the literature: only one of the works (Rana, 1990) was conducted in the XX century; the remaining works date from 2005 or afterwards and more than a half are from 2010 or afterwards showing the importance of international trade in the developing economies in recent years, similar to what was concluded by Pilinkiene (2014).

Focusing on the countries analyzed it is possible to identify some patterns: the Eastern European Countries are focused on 7 works; Russia and South-East Asia are highlighted on 10 studies, with a special emphasis for China and India which in some works (e.g. Vaidya *et al.* (2007) and Mahajan *et al.* (2015)) are the only countries analyzed. Three of the most recent studies - Chen (2012), De Castro (2013) and Kocourek (2015) - are focused on BRIC or BRICS as representative of the emergent world. Finally, there are 6 works that include a large set of countries. In this case, it is highlighted the work of Fourie (2011) which includes 147 countries.

Looking at the years analyzed, some authors do not study a continuous period of time but instead choose a set of years, namely Connolly (2008), Shafaeddin and Pizarro (2010) and Chen (2012). Yet this approach is not the most common one; the majority of the authors use a time-series analysis to extract information about the comparative advantages of the developing economies. In particular, Wadud and Yasmeen (2009), Fourie (2011) and du Toit and Fourie (2012) use a time-series longer than 20 years. There are two works that only analyze five years and the majority of studies analyzed a period between 10 and 15 years. It is important to notice that Fourie (2011), which uses the larger time-series analysis (26 years), only does it for South Africa. The rest of the 146 countries are analyzed only for 2005 limiting the interest of analysis for other countries.

In respect to the measure of comparative advantage, existing studies usually employ the Balassa index. In the present sample, 16 out of the 25 works use the Balassa Index to both measure and identify comparative advantages in merchandise or services trade. Possibly due to the limitations of the index, several authors include other indexes to strengthen their results, particularly the symmetrical revealed comparative advantage (the case of Pavličková (2013) and De Castro (2013)). However, that is not the case of

Fourie (2011) study and du Toit and Fourie (2012). These authors use the normalized revealed comparative advantage.

In terms of defining a reference scope, authors opt for one of two approaches: either do they select an area of reference (using the world exports as a whole, which is the case of 18 studies) or they select a reference area, such as the European Union, or a regional group of countries (7 studies used this approach). In order to explore Malaysia's Comparative Advantage in merchandise trade bin Abu-Hussin *et al.* (2011) use both approaches concluding that this country has a comparative advantage in 23 merchandise products including electronics, oils, jewelry and cereals.

Regarding the databases used by the studies, it is not simple to define a pattern or indicate the primary source for trade data used by the authors. Several different databases are used, conditioned by the countries analyzed or by the goals the papers try to achieve. For instance, Bojnec and Imre (2010) and Pavličková (2013) use the Eurostat databases because the countries they pretend to analyze are strongly connected with the European Union. However, Ferto and Soos (2008), Saboniene (2009) and Pilinkiene (2014) use different databases to analyze European countries and particularly the case of Ferto and Soos (2008) who intended to analyze 30 European countries (much of them within the Eurozone and the European Union), uses the UNCTAD database. United Nations databases are the most commonly used. UNCTAD is used on 7 works, followed by UNCOMTRADE used on 6 works, and UNIDO is used on 2 papers. Authors can still use other databases: namely, World Trade Organization, International trade Center, OECD database and even the World Bank databases.

Finally, in terms of the sectors analyzed, authors usually explore the dynamics of merchandise trade. In the present sample, only eight studies explore services exports. Although it seems a limited number of studies this follows the line of thought of several authors: Seyoum (2007) stated that "*There are no studies examining developing countries' comparative advantages in services*" (Seyoum, 2007, p. 376). In fact the studies found regarding the comparative advantage in services all date from more recent years. The same idea is presented in the work of Hiziroglu *et al.* (2012): the research in measuring comparative advantage in services is limited. Furthermore, it is possible to note that the way merchandise trade is approached shows diversity: some authors explore merchandise trade using 2 or 3-digit level desegregation data (Ferto and Soos

(2008) and Kocourek (2015)); some other authors categorize merchandise in different groups (Pavličková (2013) and Pilinkiene (2014)); others rely on an analysis within an industry, such as the agro food industry (Bojnec & Imre, 2010) or the pharmaceutical industry (Mahajan *et al.*, 2015). In the studies focused on the services sector, the categories are more homogeneous: apart from Wu and Lin (2008), the remaining works use the same existing categories, with little differentiation.

As it was stated before, trade in services has become progressively more important in the world economy (Hisanaga (2008); Nath *et al.* (2015)). Although scarce, studies on comparative advantage in the service sector of the developing countries have emerged in recent years (Seyoum (2007), Wu and Lin (2008), Hiziroglu *et al.* (2012) and Nath *et al.* (2015)). The developing economies become more interesting for these type of studies because in some of them (such as Liberia, Maldives, Timor-Leste among others) the weight of the services in the country's GDP is higher than in the developed economies (Nath *et al.*, 2015).

Seyoum (2007) intended to find out the comparative advantages and competitiveness in services with a special emphasis in the developing economies. The author used three different measures of revealed comparative advantage (the Balassa Index, a slightly modified version of the BI and a combination between the first two). Nevertheless Seyoum (2007)'s works include a large set of countries (a random sample of 60 developing economies), the temporal analysis is very limited (covering only the period that goes from 1998 to 2003) and the author only analyze four categories of services. The author concluded that several developing countries present a comparative advantage in travel and transport services.

Wu and Lin (2008) dedicated their study in understanding the competitiveness of India's commercial ports, determining if they presented a comparative advantage. The authors' study used the IMF Balance of Payments data between 2000 and 2005 and only for two categories of services: transportation and freight. Similar to previous works, Wu and Lin (2008) used the Balassa Index to conclude that India presented a comparative advantage in the freight services between 2000 and 2003 losing its advantage in the following years.

Hiziroglu *et al.* (2012) followed a different path of the previous studies because their work is concerned with the relations between several countries. The authors used

three different indexes (the standard Balassa Index, a Balassa Index using imports instead of exports and a third measure that results from the subtraction of the second index in the BI) to measure the comparative advantages between Turkey and 16 European Union countries. For the period ranging between 2000 and 2010, the authors concluded that Turkey presented a comparative advantage in construction, tourism and transportation services. In a similar way, Nath *et al.* (2015) compared the bilateral trade in services between the United States, India and China. By using two measures of comparative advantage (being one of them the symmetrical revealed comparative advantage) throughout the period of 1992 to 2010 for 16 different categories of services, the authors found that China and India present a comparative advantage in more traditional services, such as transportation and travel services when compared with the United States.

To conclude, it can be noted that studies on developing countries present several similar features: they tend to study a certain region (Eastern Europe or South-East Asia) using the Balassa Index to measure the countries' comparative advantage; the studies retrieved data from the end of the 20th century and the beginning of the 21st century using the world as a reference scope; and finally, they tend to analyze the merchandise sector using the United Nations Databases. The present study distinguishes itself from the previous ones in the following: first, it will exclusively address services, due to the scarcity of works regarding these transactions (of the 25 studies included in table 4 only eight focused on this type of trade); secondly, it will present a dataset with a similar time period as the majority of the studies analyzed, because it will analyze a period ranging from 2000 to 2013; third, the present research will use a more recent index (the Normalized Revealed Comparative Advantage). Apart from Fourie (2011) and du Toit and Fourie (2012), all other authors still use a problematic measure (the Balassa Index) or a corrected version of the same. Finally, the present research will address trade in ten different services categories, similarly to what was made by Fourie (2011).

3. Methodological considerations

The present chapter is mainly concerned with the methodological considerations that will serve as the base for the analysis and discussion of results. Section 3.1 presents the data source, establishes the relevant period of analysis and defines the sample of countries. In section 3.2 the Normalized Revealed Comparative Advantage is revisited to remind how is it calculated and interpreted. Based on these methodological considerations the empirical analysis can be started with a clear focus.

3.1.Data sources, period of analysis and sample of countries

In order to determine and analyze the comparative advantages of the developing economies it is essential to retrieve export information about these economies. The research will rely on the information retrieved from the UNCTAD Statistical division, a commonly used database by other authors such as Mohammadi and Yaghoubi (2008), Fourie (2011) and du Toit and Fourie (2012). Moreover, UNCTAD database uses several sources to retrieve services export data, such as the International Monetary Fund (IMF) *Balance of Payments Statistics* and the United Nations (UN) *Service Trade* database and therefore includes information from other known databases making it more complete in the information available and coherent among several other options.

The secondary data obtained from UNCTAD covers the 2000-2013 period (14 years).[1] With this time period it is intended to cover the most recent events on exports, starting at the beginning of the 21st century up to the most recent available data. This provides information about the changes that may have occurred since 2000 and will provide up-to-date information. It also provides a balance between studies with a larger time period (such as Hejing and Whalley (2014) or Kocourek (2015)) and studies with smaller time periods (like Grater (2014)).

The present work aims to identify the biggest participants of the developing world regarding trade in services and explore their services export structure. In 2014 the

[1] Initially, the work was intended to cover a period up to 21 years (1993-2013). However, this was unfeasible because of the severe lack of data for the period 1993-1999 regarding several countries, which would compromise a comparative analysis. Although service trade data is already available for 2014, this information will not be used for two reasons: first, the data is still estimated based on GDP growth of each country, not the officially publish by each national authority; second, services exports data in 2014 is registered with a different methodology that compromises the time-series analysis of some services categories (namely transport, communication and computer services).

developing economies were responsible for almost 30% of the world's exports of services (UNCTAD, 2016), a value that has been increasing at least since the last decade of the XX century (WTO, 2013). Yet among the 189 economies currently classified as developing or transitioning by the UNCTAD not all are contributing in a similar way to services trade (UNCTAD, 2016). The present work focuses on the top ten developing economies, regarding their exports of services by taking into account the information from 2013. Regarding the countries analyzed they were defined by their participation in the world trade, emphasizing their weight in the world's service exports.

Table 5 presents the ten biggest developing "players" in services exports as well as their relative weight in world's service exports and developing countries' services exports. Table 5 shows that Asian economies represent the most active countries in services exports since all of the selected economies belong to this continent (even Turkey and Russia have their largest land share in this continent). Together, these 10 economies represent more than one billion dollars in services exports, more than one fifth of the World's exports in services, and more than two thirds of the Developing and Transition Economies' Exports of services, which shows the importance of these economies.

Table 5: Top10 developing economies, according to their share in the world's services exports

Entity	Exports in millions USD	% of World's exports	% of developing and transition economies' exports
China	205,921	4.36%	13.28%
India	151,386	3.21%	9.76%
Hong Kong, SAR	133,397	2.83%	8,60%
Singapore	122,447	2.59%	7.90%
Korea, Republic Of	112,993	2.39%	7.29%
Russia	65,781	1.39%	4.24%
Thailand	58,975	1.25%	3.80%
Macao SAR	53,536	1.13%	3.45%
Taiwan, Province of China	51,640	1.09%	3.33%
Turkey	47,141	1.00%	3.04%
Total (top10)	1,003,217	21.25%	64.70%
Developing and Transition Economies	1,550,554	32.85%	100.00%
World	4,720,182	100.00%	--

Source: Own elaboration based on UNCTAD (2016) database

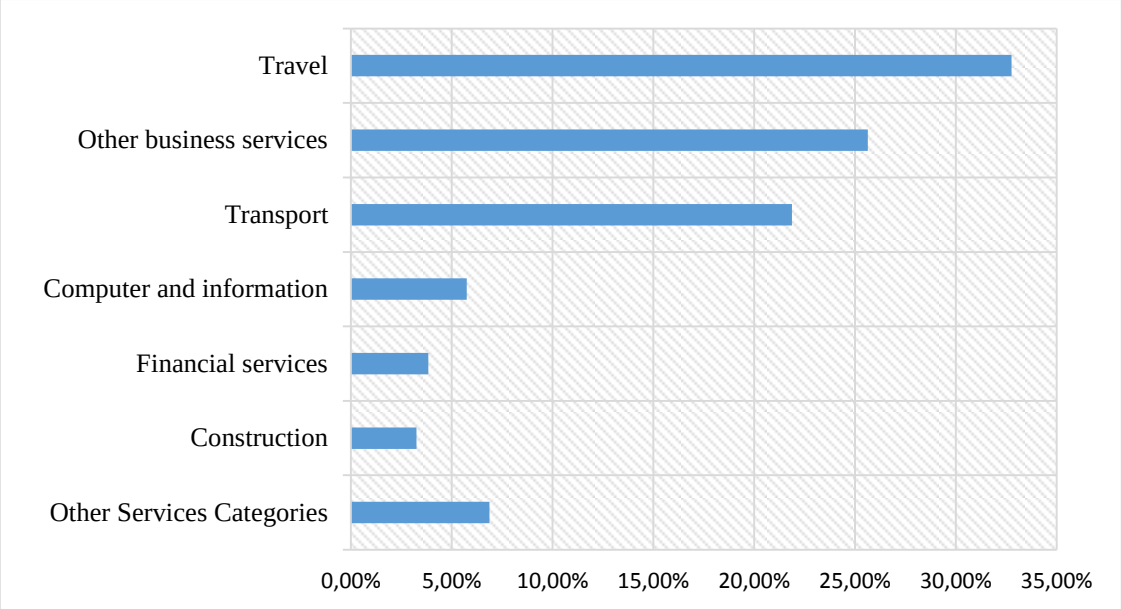
Another interesting feature is that special administrative regions (SAR) in China (such as Hong Kong, Macau and Taiwan) are also among the biggest services exporters.

3.2. Categories of services and RCA indicator

3.2.1. Defining the services categories

Currently the economies report their international trade in services following the methodology proposed by the IMF Balance of Payments and International Investment Position Manual, sixth edition (BPM6), which recognize 12 distinct services categories. These are also the standard categories used in other databases (such as the WTO and the UNCTAD database). However, since the sixth edition only started being used in 2014, the previous version of the BPM6 will be the standard classification used in the present work. The BPM5 only recognize 11 categories of services which are the ones that will be analyzed in the following chapter[2]. The IMF (and consequently the UNCTAD) distinguishes between Transport, Travel, Communications; Construction; Insurance; Financial Services; Computer and Information; Royalties and License Fees; Other Business Services; Personal, Cultural and Recreational Services; and Government services n.i.e. Figure 2 shows the importance of each of these categories in the exports of the developing economies in 2013, organized by descending order of importance.

Figure 2: Weight of each service category to the Developing Economies' services exports, 2013

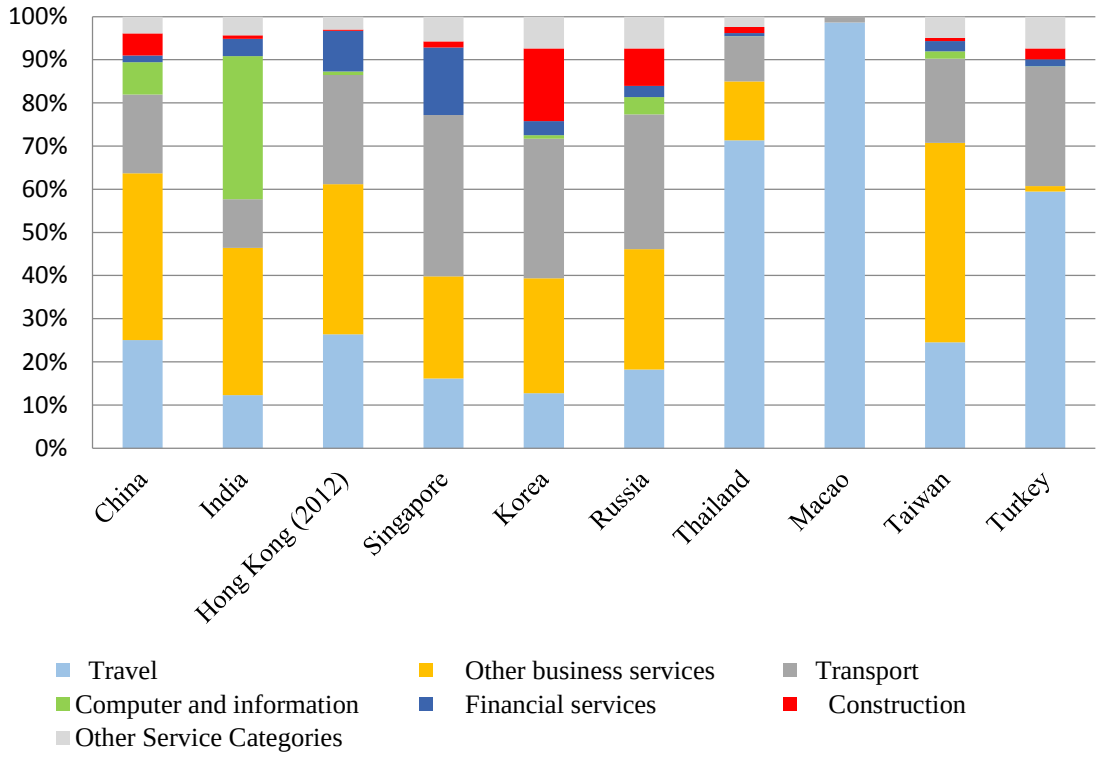


Source: Own Elaboration

[2] The main differences between the BPM5 and the BPM 6 are the merge of two distinct categories in the BPM6 (Telecommunications and computer and information services) and two other service categories (Manufacturing services on physical inputs owned by others and Maintenance and repair services n.i.e)

For the developing economies travel services represent 33% of their services exports, followed by other business services which represent 26% of services exports, transport services with 22% of the services exports and computer and information services represent 6%. Each of the other services categories represents less than 5% of the total exports of services, including financial services (4%) and construction (3%). The remaining 5 services categories represent in total about 7% of the developing economies exports and for this reasons they will be analyzed together. Concerning the top ten developing economies, figure 3 highlights the weight of each service category for each individualized economy for 2013. Data for Hong Kong is from 2012, because data for several service categories (including other business services and computer and information) is not yet available.

Figure 3: The importance of each service category for each analyzed economy, 2013



Source: Own elaboration based on UNCTAD (2016)

For most individual economies data seem consistent with the aggregated data of developing economies (as presented in figure 2). For instance, travel is clearly the most important service export of Macao (representing 99% of the exports of services of this economy) and is also important for Thailand and Turkey (representing 71% and 59% of these economies services exports respectively). Considering Taiwan its most important

category of services exported is other business services, which represent 46% of the country's exports in services. Regarding transport services, this service represents more than one quarter of the total services exports for Hong Kong (25.3%), Singapore (37%), Korea (32%), Russia (31%) and Turkey (28%). India is the strongest exporter of computer and information services, representing 33% of this country service exports. In the next Chapter, the revealed comparative advantage of the ten economies in each of these categories will be analyzed.

3.2.2. Defining the normalized revealed comparative advantage index

Although the Balassa Index is the most widely used index to measure a country's comparative advantages, considering the related shortcomings highlighted in section 2.2 and given the advantages of the Normalized Revealed Comparative Advantage (NRCA), the latter index will be the standard index used in the present research. Furthermore, NRCA seems a more appropriate measure to compare countries and changes over time (Yu *et al.*, 2009)

The NRCA is obtained in the following way:

$$\text{NRCA} = \frac{X_i^j}{\sum_i X_i^w} - \frac{X_i^w * \sum_i X_i^j}{\left(\sum_i X_i^w\right)^2} \qquad (3.1)$$

Where: *X* represents the exports; *j*, *i* and *w* represent, respectively, the country analyzed, the commodity or sector analyzed and the selected area of reference.

The first part of the equation 3.1 represents the relation between the exports of commodity *i* by country *j* (X_i^j) in comparison with the total exports of a selected reference area ($\sum_i X_i^w$). The second part of the equation represents the comparative-advantage-neutral situation, represented by the exports of commodity *i* in the area of reference multiplied by total exports of all commodities by country *j* ($X_i^w * \sum_i X_i^j$). The denominator is simply the square of the total exports of the reference area. The interpretation of the NRCA index is similar to other indexes: values above zero represent a comparative advantage in producing the commodity *i*, and a comparative disadvantage if the value is lower than zero. If a country presents a value of zero that means its production is neither stronger nor weaker than the rest of the countries considered. The NRCA also allows for comparisons between countries and

commodities: if $NRCA_{ij}$ = 0.1 and $NRCA_{ik}$ = 0.2, that means country *k* has twice the comparative advantage in producing commodity *i* than country *j*.

A simple example will provide a better comprehension of the index. Table 6 provides information about the exports of all services and transport services for China and the developing and transition economies in 2000.

Table 6: An illustrative example for calculating the NRCA

Entity	Service	Exports value in Millions (USD), 2000
China	Transport	3,671
China	All Services	30,431
Dev. And Tran. Economies	Transport	92,970
Dev. And Tran. Economies	All Services	372,225

Source: Own elaboration based on UNCTAD (2016)

Given the information of Table 6, the NRCA value concerning transport services for the year 2000 for China is:

$$NRCA_{2000}^{China} = \frac{3{,}671}{372{,}225} - \frac{92{,}970 * 30.431}{(372{,}225)^2} = -0{,}01$$

Since the value of -0.01 is obtained, it can be concluded that, in 2000, China presented a comparative disadvantage in transport services.

An important feature of the index is the range of values. According to Yu *et al.* (2009) values range between -0.25 and 0.25. Still, the authors consider that it might facilitate the interpretation and the discussion of the results if the obtained value is diveded by 0.25, which makes the range of values between -1 and 1. For instance, in the previous example, one could divide the obtained result by 0.25, obtaining the value of -0.04. This is also the procedure followed in the present work.

The NRCA requires the definition of an area of reference. In the present work, the area of reference includes all the developing and transition economies considering that the intended purpose of the research is to identify comparative advantage in services exports among the developing economies. Furthermore, in the example provided by Yu *et al.* (2009) the authors do not use the world as a reference area, which means the index might be used with a different area of reference.

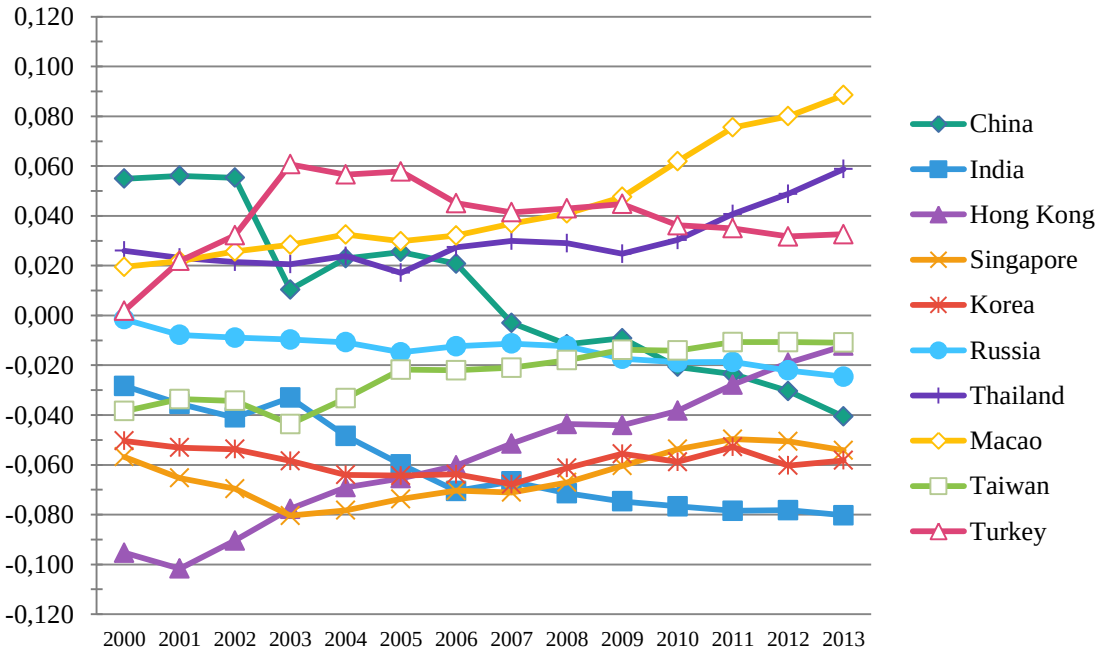
4. Empirical findings and results

The present chapter is concerned with the main findings and results that can be obtained from the evolution of the comparative advantages in the main categories of services for each of the top ten developing economies (Section 4.1 to 4.7). Following the analysis of each services category a sum-up section is provided (Section 4.8). Finally, the comparative advantages and disadvantages are compared with the trade balance for each category (Section 4.9).

4.1. The evolution of travel services

Travel services include both goods and services that are acquired by non-residents during their short-term visits, a vision that is shared by the UNCTAD, the IMF and by the United Nations (2010). Usually this category includes accommodation but also food, beverages and even transports acquired and consumed in the supplying economy. It also includes gifts and souvenirs bought in the visited economy. There are some similarities between travel and tourism, but the first includes a larger set of activities such as students abroad (United Nations, 2010). Figure 4 highlights the comparative advantages the selected 10 economies selected, presented throughout the 14 years analyzed.

Figure 4: Evolution of the NRCA in Travel services, 1993-2013



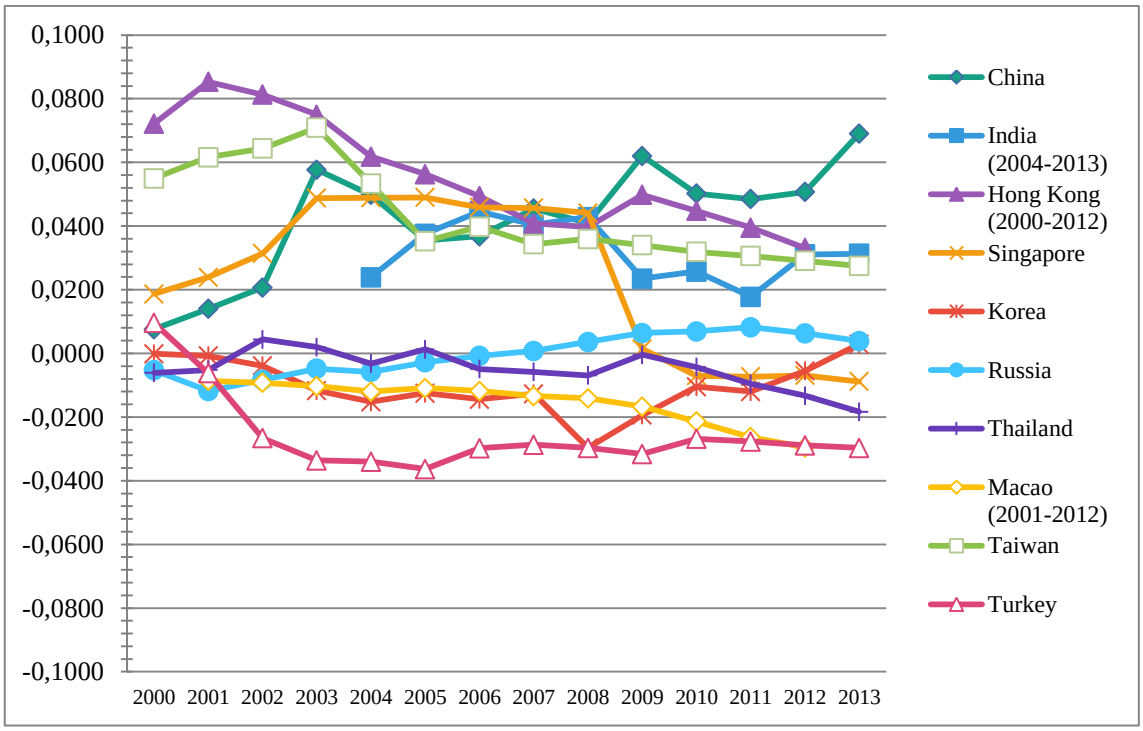
Source: Own elaboration based on UNCTAD (2016)

Macao stands out from the rest of the economies in this service category with a stable growth since 2000 and a quicker progress since 2008. Throughout the analyzed period, Macao's advantage became about 4.6 times bigger than it was in 2000. Like Macao, Thailand was also able to sustain a comparative advantage throughout the period, growing faster since 2008. Turkey, who showed a strong comparative advantage in 2003, has stabilized its value close to 0.03 in 2013 making it the third strongest economy in delivering travel services. All the other economies underperformed in terms of travel services, i.e., their exports are smaller than their comparative-advantage-neutral point in almost every year. Yet not all present a similar behavior: for instance, Hong Kong which presents the minimum value of the sample in 2001 (-0.1) presented a quick recover since 2001, meaning that its exports in travel services grew at a higher rate than other services exports and the export markets demand. In 2013 Hong Kong comparative disadvantage was almost at its neutral point, similar to what was achieved by Taiwan. China presented an interesting behavior. Until 2002, it was able to sustain its NRCA value. However, since that year the NRCA index value started to go down with some extreme falls in 2002-2003 and 2006-2007. In 2013, the country registered a NRCA value of -0.04. Among the economies with a strong comparative disadvantage, India seems to be the one that "struggled" the most in this sector, given than the decreasing values are a constant (except in 2003) presenting the minimum value among these economies in 2013.

4.2. The evolution of other business services

Other business services include a wide range of services provided to foreign enterprises by national companies. These services include, among others, research and development, legal services, advertising, consulting and accounting services, as well as operational leasing and other trade-related services (UNCTAD, 2016). Figure 5 presents the evolution of the NRCA index in the analyzed period.

Figure 5: Evolution of the NRCA in other business services, 2000-2013



Source: Own elaboration based on UNCTAD (2016)

Hong Kong started as being the country with the strongest comparative advantage in 2000, improving it in 2001 (reaching the highest value of the period for every economy: 0.085). However, its evolution was not favorable: it started to decrease its advantage, ending the analyzed period (2012) with a small comparative advantage. Taiwan shared a similar pattern: in 2000 the NRCA value was 0.05, reaching a maximum in 2003 (0.07) and although it decreased its value particularly between 2003 and 2005, Taiwan was able to end the analyzed period with a NRCA value of 0.027, maintaining the comparative advantage in this category of services.

Until 2008, China and Singapore shared a similar path in terms of consolidating their comparative advantage in other business services. However, their behaviors became completely distinctive since 2008: while China increased its advantage and finished the period under analysis with a NRCA of 0.069, Singapore decreased its advantage and in 2010 presented a comparative disadvantage in this category. Since that year, Singapore was not able to recover and until the end of the period it kept a comparative disadvantage in other business services.

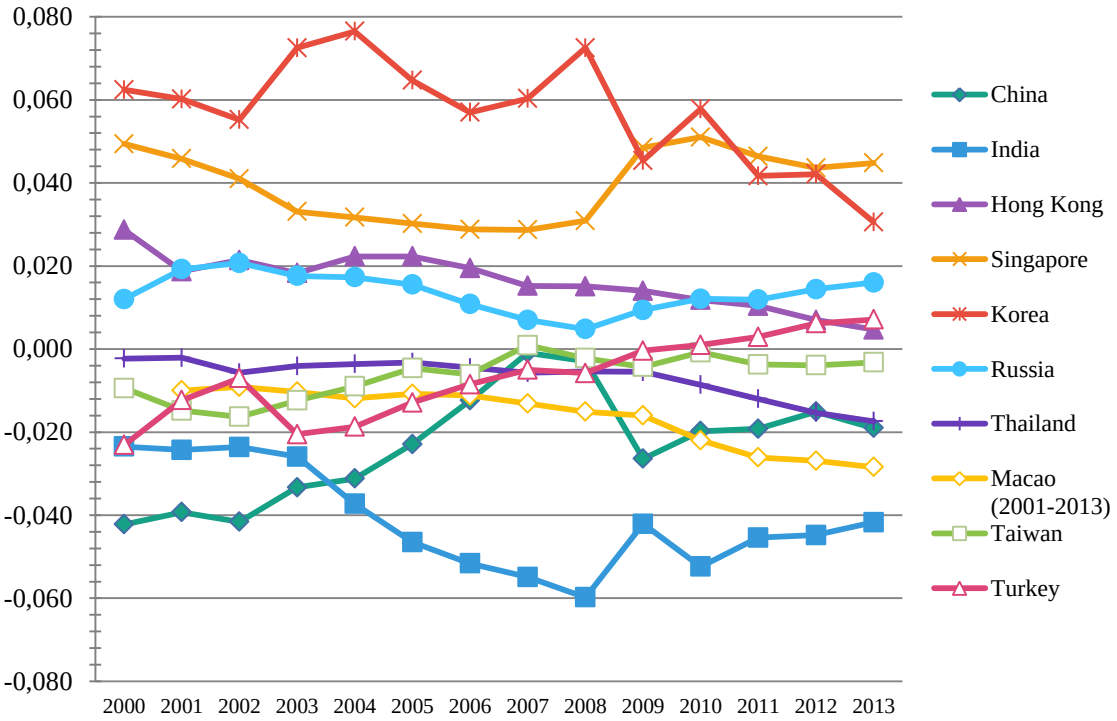
Beyond that, India succeeded in preserving its competitiveness in this service category: in 2004 India presented a comparative advantage of 0.024, which increased in

the following years but later it came back to similar values to the ones registered in 2004. By 2013, India presented the second highest comparative advantage value (0.031), only surpassed by China. Among the analyzed economies, four of them have a comparative disadvantage in almost every year (Korea, Thailand, Turkey and Macao). Although Korea finishes the analyzed period with a small comparative advantage, these economies were not able to compete on the international trade of other business services.

4.3. The evolution of transport services

Transportation services are defined as the process of carrying either objects or people from one place to another as well as supporting services (United Nations, 2010). Transportation is usually classified by the type of transport (such as sea, air, rail or road) and by what is transported (passengers or merchandise). Ferro *et al.* (2014) acknowledged that transportation has an important role in exports, particularly in low-income countries. Figure 6 highlights the evolution of the revealed comparative advantage in transport services exports for the selected developing economies, within the analyzed period.

Figure 6: Evolution of the NRCA in Transport Services, 2000-2013



Source: Own elaboration based on UNCTAD (2016)

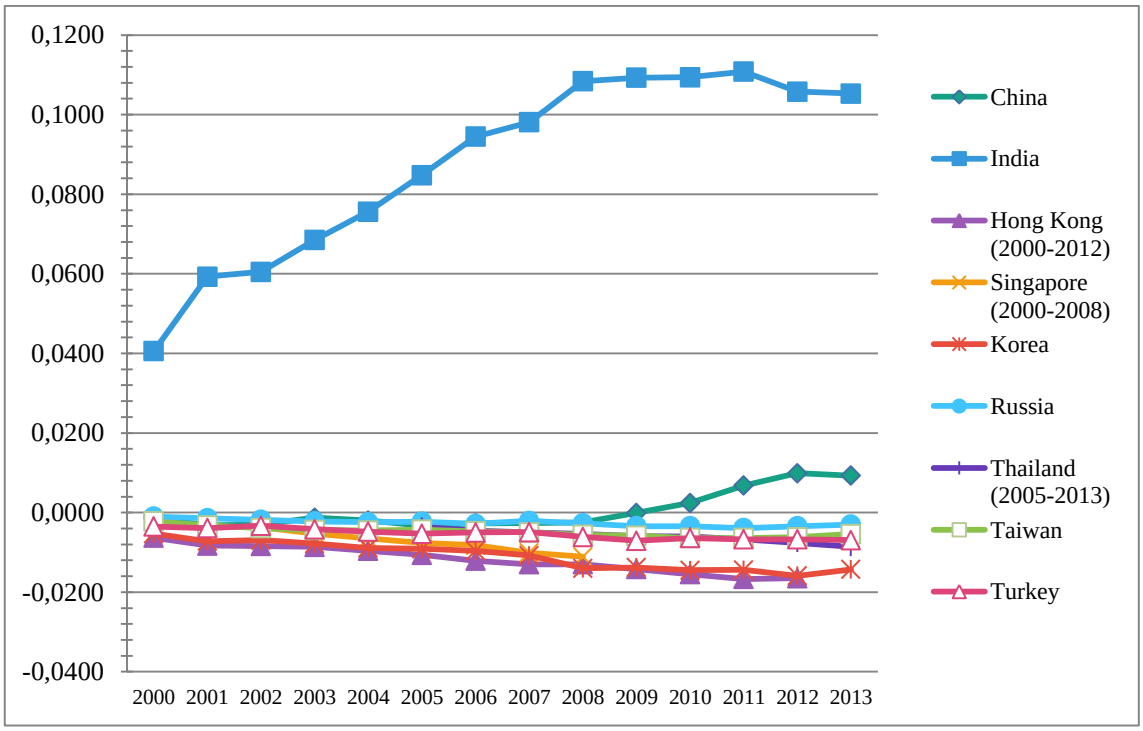
Korea and Singapore are the two economies with the strongest comparative advantage in transport services. Although Singapore decreases its NRCA value until 2008 it kept itself above the other economies and in 2009 it presented a stronger comparative advantage than Korea, which was the economy with the highest values until that date. Since 2009 Singapore stabilized its comparative advantage value at almost 0.05, while Korea decreased its values to 0.03 in 2013. The two economies kept the first and second strongest comparative advantage followed by Russia, Turkey and Hong Kong.

Turkey is a case of success: it starts the analyzed period with a comparative disadvantage of -0.02 and it progressively increases this value reaching a small comparative advantage in 2010. Since that year, it continued to grow slowly its advantage up to 0.007 in 2013. China was able to recover from its low point in 2000 until 2007; however, since that year China lost its ability to keep progressing in this service category, ending the analyzed period with a negative value. Four economies (China, India, Thailand and Macao) were not able to present a comparative advantage in any year, therefore revealing a sustained comparative disadvantage. A similar conclusion is applied to Taiwan because it exhibited a comparative disadvantage in all years excluding 2007.

4.4. The evolution of computer and information services

The UNCTAD (2016) definition of computer and information services is composed by three different dimensions: (i) the computer services, which consist in both hardware and software related services; (ii) new agency services that include the provision of news, articles and photographs to the foreign media; and (iii) information services typically related to databases conception, storage and dissemination of data. Evangelista *et al.* (2015) highlighted the importance of this service in providing greater competitiveness and a higher export shares for manufacturing sectors. Figure 7 exposes the comparative advantages of the selected economies through the 2000-2013 period, measured by the NRCA index.

Figure 7: Evolution of the NRCA in Computer and Information Services 2000-2013



Source: Own elaboration based on UNCTAD (2016)

There is no doubt that India has a strong comparative advantage in this service category showing a great distance from all the other analyzed economies. To the end of the period considered, while the other countries present a comparative disadvantage, India enlarges its advantage, reaching a peak in 2011 with a NRCA of 0.11. Although the surprising result, it is not possible to say that it was unexpected. In fact, other works mention this advantage of India compared with other countries e.g. Mitra *et al.* (2013) and Sahoo and Dash (2014).

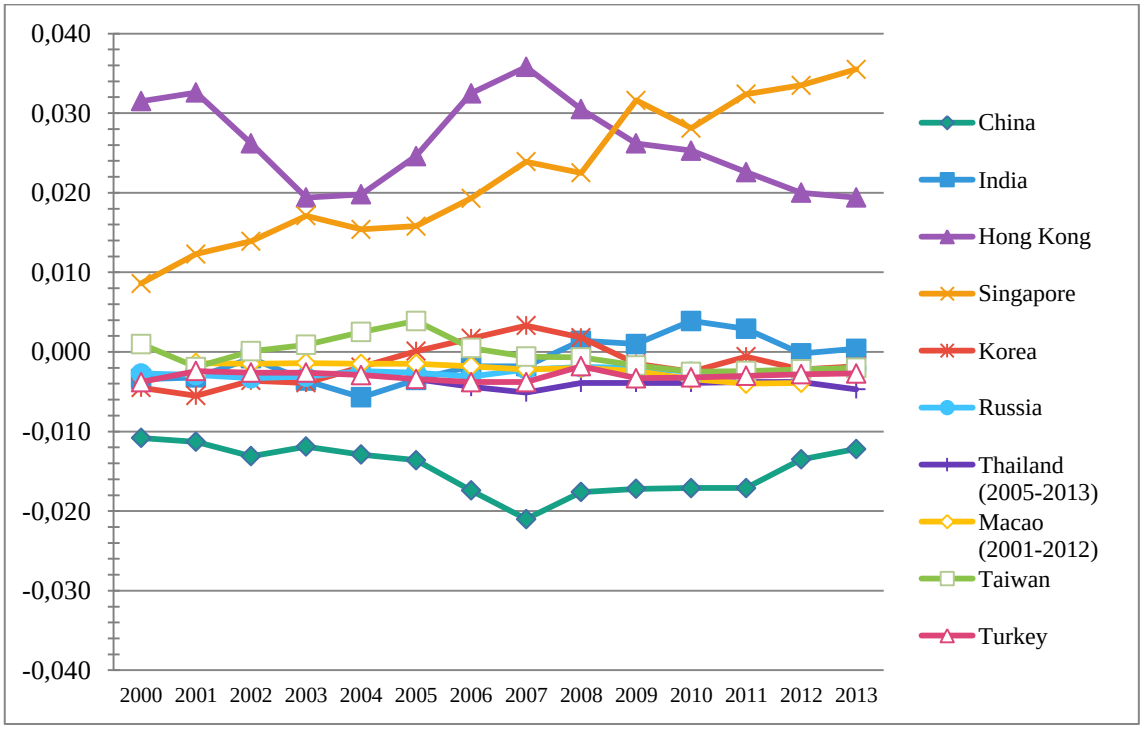
The other countries seem to be struggling with the exports of this category of services. In fact, apart from India and China (that were able to obtain a growing comparative advantage since 2008) all the other eight countries fail to achieve exports greater than their comparative-advantage-neutral point. Korea, Singapore and Hong Kong in particular have expanded their disadvantage comparing with the other analyzed economies which is reflected in the figure as a gap between these economies and the other ones that possess a comparative disadvantage.

4.5. The evolution of financial services

The definition of what is included in financial services is vague in the UNCTAD database because it simply states that financial services *"include financial intermediation and auxiliary services excluding those directly related to life insurance and pension funds (covered under insurance services)."* (UNCTAD, 2016). A similar definition is given by the United Nations (2010), although in the latter this definition is explored in depth clarifying that financial services are usually associated with banks and other financial institutions, but it also includes *inter alia* the associated costs of e-commerce transactions, letters of credit, credit card associated cost and asset management (United Nations, 2010).

Figure 8 reveals the evolution of the Normalized Revealed Comparative advantage index for the ten analyzed economies.

Figure 8: Evolution of the NRCA in Financial Services in selected economies, 2000-2013



Source: Own elaboration based on UNCTAD (2016)

Both Hong Kong and Singapore stand out from the rest of the economies since the beginning of the analysis (particularly Hong Kong, since it revealed a comparative advantage of 0.031 in 2000). Although starting with a smaller advantage than Hong Kong, Singapore growth is consistent throughout the period analyzed which means

Singapore expanded their exports of financial services at higher rates than the other economies. On the other hand, Hong Kong seems to be losing its comparative advantage: even being the country with the highest NRCA values between 2000 and 2008, reaching its peak in 2007 (0.035) Hong Kong presents an irregular path of evolution. Since 2007 the values decreased for Hong Kong, stabilizing in 2012 with a value close to 0.02. Hong Kong finishes the analyzed period with the second biggest comparative advantage in financial services (0.019).

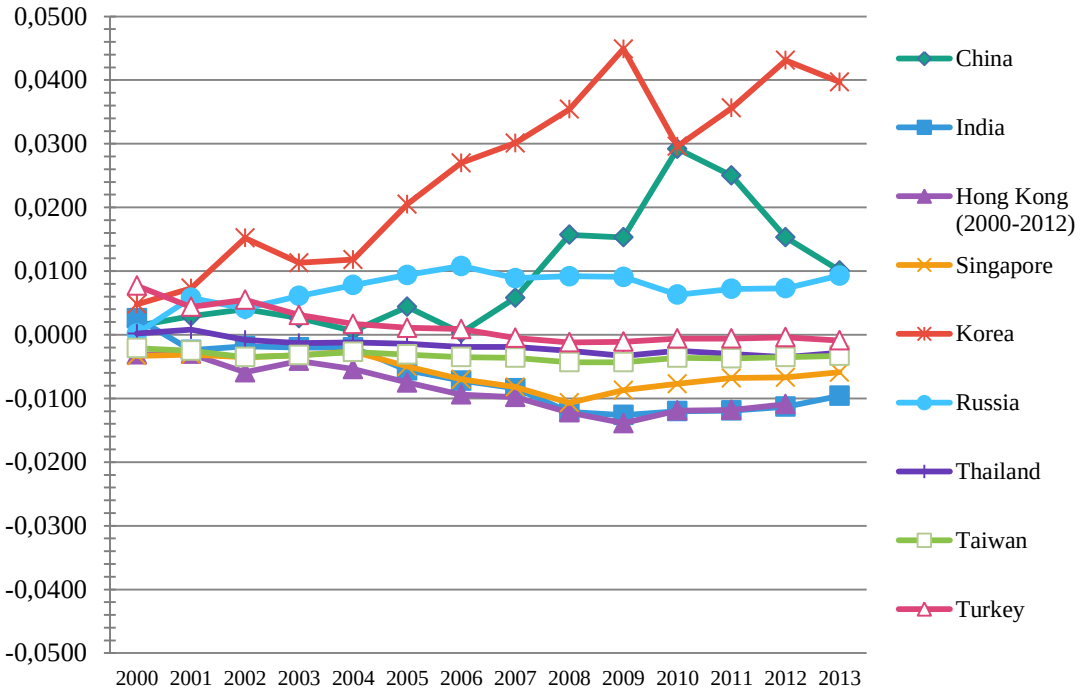
Another economy with a distinct evolution in its comparative advantage is China. Since 2000 China presents a comparative disadvantage (stronger than several other countries) which is extended to all the analyzed period, reaching its minimum value in 2007 (getting the value of -0.02) and then recovering. By the end of the analysis, China was still struggling with financial services exports, with a NRCA value of -0.012, slightly more disasvantgageous than in 2000.

The rest of the economies do not present any distinct aspect worth of mention since they all seem to have small values for the NRCA index throughout the period analyzed. Taiwan, Korea and India were capable of presenting a comparative advantage in a short period of time (2002-2006, 2005-2008, 2008-2011 respectively), but the growth was not consistent throughout the period.

4.6. The evolution of construction services

Construction services embodies a wide range of activities, including *"the creation, management, renovation, repair or extension of fixed assets in the form of buildings, land improvements of engineering nature and other constructions such as roads, bridges or dams."* (United Nations, 2010, p. 54). Within the four types of transaction for supplying services presented in Section 2.1.1, construction services fall within types 1, 3 or 4, since mode 2 implies the movement of the consumer to the firm's home country, which is unfeasible given the nature of the service and the definition presented. Figure 9 presents the evolution of the Comparative advantages in these services.

Figure 9: Evolution of the NRCA in Construction services in selected economies, 2000-2013



Note: Macau was note included because the country does not present exports for this service.

Source: Own elaboration based on UNCTAD (2016)

The first important conclusion to take is that only three economies (Korea, China and Russia) were able to sustain a comparative advantage in construction services throughout the period. Within these three countries Korea has a clear distinction at least since 2002. Korea is able to achieve the highest NRCA values for all years, except in 2000 in which Turkey was the leader for construction services. In 2009 Korea achieved the highest NRCA value for all the analyzed period (0.044) ending the period with a NRCA value of almost 0.04. China registered a positive evolution since 2006 growing its advantage until 2010 and decreasing its advantage since that year, achieving a NRCA value of 0.01 in 2013 similarly to the one registered by Russia. All the other economies presented a comparative disadvantage in almost every analyzed year. Singapore, India and Hong Kong presented a similar behavior since 2005 (enlarging their disadvantage from the other economies) but recovering closer by the end of the analysis. Given this results, it may be concluded that construction services are not the strongest category of service exports within the developing economies, since all of them present small values of comparative advantage in this service.

4.7. The evolution of other services categories

In the present section, five different services categories (Communications; Government services n.i.e; Insurance services; Royalties and License Fees; and Personal, Cultural and Recreational Services) are analyzed together because their relative export weigh is very small when compared with the services categories analyzed in the previous sections. As evidenced in section 3.1., together these categories represent less than 7% of the total service exports of the developing economies. The small weight of these services categories may be related to the state of development. For instance, developing countries are usually net importers of Royalties and License fees due to the state of development, which in order to keep progressing require some technology transfer granted by the developed world towards these economies (United Nations, 2015).

Given the small values accounted for these services, the normalized revealed comparative advantage values are also very small. Table A1 in the annex provides the NRCA values obtained for each of the economies in the examined period. Analyzing table A1, there are some important conclusions worth of mention. On communication services, only Russia and India registered positive values for the NRCA index. India has a small comparative advantage from 2000 to 2007, and Russia lost its comparative advantage in the 2003-2006 period but in the remaining years it presents a comparative advantage. In the case of government services all the economies finish the analyzed period with a comparative disadvantage and only one country (Korea) is able to hold a comparative advantage but only until 2008. Macao did not present any export values for this service category. Regarding insurance services, Singapore registered positive values throughout the analyzed period and Turkey presents a comparative advantage since 2006 until the end of the period. In the royalties and license fees category, four economies stand out: Korea, Singapore, Russia and Taiwan. These economies show that their knowledge transfer to the other economies is higher than their comparative-advantage-neutral situation. In this matter, Korea stands out as the economy that presents a sustained comparative advantage throughout the whole analyzed period. Finally, considering the personal, cultural and recreational services, Turkey sustains a comparative advantage throughout the whole period, however with decreasing values, meaning that their exports are not present such higher growth as it could be expected.

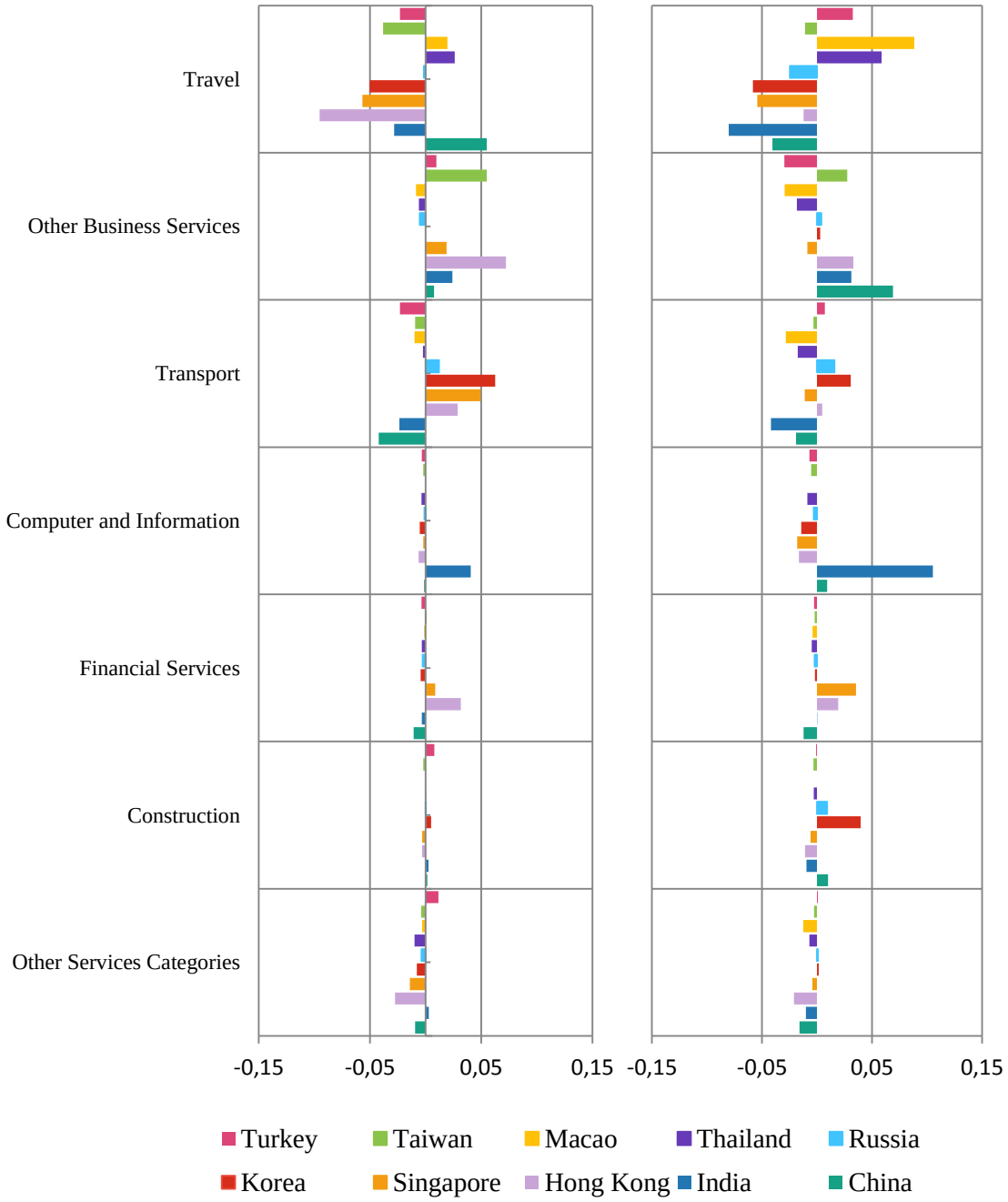
Russia and Korea also registered a small comparative advantage, although in a more reduced time period (since 2006 and 2009, respectively).

The small values registered (for all the economies) might be explained in part by the construction of the index, since the sum of all the calculated values for one year in one economy must be equal to zero. That means a country always present a balance between the comparative advantages and disadvantages it possess. Given that these services represent a small portion of services exports for every economy (as seen in figure 2) no economy will be presenting neither strong comparative advantages nor disadvantages.

4.8.Summing up the results

The present section summarizes the main findings concerning the evolution of comparative advantages in the different categories of services of the top 10 developing economies. Two distinct situations are presented in figure 10: the NRCA values in 2000 and 2013. The service categories are organized in decreasing order of exports values. It is expected that the services with greater exports are the ones with the higher NRCA values for the two years. Given that some countries do not present data for the two selected years, it was used the available data closest to 2000 or 2013, depending on the lack of data.

Figure 10: Comparing the NRCA values in the different service categories, 2000 and 2013



Source: Own elaboration based on UNCTAD (2016)

In 2000, some of the highest comparative advantage values were in other business services, transport and travel services. The latter two services were also the ones that present the strongest comparative disadvantages. Other important information retrieved in 2000 is that most countries presented a strong advantage in one category of services, and on the other services they present either a small comparative advantage or

disadvantage. The exception seems to be Hong Kong, which stood out with a high comparative advantage in three services: other business services, transport and financial. The consequence for this diversification is reflected in the highest comparative disadvantage by this country in travel services. Overviewing 2013, the existing comparative advantages seem more spread in the different service categories. For instance Singapore and Korea developed an interesting comparative advantage in Financial and Construction services, respectively. This progress came at the cost of decreasing the advantage in transport services which both possessed in 2000.

Focusing on each of the categories of services and comparing the situation in 2000 and 2013 it is possible to notice that in travel services China lost its advantage, presenting a comparative disadvantage in 2013. The reverse situation happened to Turkey, presenting a comparative advantage in 2013 in travel services. The other two countries that exhibited a comparative advantage in 2000 (Thailand and Macao) greatly improved their comparative advantage. Turkey also improved its position, registering a comparative advantage in 2013.

In the other business services, China took Hong Kong's place as being the economy with the highest comparative advantage in this service. India, Hong Kong and Taiwan follow behind although Taiwan decreased its NRCA value in this service category.

In transport services - as already mentioned - Singapore, Korea and Hong Kong were not able to hold the NRCA values possessed in 2000. Russia and Turkey improved their position, although the values achieved are still behind the ones registered by Singapore and Korea.

Regarding computer and information services, India is clearly an outlier in providing them to the rest of the world because it was the only economy with a positive NRCA value for this service in 2000 while the others present a small comparative disadvantage. This situation slightly changes in 2013, where India continues to be the strongest economy regarding computer and information services increasing its comparative advantage, and China achieved a small comparative advantage.

Comparing the situation of financial services, in 2013 Singapore took the place that belonged to Hong Kong in 2000 as the country with the highest comparative

advantage in this service. The other countries seem to remain in a similar situation when comparing the two years analyzed.

Concerning construction services, Korea was able to increase its comparative advantage and the same is registered for China and Russia (although in the latter cases in a smaller scale). The rest of the economies kept its disadvantages in Construction services.

Finally, in the other services categories, none of the economies stood out. In fact, little changes occurred, being the losses of Turkey's advantage in these services the most striking occurrence.

4.9. Incorporating the imports in the analysis

4.9.1. The trade balance index

This section intends to incorporate the imports of each service category in the analysis. Embodying information about the import structure of a country is important to comprehend if the comparative advantage is being correctly acknowledge and to conclude if a country present an export specialization in a given sector (Oelgemöller, 2013). To obtain such information the trade balance index (TBI) is used to understand if a country is a net importer or net exporter in each service category. The process of incorporating such information in the analysis follows Oelgemöller (2013)'s approach.

The trade Balance index is a trade index that offers information about trade in a specific commodity or service. Besides reflecting if a country is a net importer or a net exporter in that service, it is a symmetrical index where the critical value is zero (a similar feature to the NRCA index) and it is interpreted as a balance in the trade account of the considered service category because in this case the exports will be equal to the imports (X=M). The TBI is obtained by calculating the net exports (exports less the imports) and dividing by the total volume of trade (exports and imports) of the considered service (Oelgemöller, 2013) as express in the following equation:

$$TBI_i = \frac{(X_i - M_i)}{(X_i + M_i)} \qquad (4.1)$$

The index ranges between -1 and 1, being these the extreme situations where there is no value for the exports or the imports, respectively. Values close to -1 represent higher imports than exports and the otherwise is true for 1 (Oelgemöller, 2013).

Comparing the Trade Balance Index values with the Normalized Revealed Comparative Advantage values obtained in the previous sections, it is possible to obtain a map that follows the structure presented in table 7.

Table 7: Comparing the NRCA with the TBI

Normalized Revealed Comparative Advantage	NRCA>0	Area 2: Comparative advantage and net importer	Area1: Comparative advantage and net exporter
	NRCA<0	Area 3: Comparative disadvantage and net importer	Area 4: Comparative disadvantage and net exporter
Trade Balance Index		TBI<0	TBI>0

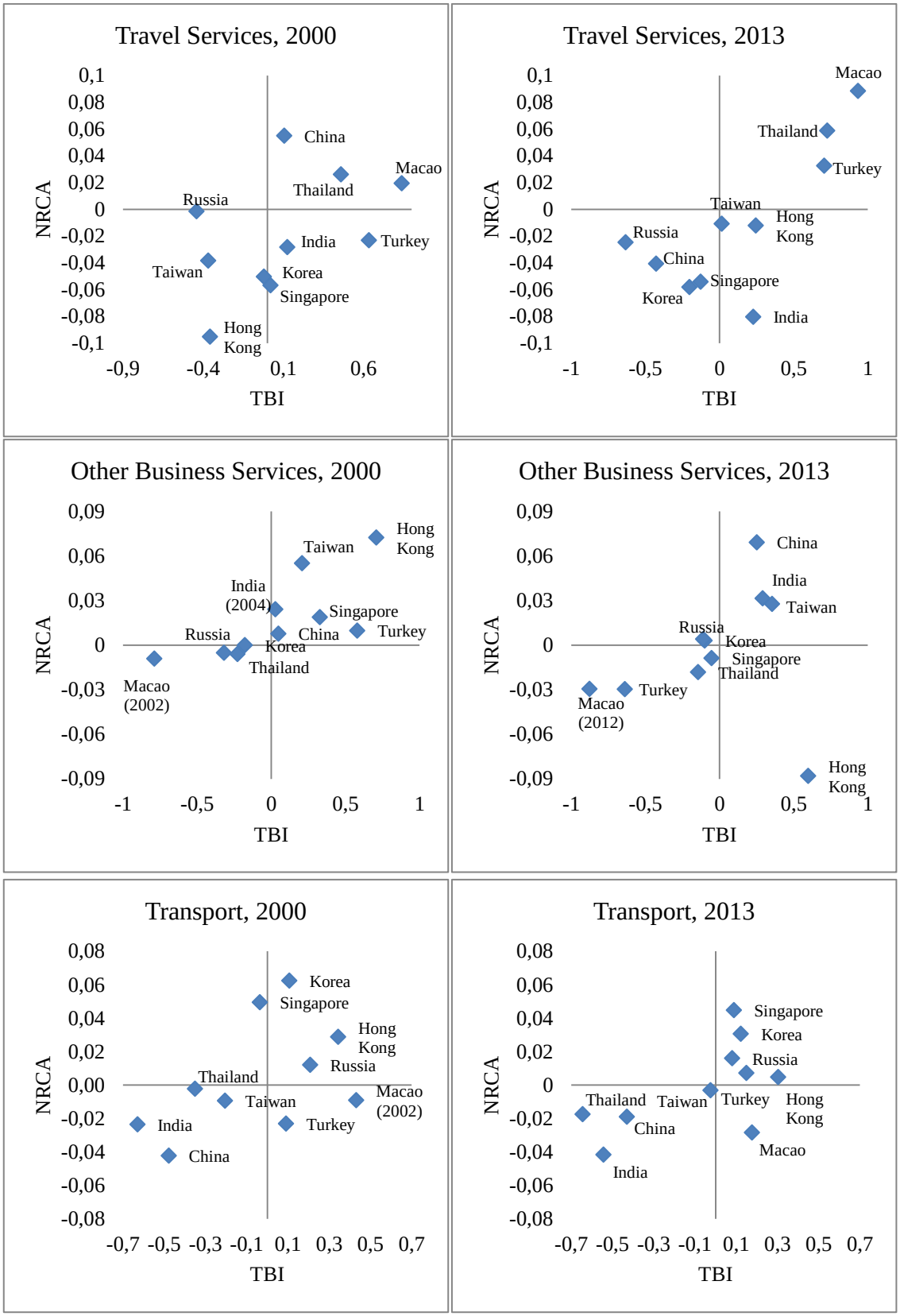
Source: Own elaboration based on Oelgemöller (2013)

There are 4 distinct areas (or quadrants). Area 1 and 3 are the most intuitive: in area 1 (3) a country present a comparative advantage (disadvantage) and it is a net exporter (importer) which are the expected situations when a country possesses a comparative advantage or disadvantage in a given service category (Oelgemöller, 2013). The other two quadrants are not so intuitive because they present either a comparative disadvantage combined with a trade surplus (Area 4), or a comparative advantage with a deficit in the trade balance (Area 2). According to Oelgemöller (2013) countries that are located in area 2 have the potential to improve their economic strength.

4.9.2. Analyzing the NRCA and the TBI

Using the values calculated for both the NRCA and the TBI and applying the table constructed in the previous section, data about the ten analyzed economies is presented in the following figures for each service category, for two different years: 2000 and 2013. Figure 11 and 12 present the figures for each service category. Every time a country does not present information about their exports regarding a certain service category, the closest available data is used in the figures, highlighting the year used instead.

Figure 11: Comparing the NRCA and the TBI for travel, other business services and transport services, 2000-2013



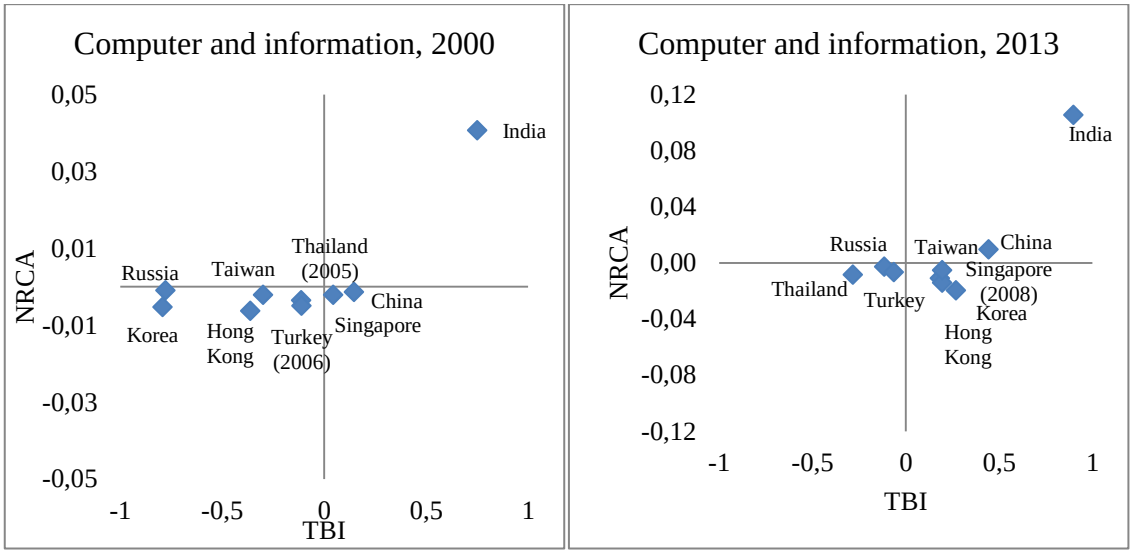
Source: Own elaboration based on UNCTAD (2016)

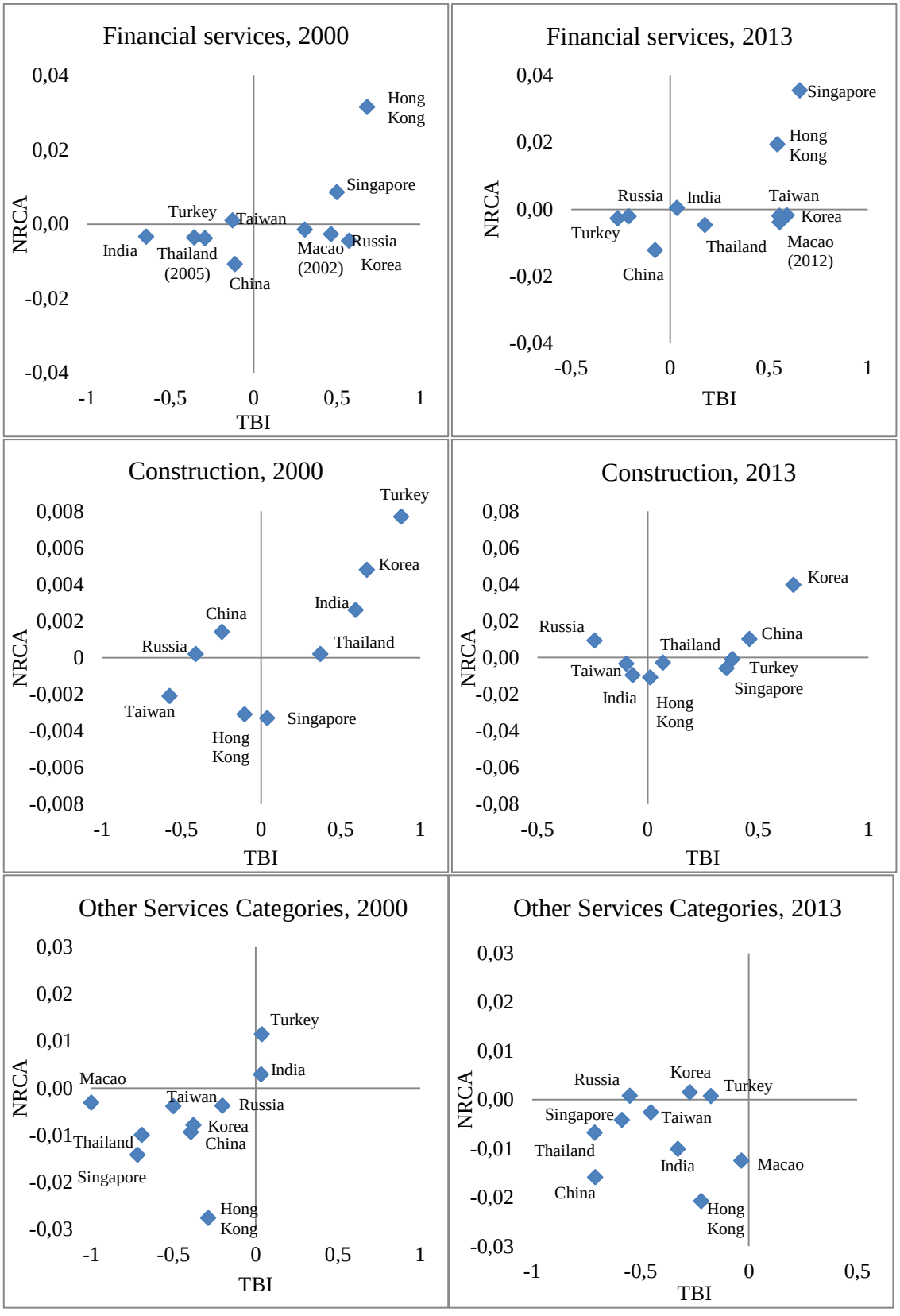
Concerning travel services, in 2000 countries with a comparative advantage (China, Thailand and Macao) are also the ones that present a surplus situation, meaning that there are no countries in area 2. In this way, these three countries present an export specialization regarding travel services. Considering the ones that present a comparative disadvantage three of them are net exporters (Turkey, India and Singapore) and the rest are on area 3 (net importers and comparative disadvantage). In 2013 the number of countries in each area remains, although one economy made a dramatic change. For instance, China lost both its advantage and its surplus in travel services, which is a dramatic change from its position in 2000. Sofield and Li (1998) claim that social tension is expected to occur between the pursuits of modernization by China and the application of strict socialist rules and traditions by the communist party. Combining the difficulties in balancing globalization, tradition and politics with the arising of other travel destinations (such as Thailand and Turkey) might explain this unusual behavior. Thailand and Macao improved their situation remaining specialized in export of travel services. Another feature the data shows is that among the countries with a comparative advantage in 2013, the higher the advantage, the higher the trade surplus. The same is not applicable to the countries in area 3.

Considering other business services in 2000, countries were exclusively either on area 1 or 3 i.e. countries have the anticipated behavior regarding trade in this service category. The ones with a comparative advantage (China, Singapore, Turkey, Taiwan, Hong Kong and India) are also net exporters and the otherwise is also true for the remaining four economies (Korea, Thailand, Russia and Macao). In 2013, only three countries remain with an export specialization (China, India and Taiwan). Both Russia and Korea acquired a small comparative advantage but that was not enough to create a surplus in other business services trade account. According to Oelgemöller (2013) it may be expected that in the near future both economies will proceed to area 1. Turkey and Singapore lost both the comparative advantage and the surplus they possess in the beginning of the century. Moreover, Hong Kong lost its comparative advantage but it was able to sustain their exports higher than the imports.

In 2000, countries positions regarding the trade balance index and the normalized revealed comparative advantage values in transport services seem acceptable: Korea, Hong Kong and Russia are positioned in area 1, while Thailand, Taiwan, India and China are in area 3. Therefore, the conclusion of the situation in these countries is the one expected: countries with a comparative advantage in transport services are net exporters while countries with a comparative disadvantage are net importers. The only exceptions are Singapore (Area 2), Turkey and Macao (Area 3). The situation was improved in 2013 given that only Macao presents a comparative disadvantage in transport services while being a net exporter. Both Turkey and Singapore moved to Area 1, meaning that Singapore corrected its small deficit in transport services trade (presenting a behavior predicted by Oelgemöller (2013)). Turkey transformed a comparative disadvantage in a comparative advantage, moving from area 4 in 2000 to area 1 in 2013. The remaining countries stayed in a similar position observed in 2000. China, India, Taiwan and Thailand remained in area 3, with negative values for both the trade balance Index and the NRCA.

Figure 12: Scatter chart for computer and information, financial, construction and other services categories, 2000-2013





Note: Macao does not present any information related to exports of computer and information services and to construction services.

Source: Own elaboration based on UNCTAD (2016)

Analyzing the relation between the Trade Balance Index and the Normalized Revealed Comparative Advantage Index in the computer and information service (Figure 12).

In 2000, an expected relation can be seen between them: India is the only country in area 1, while the remaining countries present a small comparative disadvantage. Singapore and China manage to present a positive trade balance, while the remaining six economies (Russia, Korea, Hong Kong Taiwan, Turkey and Thailand) failed to do the same, presenting a deficit in computer and information services. In 2013, the situation improves in most of the countries: Taiwan, Korea and Hong Kong position themselves in area 4, i.e., getting a positive situation in their computer and information trade account. Although Russia presents an even higher disadvantage, it was able to reduce its deficit in this account. India and China are the only economies present in area 1 and while India reinforces both its comparative advantage and its trade balance index, China is able to achieve a moderate comparative advantage while sustaining an even higher positive account.

Based on the data for 2000 and 2013, it is possible to say that the idea of Langhammer (2002) is confirmed: India success is an outlier in computer and information services. Even though his study uses data from 1998, the conclusion that India is an outlier remains true. Other authors (e.g. Mitra *et al.* (2013) and De (2013)) also confirm this idea on more recent years. Mitra *et al.* (2013) found several reasons that explain this advantage: trade reforms and market liberalization for service trade, the proficiency in English by several educated workers; suitable infrastructures for service trade and export (such as an extended internet penetration); a favorable tax treatment towards services; a favorable time-zone differential. The importance of a skilled human capital is an important endowment of the country, given that Sahoo and Dash (2014) found a relationship between this resource and the exports of computer and information services. Regarding China and its relation to India in this service, Wang (2013) addresses the idea that there is a gap between these countries, but this gap is narrowing. The reason for this is advanced by Chen and Whalley (2014) which states that China is adjusting its politics toward high-tech services in its 12th five-year plan. This plan includes changes in taxes, finance and land use, which will influence China strength in this service.

Regarding the financial services, in the beginning of the analysis five countries presented positive values for the TBI (Russia, Korea, Macao, Hong Kong and Singapore) although only the latter two combined that with a comparative advantage in this service category. Nevertheless, Russia, Korea and Macao presented a small comparative disadvantage similar to the disadvantage registered by India, Thailand and Turkey. These three countries presented a trade deficit as recorded by the negative balance index values for 2000. China was also present in area 3. Taiwan is in area 2 in an unexpected position by possessing a small comparative advantage but at the same time being a net importer. According to Oelgemöller (2013) it could be expected that the small comparative advantage possessed by Taiwan would make this country go to area 1 in 2013. However that was not the case and Taiwan's position is the most peculiar one, considering that it was in area 2 in 2000 and in 2013 it was in area 4 meaning that it improved from a trade deficit to a trade surplus, but at the same time it lost its small comparative advantage. In 2013, Singapore surpassed Hong Kong as being both the economy with the highest comparative advantage and the highest trade surplus. Langhammer (2002) idea that developing countries continue to export services which rely on unskilled labor (such as travel and transportation) starts to change, given that Singapore and Hong Kong were able to establish a sustained comparative advantage in Financial services. India also improves its situation in both criteria, being presented in area 1 as well. Russia, China and Turkey are now the economies with a comparative disadvantage and net importers of financial Services, while Thailand, Taiwan and Korea are net exporters.

Construction services were one of the services categories where most of the countries present a comparative advantage: in 2000, six of the analyzed countries presented a comparative advantage and only two of those were net importers (China and Russia). Another interesting feature of trade in construction services is that among the countries present in area 1 (Thailand, India, Korea and Turkey), the higher the comparative advantage, the higher the TBI values are. Regarding the countries with a comparative disadvantage (Singapore, Hong Kong and Taiwan) the latter two were net importers of construction services in 2000. In 2013, the situation for construction services seems less positive: only three economies present a comparative advantage - Korea, China and Russia. Russia maintained its net importer position while China

became a net exporter (revealing the expected behavior proposed by Oelgemöller (2013)). The remaining economies presented a comparative disadvantage but most sustained a net exporter position. Taiwan and India are now the economies in area 3, meaning that associated with a comparative disadvantage came a deficit in the construction services account.

Finally, the last service category to be analyzed is other services categories. Most of the countries presented both a comparative disadvantage and a trade deficit regarding such services. Only Turkey and India showed positive values for both indexes in 2000. In 2013 all the analyzed countries were net importers of these services and three of them presented small comparative advantage (Russia, Korea and Turkey). Given this position in area 2, it could be expected that these countries would have an export specialization in Other Services categories (i.e. in the future they would be in area 1). However this does not seem to be the case of Turkey, because it was in area 1 in 2000, and Russia deteriorated even further its trade balance.

Since the values were extremely small, it can be assumed these countries were almost in their comparative advantage neutral situation regarding other business services. The remaining countries were simultaneously net importers and comparative disadvantaged of these services.

5. Conclusion

International trade of services has been the most dynamic branch of international trade in the latest years, growing at higher rates than merchandise trade at least since the 1990's (De, 2013). In fact, the technological revolution, service and knowledge-based economies, trade reforms and agreements are some of the changes occurred that provided a possibility for enlarging trade in service between economies. In this scenario, developing economies are the ones with the highest growing rates and consequently the ones where the services sector will increase as a percentage the exports (Hoekman & Mattoo, 2008). In this way, the overall aim of this work was to analyze the evolution in the services sector of the ten largest developing economies in terms of services exports, by analyzing their comparative advantages in several categories of services.

The simplest definition of comparative advantage stated that countries are more efficient at producing certain commodities, hence producing at lower prices, specializing its production and exporting the commodities to the other countries (Deardorff, 2005). A second approach highlights the importance of considering the relative abundant factor of production (labor or capital), implying that a country will specialize its production in a product that intensively uses the relative abundant factor (Fisher, 2011a). Finally, a more recent idea is presented, showing that the institutions (like the political and legal systems) may play a role in explaining how trade occurs between countries and which commodity or service will be provided by which country (Belloc, 2006).

The literature research conducted showed that there are several indexes used to measure the comparative advantages. Although the most widely used index in both academic and institutional contexts is the Balassa index (Laursen, 2015), the present work resorted to the normalized revealed comparative advantage (NRCA) index because according to Yu *et al.* (2009) it is the appropriate index to compare different years and countries simultaneously.

The scope of the present study is defined in the following way. First, a set of countries was defined - ten developing economies according to their importance in the developing countries exports of services – and then it was established a time period from 2000 to 2013 (14 years). Regarding the number of services categories analysed, it

was applied the IMF service typology, which identifies 11 service categories. Results indicate that travel, other business services, transport and computer and information are the most representative services of the selected developing countries exports.

Analyzing each service category, it was found that Macao, Thailand and Turkey present a comparative advantage in travel services. China is the strongest economy in other business services. Singapore presents a comparative advantage in both financial and transport services and Korea in construction services. Hong Kong and Taiwan reveal a small comparative advantage in financial and other business services respectively and Russia does not stand out in any service category. India presents a large comparative advantage in computer and information services a result in line with Langhammer (2002), with China improving its position, as a result of the government policies oriented towards high-tech services.

Some countries showed significant changes from the beginning to the end of the analysis. For instance, China possessed the highest comparative advantage in travel services in 2000 and in 2013 China presented a comparative disadvantage for the same service category. A similar situation was perceived for Hong Kong in other business services because the country was the strongest international competitor among the analyzed economies in this service category in 2000 but in 2013 the country presented a comparative disadvantage.

Finally, considering the importance of the imports to fully understand the trade dynamics from the selected economies, it was followed an approach used by Oelgemöller (2013) to infer the export specialization of a country: using the Trade Balance Index (TBI) and plotting it together with the NRCA index some regularities were found, allowing to conclude that overall countries with a comparative advantage in a service category tend to be net exporters of that service, therefore the countries present an export specialization in those service categories.

The fact that some developing economies present some problems with the data (such as being not available or not published, or even not discriminated) comes as a limitation to identify the comparative advantages and their evolution. Another limitation of the present study derives from the fact that there are few studies in the literature concerning this topic. Although in the latest years several studies started to emerge (Seyoum (2007), Wu and Lin (2008), Hiziroglu *et al.* (2012) and Nath *et al.* (2015)), the

literature regarding the comparative advantage in the services sector of the developing economies remains scarce.

Even though limitations exist, the present work was able to achieve its main purpose of analyzing the comparative advantages in the services sector of the developing economies in terms their exports. To carry further the analysis, it could be made specific studies to find the reasons that justify the specific comparative advantages of the developing economies. Although some reasons are presented (such as the case of India and its comparative advantage in computer and information services) it would be interesting to find out why China lost its comparative advantage in travel services, or what is the reason for Hong Kong has lost its comparative advantage in other business services. Other recommendation regarding the study of developing economies is the importance of the availability of the data. Before carrying a study regarding these economies, it is vital to verify if the data for the specific study is available. Once this step is made, the study of the developing economies can be made and our knowledge about the fastest growing economies of the world will be deepened.

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Annex

Table A1: NRCA values for the other service categories for the selected developing economies, 2000 to 2013

Service Category	Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Communication Services	China	0,0046	-0,0072	-0,0054	-0,0058	-0,0088	-0,0083	-0,0090	-0,0085	-0,0085	-0,0104	-0,0087	-0,0064	-0,0060	-0,0066
	India	0,0011	0,0065	0,0024	0,0026	0,0001	0,0014	0,0014	0,0002	-0,0015	-0,0031	-0,0040	-0,0042	-0,0038	-0,0023
	Hong Kong	-0,0091	-0,0070	-0,0052	-0,0048	-0,0048	-0,0040	-0,0058	-0,0057	-0,0057	-0,0064	-0,0041	-0,0031	-0,0023	
	Singapore	-0,0046	-0,0045	-0,0047	-0,0056	-0,0060	-0,0051	-0,0054	-0,0054	-0,0052					
	Korea	-0,0060	-0,0049	-0,0046	-0,0055	-0,0056	-0,0049	-0,0046	-0,0057	-0,0061	-0,0057	-0,0041	-0,0038	-0,0054	-0,0036
	Russia	0,0010	0,0012	0,0011	-0,0001	-0,0008	0,0001	-0,0002	0,0009	0,0004	0,0003	0,0010	0,0007	0,0009	0,0010
	Thailand	-0,0031	-0,0028	-0,0029	-0,0025	-0,0023	-0,0015	-0,0022	-0,0023	-0,0017	-0,0019	-0,0012	-0,0012	-0,0016	-0,0018
	Macao			-0,0009	-0,0010	-0,0012	-0,0010	-0,0012	-0,0012	-0,0014	-0,0019	-0,0019	-0,0024	-0,0024	-0,0027
	Taiwan	-0,0033	-0,0032	-0,0031	-0,0027	-0,0027	-0,0020	-0,0027	-0,0024	-0,0023	-0,0024	-0,0019	-0,0017	-0,0014	-0,0015
	Turkey	-0,0066	-0,0049	-0,0038	-0,0025	-0,0022	-0,0018	-0,0015	-0,0010	-0,0009	-0,0016	-0,0011	-0,0011	-0,0012	-0,0015
Government Services n.i.e.	China	-0,0049	-0,0048	-0,0072	-0,0091	-0,0082	-0,0083	-0,0079	-0,0079	-0,0080	-0,0068	-0,0076	-0,0082	-0,0070	-0,0061
	India	0,0027	0,0009	-0,0018	-0,0039	-0,0040	-0,0060	-0,0068	-0,0059	-0,0061	-0,0059	-0,0062	-0,0064	-0,0061	-0,0056
	Hong Kong	-0,0098	-0,0107	-0,0115	-0,0117	-0,0088	-0,0092	-0,0082	-0,0068	-0,0062	-0,0067	-0,0068	-0,0068	-0,0062	
	Singapore	-0,0062	-0,0067	-0,0070	-0,0086	-0,0069	-0,0073	-0,0068	-0,0062	-0,0061	-0,0052	-0,0055	-0,0056	-0,0051	-0,0047
	Korea	0,0002	0,0017	0,0020	0,0013	0,0021	0,0009	0,0009	0,0006	-0,0021	-0,0016	-0,0024	-0,0021	-0,0023	-0,0019
	Russia		-0,0008	-0,0021	-0,0030	-0,0026	-0,0024	-0,0025	-0,0020	-0,0015	-0,0017	-0,0013	-0,0012	-0,0006	-0,0003
	Thailand	-0,0027	-0,0027	-0,0033	-0,0032	-0,0024	-0,0021	-0,0019	-0,0015	-0,0012	-0,0014	-0,0015	-0,0016	-0,0016	-0,0016
	Macao														
	Taiwan	-0,0039	-0,0042	-0,0045	-0,0049	-0,0026	-0,0024	-0,0014	-0,0016	-0,0016	-0,0011	-0,0019	-0,0019	-0,0017	-0,0016
	Turkey	-0,0026	-0,0030	-0,0032	-0,0038	-0,0021	-0,0023	-0,0014	-0,0008	-0,0010	-0,0011	-0,0008	-0,0009	-0,0002	-0,0001
Insurance services	China	-0,0049	-0,0038	-0,0042	-0,0036	-0,0040	-0,0037	-0,0039	-0,0039	-0,0022	-0,0015	-0,0022	0,0012	0,0015	0,0023
	India	-0,0006	-0,0002	0,0002	0,0002	0,0019	0,0007	0,0005	0,0008	0,0003	0,0004	0,0002	0,0016	0,0004	-0,0005
	Hong Kong	-0,0033	-0,0028	-0,0027	-0,0031	-0,0028	-0,0035	-0,0032	-0,0033	-0,0025	-0,0027	-0,0023	-0,0026	-0,0024	-0,0025
	Singapore	0,0003	0,0017	0,0030	0,0053	0,0041	0,0025	0,0024	0,0010	0,0017	0,0058	0,0071	0,0039	0,0042	0,0055

	Korea	-0,0056	-0,0050	-0,0045	-0,0046	-0,0036	-0,0036	-0,0028	-0,0028	-0,0027	-0,0031	-0,0026	-0,0026	-0,0031	-0,0028
	Russia	-0,0016	-0,0014	-0,0011	-0,0010	-0,0004	-0,0004	-0,0004	-0,0009	-0,0002	-0,0011	-0,0008	-0,0014	-0,0012	-0,0011
	Thailand	-0,0019	-0,0015	-0,0015	-0,0011	-0,0010	-0,0018	-0,0018	-0,0017	-0,0013	-0,0015	-0,0015	-0,0013	-0,0009	-0,0017
	Macao			-0,0006	-0,0006	-0,0007	-0,0007	-0,0007	-0,0008	-0,0008	-0,0011	-0,0013	-0,0016	-0,0016	
	Taiwan	0,0025	0,0006	0,0021	0,0007	0,0000	-0,0002	0,0005	-0,0004	-0,0005	-0,0001	-0,0005	-0,0005	-0,0003	-0,0006
	Turkey	-0,0037	-0,0027	-0,0019	-0,0007	-0,0005	-0,0007	0,0007	0,0008	0,0009	0,0005	0,0006	0,0007	0,0009	0,0008
Royalties and License Fees	China	-0,0012	-0,0015	-0,0014	-0,0022	-0,0024	-0,0026	-0,0021	-0,0018	-0,0016	-0,0023	-0,0010	-0,0021	-0,0013	-0,0026
	India	-0,0003	-0,0010	-0,0011	-0,0014	-0,0020	-0,0013	-0,0021	-0,0016	-0,0021	-0,0021	-0,0023	-0,0025	-0,0023	-0,0025
	Hong Kong	-0,0016	-0,0012	-0,0008	-0,0002	-0,0019	-0,0016	-0,0012	-0,0007	-0,0009	-0,0011	-0,0011	-0,0015	-0,0013	
	Singapore	-0,0010	0,0010	0,0014	0,0006	0,0020	0,0027	0,0027	0,0028	0,0024	0,0010	0,0010	0,0021	0,0029	0,0023
	Korea	0,0052	0,0075	0,0062	0,0090	0,0101	0,0089	0,0084	0,0052	0,0062	0,0104	0,0084	0,0104	0,0079	0,0079
	Russia	0,0003	-0,0003	0,0005	0,0004	0,0003	0,0004	0,0004	0,0006	0,0004	0,0002	0,0002	0,0003	0,0005	0,0003
	Thailand	-0,0009	-0,0009	-0,0010	-0,0010	-0,0011	-0,0008	-0,0006	-0,0006	-0,0004	-0,0004	-0,0003	-0,0005	-0,0004	-0,0008
	Macao														
	Taiwan	0,0026	0,0020	0,0010	0,0003	0,0004	0,0002	0,0002	0,0000	-0,0002	0,0000	0,0006	0,0013	0,0015	0,0014
	Turkey	-0,0014	-0,0013	-0,0010	-0,0012	-0,0014	-0,0013	-0,0009	-0,0008	-0,0009	-0,0011	-0,0009	-0,0010	-0,0009	-0,0011
Personal, Cultural and Recreational Services	China	-0,0030	-0,0019	-0,0041	-0,0035	-0,0038	-0,0027	-0,0025	-0,0018	-0,0017	-0,0024	-0,0023	-0,0023	-0,0025	-0,0029
	India					-0,0021	-0,0018	-0,0009	-0,0001	0,0001	-0,0003	-0,0009	-0,0011	-0,0001	0,0008
	Hong Kong	-0,0037	-0,0016	-0,0038	-0,0025	-0,0015	-0,0014	-0,0011	-0,0010	-0,0011	-0,0003	-0,0004	-0,0004	-0,0006	
	Singapore	-0,0028	-0,0015	-0,0022	-0,0017	-0,0018	-0,0016	-0,0013	-0,0012	-0,0015	0,0001	0,0001	-0,0002	-0,0007	-0,0009
	Korea	-0,0018	-0,0005	-0,0016	-0,0021	-0,0019	-0,0008	-0,0001	0,0000	-0,0001	0,0005	0,0006	0,0013	0,0017	0,0020
	Russia		0,0002	-0,0009	-0,0002	-0,0002	-0,0001	0,0001	0,0002	0,0003	0,0005	0,0008	0,0006	0,0006	0,0009
	Thailand						-0,0006	-0,0005	-0,0004	-0,0003	-0,0003	-0,0002	-0,0004	-0,0005	-0,0007
	Macao														
	Taiwan	-0,0018	-0,0009	-0,0019	-0,0015	-0,0013	-0,0009	-0,0006	-0,0006	-0,0005	-0,0003	-0,0004	-0,0003	-0,0003	-0,0003
	Turkey	0,0257	0,0104	0,0118	0,0053	0,0083	0,0050	0,0041	0,0032	0,0035	0,0023	0,0024	0,0031	0,0027	0,0026

Source: Own elaboration based on UNCTAD (2016)