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China's One Belt and One Road Initiative and its potential for the tourism industries in Africa, Asia and Europe: a gravity model approach

Master thesis

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Abstract

In 2013, China presented the idea of the infrastructure project One Belt One Road. The thesis aims to analyse the potential effects of the initiative, and how its attempt to improve transport infrastructure will impact EU-tourist flows to participating countries. A closer look to the effects on the tourism industry is justified because of the importance of the touristic sector for the global economy. For instance, the direct contribution of the touristic sector accounted for 2.3 trillion USD worldwide in 2016. A gravity model approach is used in the following paper to examine the significance of road, railway, air service as well as port infrastructure for tourists from the European Union. Afterwards, an OBOR simulation is carried out that forecasts a potential change for EU-tourist inflows. The results go in line with previous gravity model studies regarding the positive relationship of the GDP and the inverse influence of the distance on tourism flows. Furthermore, the findings suggest a significant impact of well-developed road, railway and air service networks. However, the quality of ports did not meet the expectations and is somewhat contra productive for the decision making of EU tourists. The simulation for the improvement of transport infrastructure implies that countries with an under-developed availability and quality concerning the modes of transport are expected to have the highest potential change of EU-tourist inflows.

Keywords

Gravity Model, One Belt One Road, Tourism Potential, Transport Infrastructure, China

Range of thesis: 92 293 characters

Declaration of Authorship

1. The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

2. The author hereby declares that all the sources and literature used have been properly cited.

3. The author hereby declares that the thesis has not been used to obtain a different or the same degree.

Prague, 04/01/2019 **Patrick Jannaschk-Schmitz**

Master Thesis Proposal

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Proposed Topic:

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Topic characteristics / Research Question(s):
Announced in September 2013, the Belt and Road initiative by China has the goal to develop and improve the infrastructure on both the land way and maritime way. The expected reduction of transportation costs on the Maritime Silk Road and the Silk Road Economic Belt resulting from the project have the potential to be beneficial for international tourism flows. Developed tourism industries are profitable for economies. Besides the social development, through cultural exchange, economic growth is dependent on tourism because the touristic sector can boost GDP and create jobs. In 2016, 109 million people worked worldwide in travel and tourism-related jobs and the direct contribution to the worlds GDP was 2.3 trillion Dollars. In particular, this master thesis attempts to analyse the effects of the Belt and Road initiative on the tourism outflow from the EU-members to the participating countries in Africa, Asia and Europe. The improvement of the transport infrastructure might increase tourist flows from the EU-countries, because of expected less travel time and more convenience for travelling. However, it is assumed that the EU- tourism outflow differs between the various regions in the world. Therefore, the thesis examines the potential for tourism flows to Africa, Asia and Europe.

Working hypotheses:
1. The higher the GDP of the EU-member, the more tourist inflows can be expected in the destination countries.
2. A well-developed infrastructure of roads, railways, air services and ports has a positive impact on tourism inflows originating from EU-countries.
3. The One Belt and One Road initiative will have a positive effect on potential EU-tourist inflows for the participating members in the future.

Methodology:
To analyse the tourism outflows between the EU-countries and the destination countries in Africa, Asia and Europe it is necessary to use an appropriate statistical tool. Therefore, I will use the gravity model of trade since it is one of the most applied models to international trade flow issues. Tourism can be regarded as a trade of services, that depicts the flow of people from one region to another one. It has been proven that the gravity model of international trade is useful for the analysis of tourism flows. The Belt and Road initiative aims to improve the transport infrastructure in participating countries and thus, reduces the transportation costs. Therefore, the thesis attempts to simulate an improvement of transport infrastructure and compares the tourism flow effects between Belt and Road members and the other countries. The master thesis will follow the standard version of the micro founded gravity model and will be estimated by PPML regression. Afterwards, tourism potentials will be calculated on the base of the PPML estimates.

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    - 4.2 Results for PPML estimator
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List of Abbreviations

AIIB	Asian Infrastructure Investment Bank
ASEAN	Association of Southeast Asian Nations
BRICS	Brazil, Russia, India, China, South Africa
CEPII	Centre d'Études Prospectives et d'Informations Internationales
CPEC	China Pakistan Economic Corridor
DGBAS	Directorate-General of Budget, Accounting and Statistics
EEC	Eurasian Economic Union
ECTY	EU-China Tourist Year
e.g.	Exempli gratia
et al.	Et alii
EU	European Union
GDP	Gross Domestic Product
HKTDC	Hong Kong Trade & Development Council
i.e.	Id est
MDB	Multilateral Development Bank
MRT	Multilateral Resistance Terms
OBOR	One Belt One Road
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
OSCE	Organisation for Security and Co-operation in Europe
PPML	Poisson Pseudo-Maximum-Likelihood
SCO	Shanghai Cooperation Organization
TEN-T	Trans-European Transport Network
TSLS	Two-stage Least Squares
UNWTO	World Tourism Organization
U.S.	United States
USD	United States Dollar
WWTC	World Travel & Tourism Council

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1. Introduction

The One Belt One Road initiative (OBOR) introduced by Chinese President Xi Jinping late 2013 is one of the most comprehensive plans for improvement of infrastructure in this century. An essential pillar of the new Silk Road, how the initiative is known as well, is to support transport infrastructure projects in over 70 participating countries. There have been several studies regarding the effects of OBOR on the international trade of goods (Herrero & Xu, 2016; Lu et al., 2018). Although their findings regarding the consequences of the promotion of transport infrastructure are promising, there has not been an attempt to look into the international trade of services and its potentials due to OBOR.

This Master thesis attempts to analyse one side effect of the OBOR to a specific type of trade of services, namely tourism flows. In particular, it will be analysed how OBOR, and its attempt to improve infrastructure, will impact EU-tourist flows to participating countries. Furthermore, it is interesting to look at the potentials for the tourism industries in the OBOR countries and how they benefit from better land, air, and sea transport networks. There are many reasons for having a closer look at the effects on the touristic sector. Besides the social development, through cultural exchange, also economic growth is dependent on tourism because the tourist market can boost GDP and create jobs. In 2016, 109 million people worldwide worked in travel and tourism-related jobs and the direct contribution to the worlds GDP was 2.3 trillion USD (WTTC, 2017). China's initiative might have the strength due to the promotion of transport infrastructure projects to decrease the travel costs and therefore, to increase tourism flows.

Firstly, the article will present the historical background and the financial pillars of the new Silk Road plan to get an idea of how the initiative works. Afterwards, throughout the second part of the literature review, a comprehensive overview follows, in which the current state of the tourism industries, as well as OBOR projects in the regions, is presented. Furthermore, since this thesis is examining the tourism inflows to the participating countries that are originating from the European Union (EU) members, the unique role of EU tourism-outflows will be described. To figure out the consequences of the better transport infrastructure for the tourism industry, an appropriate economic model is necessary. Therefore, this thesis will use a micro-founded gravity model of trade, which will be explained. Also, previous applications of the gravity model on tourism flows are stated.

Secondly, the methodology and the data to analyse the research question and the hypotheses will be introduced. Recent gravity model applications use a Poisson pseudo-maximum-likelihood estimator (PPML) for the calculation. It has several advantages regarding the specific econometric character of gravity models and is, therefore, the right tool for the analysis of tourism flows. The thesis attempts to gain knowledge about the possible effects that result from the OBOR. That is why the approach to calculate tourism potentials, which arise through China's initiative, will be explained as well.

Thirdly, based on the outcome of the PPML estimator as well as the tourism potential analysis, the results are presented. The study finds that an improvement of transport infrastructure has a positive effect on tourism flows from the EU. In detail, good quality and availability of roads, railways and air services lead to more tourism inflows. Subsequently, the OBOR initiative by China might be an excellent opportunity for countries to promote their tourism industries.

2. Literature review

To have a foundation, on which the following analysis can be built on, a comprehensive literature review is necessary. Therefore, firstly, the OBOR initiative will be explained briefly; secondly, current planned or realised OBOR projects will be presented and the status quo of the tourism sectors displayed. Thirdly, the vital role of the EU regarding their tourist “exports” will be shown. Moreover, the idea of the gravity model and its application on tourism flows is described. This chapter is the base for the hypotheses this study attempts to test.

2.1 One Belt and One Road: China’s initiative for the 21st century

This subchapter will clarify the routes of Chinas infrastructure plan with its ideas rooted back to the ancient Silk Road. Also, the necessary financial resources to support the large projects are going to be expounded upon.

2.1.1 Historical background

There have been two significant milestones for the OBOR initiative. At first, there was the 7th of September 2013, when the president of China, Xi Jinping, held a speech at Kazakhstan's Nazarbayev University. The topic of his speech was how to 'Promote People-to-People Friendship and create a better future.' According to a press release of the Ministry of Foreign Affairs of the People's Republic of China (2013), the president emphasised the friendly ties between both countries, China and Kazakhstan, and to the other Central Asian countries. This connection goes back 2100 years to the time of China's Western Han Dynasty when the Eurasian area has been connected through the ancient intercontinental Silk Road. To strengthen this historical connection, Xi Jinping proposed to create a Silk Road Economic Belt for the promotion of

cooperation in the region. With this attempt, China wants to achieve a better economic exchange network, an improvement in road infrastructure, increasing trade activities and money circulation, and more opportunities for cultural exchanges between the countries in the region.

The second important milestone followed just one month later. Since China wanted to extend the plans of an intercontinental connection, Xi Jinping announced during a speech at the Indonesian parliament that he wants to create a Maritime Silk Road as well. It was meant to further promote the connectivity of the Association of Southeast Asian nations on the maritime way (Ploberger, 2017).

According to Yu (2017a), these two announcements of Chinese president attempt to rebuild a historical trade route, that lost its previous importance in the 1600s after several immense frequently used centuries. To set the framework of the new land and maritime Silk Road, with an authorization of the State Council, the National Development and Reform Commission, Ministry of Commerce, and Ministry of Foreign Affairs of the People's Republic of China developed the blueprint ‘Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road’ (Ministry of Foreign Affairs of the People’s Republic of China, 2015). The ‘Belt and Road Forum’ 2017 in Beijing reiterated the fundamental ideas and framework in the paper published in 2015 (Tiezzi, 2017).

It depicts that the area of the OBOR initiative would not just include countries in Asia, as mentioned in the announcements 2013. Furthermore, it will stretch over the three continents of Africa, Europe, and Asia and would connect six economic corridors from the Eurasian Landbridge over the China-Mongolia-Russia, the China-Central Asia-West Asia, and the China-Indochina Peninsula economic corridors as well as the China-Pakistan and the Bangladesh-China-India-Myanmar Economic Corridor.

According to the paper, the goals of China are to enhance policy coordination and facility connectivity, to promote obstacle free trade as well as financial integration and cultural exchanges through people-to-people bonds. One application of those goals is the ‘Belt and Road Sports Tourism Development Action Plan 2017-2020’, which should promote sports tourism inside of China and around the new Silk Road with the goal, what shows that the initiative will lead to an improvement of the tourism industry along the participating countries (HKTDC, 2017a).

In the framework of 2013, the Ministry of Foreign Affairs of the People's Republic of China (2015) depicted that the Silk Road Economic Belt is meant to connect mainly

- China, Central Asia as well as Russia and Europe, in particular, the Baltic;
- the Mediterranean Sea and the Persian Gulf with China,
- as well as China with Southeast Asia, South Asia, and the Indian Ocean.

Also, the 21st-century Maritime Silk Road should link Chinas Coast through the South China Sea

- and the Indian Ocean with Europe;
- to the South Pacific (Ministry of Foreign Affairs of the People’s Republic of China, 2015).

Nevertheless, China has tried to expand their initiative and invited countries from Latin America to join OBOR as well (Cambero & Sherwood, 2018). The affected countries count for at least 65% of the global population as well as a minimum of 30% of the worlds GDP (Herrero & Xu, 2016). According to the Hong Kong Trade Development Council, there are more than 80 countries, including China, involved in the initiative, but the OBOR is not limited to those nations (HKTDC, 2018). Instead, it

can be seen as an open economic and infrastructural development plan backed with the necessary financial pillars.

2.1.2 The five financial components of OBOR

The mentioned broad goals of the New Silk road program require an enormous investment foundation and therefore, the OBOR relies mostly on five different commercial sources (Aris, 2016).

Firstly, when visiting Indonesia in October 2013, Xi Jinping announced the idea of building an additional development institution, the Asian Infrastructure Investment Bank (AIIB), to foster the efforts of improvement of infrastructure in Asia (Callaghan & Hubbard, 2016). The U.S. criticised this attempt of creating an alternative to the existing development banking system. They feared that the AIIB would not introduce the current anti-corruption and environmental guidelines like the established development promoting institutions (Feigenbaum, 2017). Nevertheless, the AIIB launched in 2015 with 57 founding members, including West-European countries, even though the U.S. tried to diminish its leverage (Weiss, 2017). That the AIIB was not exclusively founded for financing OBOR projects was stated by the president of the bank, Jin Liqun. Also, the lately developed multilateral development bank (MDB) wants to support other infrastructure initiatives, outside of the new Silk Road, as well (Nan & Xiao, 2016).

Secondly, the Silk Road Fund, with a total capital of 40 billion USD was founded in late 2014, aiming to support infrastructure projects as well as to promote economic and trade cooperation along the Silk Road Economic Belt and the 21st-century Maritime Silk Road (Dodillet, 2015). The fund is mainly financed through Chinese public institutions, like the State Administration of Foreign Affairs, the China

Development Bank and the China Investment Corporation as well as the Export-Import Bank of China (Silk Road Fund, 2015; Aris 2016).

Thirdly, state-owned banks directly support the initiative. The Export-Import Bank of China, the China Development Bank as well as the China Agriculture Development will be the most prominent investors in the plan of OBOR.

The fourth source is the BRICS New Development Bank with a capital of 100 billion USD like the AIIB. This MDB was formed to promote sustainable development visions and infrastructure projects in Brazil, Russia, India, China and South Africa as well as in other developing countries (NDB, 2014). As a fifth financial source, provincial governments and their provincial banks are planned to serve (Aris, 2016).

2.2 Regional tourism industries and planned OBOR projects in Africa, Asia and Europe

The tourism industries worldwide have a more and more increasing impact on the domestic economies. Due to its positive effects like on the local labour market and businesses, tourism can foster the socio-economic development of a region. The local tourism industries earned accumulated more than 1.2 trillion USD in 2016. Throughout the last sixty years, the touristic sector grew enormously and is regarded as one of the most significant economic sectors worldwide. In 2016, there were 1.21 billion more tourist arrivals than in 1950 when there had been just 25 million arrivals a year. Since tourism can be regarded as a trade of services, the touristic sector pushes the export of a country. It has been 4 billion USD a day globally in 2016 by offering transport services to non-residents. Overall, tourism accounted for 7% of total exports in goods and services in the same year. That is why it is not surprising that for many countries

focusing on their tourism industries is vital, especially for developing countries (UNWTO, 2017).

To make a destination more attractive to tourists, appropriate transport infrastructure is crucial because a better infrastructure leads to fewer costs of travelling due to less travel time. Therefore, to travel around a country or region, the availability, as well as the quality of airports, roads, railroads and water transport system, need to be sufficient.

Because of that, international organisations like the OSCE are striving for the promotion of transport infrastructure projects, according to its 1975-signed Helsinki Final Act (CSCE, 1975). The participating member states considered "that the improvement of the conditions of transport constitutes one of the factors essential to the development of co-operation among them" and "that it is necessary to encourage the development of transport and the solution of existing problems by employing appropriate national and international means" (CSCE, 1975, 31). It is noticeable that the development of transport infrastructure is a lever for both decreasing security issues and expediting the economic growth.

The importance of transport infrastructure for tourism development was stated by Prideaux (2000), who argues that the improvement of the modes of transport would lead to an increase in tourism inflows. Furthermore, the population of developed nations appreciate the same level of infrastructure somewhere else as they are used to in their countries of origin.

China finances under the OBOR framework many infrastructure projects in developing countries. On the one hand, developing countries have the opportunity to realise plans that weren't possible before due to lack of financial resources.

Furthermore, because of spill-over effects, other parts of the economy could be better off as well. However, on the other hand, those countries have to bear the financial burden of the loans from China. In the worst case due to decreasing trade relationships, this could turn into a curse (Hayes, 2017). Overall, China supported the New Silk road projects with over 900 billion USD investments along the OBOR initiative countries (Economist, 2017a). Even though China opened its initiative to other regions in the world as well (Cambero & Sherwood, 2018), the focus lies still on the countries in Africa, Asia and Europe.

In the following subchapter, the state of the tourism industry of the different regions in Africa, Asia and Europe will be introduced and essential projects associated with OBOR presented. Also, three summaries of the continents, tables one (1) to three (3), were created to achieve a better overview about the participants and the projects. The compilation of projects is not complete because it is just supposed to display the diversity of the projects. New Zealand and Uruguay will be presented briefly, as examples for participants from other continents.

2.2.1 European Union

On a global scope, European destinations account for the majority of international tourist arrivals worldwide. Approximately 50% of all tourist arrivals happened in Europe 2015, even though the EU, with 40% of overall tourist arrivals, is the main driver for tourism on the continent (Popescu, 2017). The tourist arrivals grew by 4% and over half of all tourists reached the EU by air in 2016. When it comes to travelling between the EU members, tourists enjoy the benefits of the Schengen area, where they can move in 22 EU members without notable border checks (UNWTO, 2018).

Since the fall of the iron curtain, the former socialist countries in Central and Eastern Europe faced a rapid growth of incoming tourists from all over the world. Inhabitants of this region, mainly from higher income groups, started to visit new countries as well. Especially the countries that were part of the EU enlargement benefited from increasing tourism flows due to a more efficient cross-border travelling (Banaszkiewicz et al., 2017).

Table 1 Summary of OBOR countries and projects in Europe; Source: HKTDC 2018

One Belt One Road in Europe

Participants

Country	Region	Country	Region
Austria	European Union	Albania	Rest of Europe
Bulgaria	European Union	Belarus	Rest of Europe
Croatia	European Union	Bosnia and Herzegovina	Rest of Europe
Czech Republic	European Union	Macedonia	Rest of Europe
Estonia	European Union	Moldova, Rep.of	Rest of Europe
Greece	European Union	Montenegro	Rest of Europe
Hungary	European Union	Russia	Rest of Europe
Latvia	European Union	Serbia	Rest of Europe
Lithuania	European Union	Turkey	Rest of Europe
Poland	European Union	Ukraine	Rest of Europe
Romania	European Union		
Slovakia	European Union		

OBOR Projects

Country	Region	Project
Greece	European Union	Port of Piraeus
Hungary	European Union	Budapest-Belgrade railway
Albania	Rest of Europe	Arber roadway
Montenegro	Rest of Europe	Podgorica-Kolasin highway
Macedonia	Rest of Europe	Skopje-Shtip motorway

The touristic sector and its related industries have a significant share of more than 10% of the overall Gross Domestic Product (GDP) in the EU. Thereby, the countries in the south like Spain and Portugal are more dependent on tourism comparing to the EU-member in the north and the west when it comes to the contribution to the national GDP. On the labour market, tourism plays an important role especially for young workers and is, therefore, a chance to fight against youth unemployment in

countries like Spain. The tourism industry accounts for 22% of all trade of services in the European Union and 6% of the total exports (UNWTO, 2018).

A core requirement for a well-working tourism industry is the transport infrastructure of the several countries, and in the time after the financial crises, there has been a lack of financial support to build or renew the roads, railways, ports or airports. That is why the EU wants to modernise the transport system. The development of the trans-European transport network (TEN-T) has suffered, to name one example. Therefore, investments for modernisation are needed. Poor infrastructure can be found primarily in the East. In the last 20 years, investments in Eastern Europe were mainly focused on the upgrading of the roads, whereby the railways did not get enough focus. However, also in the other parts of the EU, railways and roads have not been maintained as it would have been necessary because of sometimes too little budgets. EU-members, in the south, are in need of modern port facilities and their interconnection to the countryside. The waterways in the inner countries in Germany, France, Belgium and Netherlands do not satisfy modern demand as well (European Commission, 2018).

Thus, OBOR is an initiative that finds willing takers for investments in the area of the European Union. One major project in the EU under the sponsorship of China is the development of the Piraeus port in Greece. Fifty-one per cent of the port is in Chinese hand, and the plan is it to transform it into a hub for logistics as well as for cruise ships (Amato, 2018). Although in Hungary, China gives financial support for the construction of the Budapest-Belgrade railway, other EU-members in the east are hoping for more engagement from the Chinese site in their countries (Tsolova et al., 2018).

2.2.2 European Non-EU countries & Russia

For the European countries outside the EU, there are different observations for tourism arrivals in 2016. Many countries were able to achieve a substantial increase in incoming tourists, but Russia and Turkey were suffering from a drop in tourist numbers. Because of the insecure situation, due to the political circumstances and several terrorist attacks, Turkey has noticed a decrease of 23% of tourists coming to the country in 2016. One year later, the numbers stabilised again. The countries in the Balkan areas attracted up to 15% more tourists in 2016. Bosnia Herzegovina and Serbia are the forerunners in this region. In Northern and Western Europe, Iceland welcomed 39% more tourists and Norway as well as Switzerland observe constant growth in 2016. Even though in the eastern part of Europe, Russia was responsible for a negative average growth rate in 2016, countries like Ukraine or Armenia were able to receive 7% respectively 6% more tourists (UNWTO, 2018).

Historically, tourism was not one of the leading interests of the Russian government, what changed a bit in the past years. Due to plans that should promote tourism, Russia desires increasing flows of tourists. To achieve this goal, the country needs to face challenges like a biased image of the destination as well as the struggles with the transport infrastructure. Geopolitical problems, like the Ukraine crisis, lead to concerned tourists (Andrades & Dimanche, 2017, 362). Following these difficulties, Russia stated a decrease in tourism inflows of 9% in 2016 (UNWTO, 2017).

The crises that Russia needs to solve are one reason for the improved relationship with China in the past years. On May 2015, both political leaders of China and Russia agreed on a collaboration between the two countries regarding the two initiatives OBOR of China and the Eurasian Economic Union (EEC) of Russia. Although Vladimir Putin and Xi Jinping agreed on a stronger connection between the

two nations, Russia's role in the OBOR initiative is still not clear. According to Sangar (2017), Russia might hope for investments of 40 billion USD by the Silk Road Construction Fund following the possible fruitful partnership in EEC and OBOR. For China, a developed route through Russia seems fortunate for, e.g., transporting goods to the European market. Furthermore, it is expectable that Russia will benefit from the high investments of China in Central Asia's infrastructure due to spillover effects.

The war with Russia had effects on the transport infrastructure in Ukraine. Several infrastructures got destroyed and investments to renew or build further transport ways were not made. Other countries in Eastern Europe need infrastructure investments from the OBOR as well (The Economist Intelligence Unit, 2016a).

In Albania, Chinese investments are addressed for the building of the Arber roadway, which links the country with Macedonia and Bulgaria. Besides that, a Chinese company is constructing a part of the railway in Montenegro, and furthermore, a loan by the Export-Import Bank of China was approved for a highway that connects Podgorica and Kolasin. China supported the Former Yugoslav Republic of Macedonia for building the Skopje-Shtip motorway (Tonchev, 2017). More members of OBOR are shown in table 1.

2.2.3 Central Asia

In 2014, the region in the centre of Asia attracted 11 million visitors from all over the world, and there is potential for further growth of the tourism industry. Cooperation between the countries in Central Asia could promote rising tourist numbers in the future (Worldbank, 2017).

Table 2 Summary of OBOR countries and projects in Asia; Source: HKTDC 2018

One Belt One Road in Asia

Participants

Country	Region	Country	Region
Kazakstan	Central Asia	Maldives	South Asia
Kyrgyzstan	Central Asia	Nepal	South Asia
Tajikistan	Central Asia	Pakistan	South Asia
Turkmenistan	Central Asia	Sri Lanka	South Asia
Uzbekistan	Central Asia	Armenia	Western Asia
China	Eastern Asia	Azerbaijan	Western Asia
Korea	Eastern Asia	Bahrain	Western Asia
Mongolia	Eastern Asia	Georgia	Western Asia
Brunei Darussalam	Southeastern Asia	Iran	Western Asia
Myanmar	Southeastern Asia	Iraq	Western Asia
Cambodia	Southeastern Asia	Israel	Western Asia
Indonesia	Southeastern Asia	Jordan	Western Asia
Lao People's Democratic Republic	Southeastern Asia	Kuwait	Western Asia
Malaysia	Southeastern Asia	Lebanon	Western Asia
Philippines	Southeastern Asia	Oman	Western Asia
Singapore	Southeastern Asia	Palestine	Western Asia
Thailand	Southeastern Asia	Qatar	Western Asia
Viet Nam	Southeastern Asia	Saudi Arabia	Western Asia
Timor Leste	Southeastern Asia	Syrian Arab Republic	Western Asia
Afghanistan	South Asia	United Arab Emirates	Western Asia
Bangladesh	South Asia	Yemen	Western Asia
Bhutan	South Asia		
India	South Asia		

OBOR Projects

Country	Region	Project
Mongolia	Eastern Asia	Trans-Mongolian railway
Indonesia	Southeastern Asia	Jakarta-Bandung high-speed railway
Laos	Southeastern Asia	Sino-Laos railway
Afghanistan	South Asia	Afghanistan railway network
Sri Lanka	South Asia	Colombo port city
Israel	Western Asia	Port of Ashdod
Kuwait	Western Asia	Silk City incl. new airport

According to Koh and Kwok (2017), the tourism industry of the nations in the area did not increase as much as in other world regions but to develop the tourism infrastructure, the Shanghai Cooperation Organization (SCO), that should serve as a platform for collaboration among the member states, introduced a regional tourism

program, which concentrates especially on security issues. The authors are arguing that the crises in neighbouring countries like, e.g., terrorism and wars, are responsible for the slow growth of incoming tourism flows. Furthermore, a poorly developed infrastructure is contra productive for uncomplicated travelling.

What the transport infrastructure concerns, the OBOR initiative can supply the missing facilities. As promised on the visit to Kazakhstan in September 2013, the Chinese invested already or plan to spend about one billion USD in Central Asia (Malle, 2017). The New Silk Road initiative finances motorways to connect Kashgar with the borders of Kirgizstan and Tajikistan and even further to the industrial hotspots Torugart as well as Dushanbe. Also, China supported the motorway between Torugart and Chanak, which is on the border to Uzbekistan, to better connect both countries. Another highway is already built to connect Russia through Kazakhstan with the Chinese province Xinjiang (Malle, 2017).

2.2.4 East Asia

China's tourism industry is booming. Nowadays it is one of the countries with the most tourist arrivals worldwide (Ahmad et al., 2018). Alone in 2016, the tourism sector recorded 120-billion-USD revenue from international tourism. More than two-thirds of the foreigners came from Asia, followed by 17.3 % from Europe and 10.2% from America. Of all foreign visitors, one third came for touristic reasons. The popularity of China as a destination is increasing, especially by EU-citizens. More than two million people found their way to China in 2016 (ECTY, 2018). In particular, the length of the stay of 15.6 nights on average has excellent potential for the Chinese tourism industry. China has ambitious plans to foster their tourism business. According to a governments plan from 2010, the officials made a ten years plan to construct more than 500 new airports and to own overall more than 5000 aeroplanes. On the surface,

20000 kilometres on rail network has been built for high-speed railways, that connect the most parts of the country except five provinces (Amato, 2018). Through promotions like the “EU-China Tourism Year 2018”, the country seeks cooperation with economically strong partners, like the EU, to convince more people to visit the country (ECTY, 2018).

In South Korea, the touristic industry is flourishing as well. The direct contribution to the GDP was expected to rise by 3.7% in comparison to 2017 when the direct contribution was 1.6%. Including the indirectly affected employment, tourism accounted for 5.3% of the total employment in the country. A similar development in the industry can be observed in Mongolia, where the direct contribution in 2017 was 330 million USD. In 2018, an increase of 2.7% was expected (WTTC, 2018a; 2018b).

For Mongolia, OBOR brings many potentials, since the transport infrastructure is not well developed as it should be to transport, e.g. the natural resources, the nation has to offer. Thus, the Tavan Tolgoi rail project, that is supposed to connect the Tavan Tolgoi coal mine with China by 2021 is a crucial OBOR project for the country (Stanway, 2018). Besides this one and other projects, the Trans-Mongolian railway will get expanded with financial support from the Chinese Side. That will bring new opportunities for the tourism sector as well (Edwards, 2016).

The situation in South Korea is different because of its northern neighbour. The plans of an inter-Korean railway, which would be linked to the Trans-Siberian railway in Russia, are on hold due to the political situation in North Korea. However, for now, China and South Korea want to cooperate in other countries that participate in OBOR (Ekman, 2016).

2.2.5 Southeast Asia

Despite Timor Leste, the other ten countries (see table 2) are all members of the Association of Southeast Asian Nations (ASEAN). The ASEAN countries account for 10% of the world population with 620 million people living in this area. Besides other economic cooperation plans, tourism is one crucial part of the association. To promote the tourism industries in the region, the Tourism Strategic Plan was introduced in 2011 and a Marketing Plan in 2012. The aim of the programs was it to inspire tourists to visit and to explore more nations of the ASEAN throughout one visit of the region. For the achievement of this goal, the member countries work on a Single ASEAN Visa for the whole area. Since 1991 the inbound tourism to ASEAN rose by 56.7 million to 76.9 million visitors each year in 2012 (Henderson, 2015).

In the framework of OBOR, Southeast Asia plays a central role because of its geographical position at the Strait of Malacca as one of the most frequented commercial shipping routes. Thus, the Strait of Malacca is essential for China's Maritime Silk Road. Therefore, China is investing in transportation infrastructure to improve the connection as well as the relationship to the ASEAN countries. Two of these projects are, e.g., the Jakarta-Bandung high-speed railway in Indonesia and the Sino-Laos Railway, that connects the capital of Laos, Vientiane, and Mohan, a city on the border of China and Laos. Also, the Sino-Laos Railway will reduce the travel time between the two cities from three days to approximately three hours (Yu, 2017b; Bangkok Post, 2018).

2.2.6 South Asia

In table 2, eight South Asian OBOR participants are displayed. These countries account for approximately 20% of the world's population but consist the highest amount of poor people as well. In comparison with the countries in the south-east of the

continent, South Asia missed reducing its poverty by for example promoting the tourism industry (Rasul & Manandhar, 2009). According to the World Tourism Organization (UNWTO, 2017), the market share of incoming tourist to the region was just about 2% of the world market. In particular, the low-developed cross-border transport facilities are one of the main reasons for a few incoming tourist flows. Other obstacles are the complicated visa and permit restrictions in this area (Rasul & Manandhar, 2009).

Especially Pakistan will benefit a lot from Chinas infrastructure project. Around 60 billion USD are planned to be invested in Pakistan by China, and 50% of it will flow in power generation projects to make the electricity supply more reliable (Economist, 2017b). Although, the rest of the money the Chinese will invest in transport infrastructures like airports, harbours and roads and subsequently, also in the tourism industry, which should benefit from the improved connectivity (Economist, 2017c). According to Ch. Abdul Ghafoor, Managing Director Pakistan Tourism, the improvements in the China Pakistan Economic Corridor (CPEC) led to more chances for investments in the tourism sector (APP, 2017).

Afghanistan does hope to benefit the same way from OBOR as Pakistan does. An extension of the CPEC could be the solution for the transport infrastructural issues the countries have. There are several possibilities where China can apply its new Silk Road founding, e.g., for the Afghanistan-Railway Network (Khalil, 2017). It seems what stops China from investing in Afghanistan like in Pakistan is the issue with security in the country (Rashid, 2017). China's visions for the other South-Asian nations are projects like a China-Nepal railway and the Colombo Port City project in Sri Lanka, which has already begun (Das, 2017). In 2016, China signed an investment package with Bangladesh for, e.g., highways and railways (The Economist Intelligence Unit, 2016b). The Padma river bridge in Bangladesh that is supposed to open in 2018 was

realised by Chinese investment of 3 billion USD and will be used by cars and trains (Stacey, 2018). The Male international airport in the Maldives is going to be bigger, thanks to supporting from Chinese Investors (The Guardian, 2016). In Sri Lanka, the port of Hambantota was built by Chinese, but because the country of Sri Lanka did not pay their debts, China received the port for 99 years (Abi-Habib, 2018). More projects in this region will most likely follow.

2.3.7 Western Asia

In Western Asia, China found many countries that were interested in joining the New Silk Road framework according to table 2.

In the west of Asia, Tourism is not everywhere flourishing like in most countries of the world. On the one hand, Iran, Palestine and Qatar have to suffer from a decrease of tourism arrivals from 2015 to 2016, and on the other hand, Oman and Lebanon were able to raise their tourism arrivals by approximately 11%. Absolute top performer by the increase of tourism arrivals is Georgia. The country received 19% more tourists throughout the timeframe from 2015 to 2016 (UNWTO, 2017). The weak tourism development, e.g. in Iran is justified by the state of security in the country and the lack of sufficient infrastructure, for which the country needs investments from other countries. Although, e.g. Iraq suffers from similar problems, countries like Saudi Arabia, the United Arab Emirates or Qatar do not have issues with risky infrastructure.

Since 2009, China has been, due to the international sanctions, the most important trading partner for Iran. At the end of 2016, Xi Jinping visited Iran and signed at the same time many economic cooperation agreements. The Niayesh Tunnel is one example for Chinese financial support in the last years. Moreover, China is financing the Tehran-Isfahan high-speed railroad with at least 1.8 billion USD. Further

investments are made in airports, railway and roads all over the country (The Economist Intelligence Unit, 2016a; Financial Tribune, 2017).

Iran will be one of the biggest beneficiaries in Western Asia, but China is investing in other countries an enormous amount of money as well. OBOR projects can also be found in, e.g., Georgia, with the investment of 50 million USD in the Anaklia Deep Water Sea Port (Jardine, 2018). Furthermore, in Armenia, with the support of the North-South Road Corridor (Ministry of Transport and Communication of the Republic of the Republic of Armenia, 2016), in Isreal, at the port in Ashdod (Mintner, 2018) or in Kuwait, for Silk City including a new airport (Financial Times, 2018).

2.2.8 Africa

The tourism market in Africa, in general, is growing. In 28 countries on the continent, the tourism receipts increased by almost 14% between 1995 and 2008. Capital investments shares for the tourism sector rose from 5,9% to 10,1% in Ethiopia and 4,5% to 9,3% in South Africa. Africa still has, on average, an undeveloped transport infrastructure, in line with immense travel costs if someone wants to take a plane. Thus, tourists from Africa mainly tend to visit neighbouring countries by road. Chinas infrastructure plan could, therefore, be beneficial for the tourism industry since it could decrease travel costs (Fourie & Santana-Gallego, 2013).

Ethiopia understands the OBOR initiative as an opportunity for economic growth because, without the infrastructure investments, the country has problems to connect people and to develop new markets (Xiao & Linyan, 2017). In Senegal, China invested in the building of the highway between Dakar and Touba (Tiezzi, 2018).

Table 3 Summary of OBOR countries and projects in Africa; Source: HKTDC 2018

One Belt One Road in Africa

Participants

Country	Region	Country	Region
Tunisia	Africa	Morocco	Africa
Sudan	Africa	Madagascar	Africa
South Africa	Africa	Libya	Africa
Somalia	Africa	Ethiopia	Africa
Senegal	Africa	Egypt	Africa
Rwanda	Africa		

OBOR Projects

Country	Region	Project
Kenya	Africa	Mombasa-Nairobi railway
Senegal	Africa	Dakar-Touba highway

As one can observe in table 3, there are not many African countries that join OBOR officially.

However, it is notable that OBOR is not limited to these members. In the last ten years, China financed many infrastructure projects for roads, ports, and railways all over Africa (Economist, 2017d). Especially in Kenya, enormous investments are flowing into the country from China. The new standard-gauge railroad connecting Mombasa and Nairobi is an almost four billion USD project, mainly financed by the Chinese Export-Import Bank, and has the leverage to promote economic growth in the long run as well as to foster better integration of Kenya in the East African community (The Economist Intelligence Unit, 2014).

2.2.9 Other areas

Situated in Oceania, New Zealand is also a participant of OBOR. With a developed road infrastructure to travel the most of the nation easily as well as a good air connection to Australia, what offers linkage to vast parts of the world, New Zealand

provides a robust travel infrastructure network for especially western tourists (BMI Research, 2017). However, the costs of travelling are high caused by the strong New Zealand dollar as well as the limited opportunities to reach the country.

Even though the country has already a well-developed infrastructure, with the signing of the Memorandum of Understanding for the OBOR initiative end of March 2017, the nation expects to gain new possibilities infrastructure-wise to reach all parts of the country. The agreement between both countries is still pretty new, and thus, there are not so many projects realised yet. However, the region of Northland, as the name suggests in the north of the country, is willing to cooperate with China in building a railroad of 22 kilometres connecting the port at Marsden Point with the city of Whangarei. Also, other investments in the hotel industry and road projects are discussed in Northland (Greenfield, 2017).

In Latin America, China found a partner, e.g. Uruguay. In August 2018, both countries signed a memorandum of understanding for the membership of Uruguay in OBOR. According to Uruguay's foreign minister Nin Novoa, the country expects to improve, for instance, the central railroad with China's financial support. A new fishing port is supposed to follow as well (International Schiller Institute, 2018).

2.3 EU outbound tourism

Since this paper attempts to analyse the tourism outflows of the EU-28 countries, it is necessary to point out the importance of EU travellers for the global tourism industries.

Firstly, the 28 member states of the EU are the home for 7% of the world’s population. Thus, in 2018 there were approximately 513 million people, that can be seen as potential targets for the tourism industries worldwide. Mainly because the EU

citizens, with an average of 30 thousand Euro GDP per capita in 2017, have the necessary financial background for international travelling. Although comparing the GDP, there is a considerable contrast between the EU-28 countries but the total GDP accounts for more than a fifth of the world's total output. In particular countries like Germany, the United Kingdom and France are responsible for an enormous part of the EU's overall GDP (Eurostat, 2018a; Eurostat, 2018b).

In 2015, EU-citizens made 1.2 billion trips, from which almost 300 million went to international destinations. Overall, they slept 2.5 million nights abroad on average eight-nights-longing trips, where they spent on average 89 Euros per night. Higher-income countries like Germany and UK account for 51% of overall nights spent at international destinations. Finish tourists are paying for a night the most among all EU-citizens with an average of 156 Euros. For the whole trip, French citizens have the highest expenditure. They are willing to spend 975 Euros for an international trip on average. Although the majority of the EU has the financial background for travelling, there were still 34% of the population that were not able to have a one-week vacation in 2015 like approximately two-thirds of Romanians and Croatians (UNWTO, 2018).

2.4 The gravity model and applications on the touristic sector

With the attempt to analyse the effects of the OBOR on the tourism industries in the participating regions, certain econometric instruments are obligatory. Due to its very frequently used and its acknowledged results, the gravity model of trade will serve as the tool to answer the research question. Thus, the model will be presented and its applications on the trade of services, in particular tourism flows, unrolled.

2.4.1 The history of the gravity model of trade

The idea of the gravity model of trade is based on Newton's law of universal gravitation, which states that the gravitation force of two particles is dependent on their physical masses and their distance. The gravitation force is increasing, the higher the masses are and decreasing over longer distances. Jan Tinbergen (1962) and Pentti Pöyhönen (1963) were the first scientists, who picked up the idea of Newton independently and described that bilateral export flows are related to the economic masses of the traders as well as their geographical distances. They explained in their intuitive model that the economic size of traders, i.e., the national income, is directly proportional to the bilateral trade and that the distance between traders is inversely proportional to the trade flows between the trade partners due to transportation costs.

Besides a high amount of applications of the intuitive gravity model, critics have argued that the model of Tinbergen and Pöyhönen has no theoretical background (Kabir et al., 2017). Thus, the paper by Anderson and Wincoop (2003) is recognized as a major breakthrough because it adds important micro foundations to the gravity model of trade.

2.4.1.1 The intuitive gravity model

The intuitive model of the gravity model attempts to estimate the effects of geographical distance as well as economic masses on bilateral trade. The basic form of this gravity equation can be displayed as follows (Shepherd, 2016):

(1) $logX_{ij} = c + \beta_1 logGDP_i + \beta_2 logGDP_j + \beta_3 log\tau_{ij} + \epsilon_{ij}$

(2) $log\tau_{ij} = \log(distance_{ij})$

in which X_{ij} stands for the exports made by country i to country j, GDP reflects the gross domestic product of the analysed countries, τ depicts the trade costs, distance

represents the geographical distance and is a proxy for the trade costs between the trading partners, ϵ reflects the random error term of the equation. The regression constant is represented by c and β are the coefficients, which need to get estimated. As mentioned above, the gravity model of trade was influenced by Newton's law of gravity and thus GDP, a nation's economic mass, influences the exports of two countries proportionally, whereby there is an inverse proportional relationship between the distance and the bilateral exports. Therefore, it implies that geographically more distant countries trade less than neighbouring countries and that well-developed economies trade more than developing countries.

Although, the intuitive gravity equation gives space to challenge the model, out of several economic reasons. Firstly, it cannot serve to include third-country effects. For instance, there are certain occasions between two countries i, and k, like bilateral trade agreements, that cause a change in trade in another country j as well. Such events would not be reflected in the gravity equation that tries to estimate the trade relationship between state i and j (Shepherd, 2016). Secondly, the intuitive model has problems going hand in hand with standard economic theory. Assuming, e.g., a decrease in oil prices, which lowers the cost of trade (X_{ii}). According to the model, which does not include relative prices, this scenario would result in proportional higher trade on the bilateral trading routes of two countries as well as on the domestic trade (X_{ii}). But since the price structure does not change, the demand and supply do not change either, which leads to the mentioned clash with the standard economic theory (Shepherd, 2016).

2.4.1.2 The micro-founded gravity model

The first economist who tried to solve the issues of the intuitive model was Anderson (1979). His model estimates the number of imports and exports as a

dependent variable on transport costs and income. He developed the equation on the idea that consumers differentiate commodities regarding their production location. After this approach, derivations were made based on, e.g., the monopolistic competition model (Helpman & Krugman, 1985), the Heckscher-Ohlin model (Deardorff, 1998), and the Ricardian model (Eaton & Kortum, 2002).

Nevertheless, Anderson and Wincoop (2003) provide the recently most used micro-founded model, which is at its core a demand function (Shepherd, 2016). Additionally, the production side of the equation is defined by the assumption that all existing firms produce a single, unique product variety with the expectation of an increase of returns to scale (Krugman, 1979). Thus, in a market with many firms, in an equilibrium price structure, just the fixed costs of market entry are covered by the price of a product less marginal costs. Producers have the free choice of offering the product domestically, which is connected with no transportation costs, or abroad, what implies costs for the transport. Following that, consumers can buy international and domestically produced products, but the abroad produced varieties reflect the additional transport costs in their price. This scenario leads to equilibrium, in which firms, simultaneously, sell their products in other countries as well as their own and, in which consumers buy the available goods. The dependent variable of the gravity model of Anderson and Wincoop (2003) reflects the aggregation of the exports of each firm in one economy. The “gravity with gravitas” model describes a single sector economy, where the overall production has to equal the GDP (Shepherd, 2016, 8).

(3) $logX_{ij}^{k} = logY_{i}^{k} + logE_{j}^{k} - logY^{k} + (1 - \sigma_{k})\left[log\tau_{ij}^{k} - log\Pi_{i}^{k} - logP_{j}^{k}\right]$

in which X represents the exports between countries i and j in sector k, Y reflects the GDP, E displays the expenditures, Y^k equals the world GDP, σ_k states the elasticity of substitution between varieties, and τ_{ij}^{k} are to costs of trading.

Furthermore, Anderson and Wincoop (2003) introduced two more variables to solve the problem of the intuitive model, which doesn't display any trade relationship between other country pairs, except i and j, and their effects on the trade of the bilateral trade of i and j. Therefore, Π_{i}^{k} and P_{j}^{k}, the so-called multilateral resistance terms (MRT), capture these connections. Π_{i}^{k}, the outward multilateral resistance, reflects the dependence of the costs of trading across every existing export markets on the exports of countries i and j, and P_{j}^{k}, the inward multilateral resistance, represents the influence on imports from region j to region i of the costs of trading across all possible trading partners. To put in a nutshell, the gravity model by Anderson and Wincoop (2003) shows due to a change of the relative price, that a shift in trading costs between any two countries has effects on all other bilateral trade routes as well, $\frac{\partial logX_{ij}}{\partial log\tau_{ij}} \neq 0$.

In the following subchapter, applications of the gravity model of trade on international tourism flows will be presented. Afterwards, based on the literature review, the hypotheses will be presented.

2.4.2 Estimation problems of the gravity model

The application of gravity models of trade can generate several statistical problems. In this subchapter, the issues of zero trade flows and endogeneity will be explained.

2.4.2.1 Zeros in trade data

The issue with having zeros in the dependent variable is not just applicable for trade in goods but trade in services as well (Shepherd, 2016). The problem is essential for the thesis since the tourism outflow from one country to another is nothing else than trade in services from one destination to another destination.

Having zeros in trade data is a common issue and can be caused by different reasons. One of the reasons could be that trade is not happening between a country-pair and another one could be that the zeros in the data are due to rounding issues. The problems are also likely to arise while generating the data. Several countries might have statistical problems to generate the actual numbers (Silva & Tenreyro, 2006). Helpman et al. (2008) found that half of their trade data involves zeros. Since there is no definition of the logarithm of zero, several solutions had been applied throughout gravity model estimations in the last decades.

The first solution could be to drop all the observations with zero trade. However, dropping of data, that could contain valuable information, could result in biased estimates. Furthermore, Silva and Tenreyro (2006) argue that using a Tobit estimator or adding a small number to the zero to have a defined logarithm will, also, always result in inconsistent estimators. Therefore, the authors propose the usage of the Poisson pseudo-maximum-likelihood estimator (PPML).

Fortunately, the PPML estimator does not drop data with zeros in the dependent variable because the dependent variable is included in the model without logarithmic form (Shepherd, 2016). Silva and Tenreyro (2011) show that PPML is a tool that works well, even with a high share of zeros in the data set. Also, it is a robust estimator in existence of heteroscedasticity (Prasada, 2013).

2.4.2.2 Endogeneity

Endogeneity is a problem in econometrics that describes the issue when there is a correlation between a variable that is included in the estimated model and a variable that is not incorporated in the model. For gravity estimations, the problem often occurs for models that attempt to analyse policies because those are most likely to be shaped by the country's integration in the global economy (Shepherd, 2016). It means that when two countries have a healthy relationship in trading, both might be willing to foster several trade policies for a better exchange of the countries (Yotov et al., 2016).

Instrumental variables can solve issues with endogeneity. Shepherd (2016) names the two-stage least squares (TSLS) method as an approach for instrumental variables. With it, the OLS regressions need to be run two times. However, the usage of instrumental variables for analysis in order to solve the problem was not rewarding for past cross-sectional studies due to missing appropriate instrumental variables (Yotov et al., 2016).

2.4.3 Applications of the gravity model on tourism industry

The first studies with gravity models were mostly applied on trade with goods, but Kimura and Lee (2006) were able to prove that gravity equations for the trade of services have an even better performance. Furthermore, the authors conclude that the distance in bilateral trade is more influential for the trade of services than for the trade of goods caused by possible higher transport costs. Additionally, they found a positive correlation between a common land border, the membership in the same trade agreements as well as the economic freedom with the trade of services. For this paper essential is the fact that tourism is a type of trade of services. Thus, travelling is nothing else than the flow of people from one region to another region, and the dependence on economic wealth and distance are reflected in tourism flows as well (Keum, 2010).

Taplin and Qiu (1997), take the size of the population to measure the economical mass instead of the region's GDP. Thus, Researchers who apply tourism flows on gravity models have similar critiques like Anderson and Wincoop (2003) for the intuitive model of Tinbergen due to a missing theoretical founding.

To give gravity approaches for tourism flows the required theoretical background, Morley et al. (2014) derived a micro-founded gravity model from consumer choice theory. The authors state that the applications of the gravity models regarding tourism flows are nothing else than "the exploration of the spatial dimension of the theoretical tourism demand function" (Morley et al., 2014, 8).

In a dynamic panel data regression analysis, Khadaroo and Seetanah (2007) examined the influence of transport infrastructure on tourism flows employing a gravity model approach. Their results prove, again, the importance of the state of transport infrastructure on tourism inflows into a destination. The study finds a positive relationship between the state of road, port and air service infrastructure and the number of tourists flowing into a country.

Kosnan et al. (2013) investigated the tourism receipts to Malaysia. For this specific country, the authors find that even though, the road and air infrastructure have a positive influence on tourism flows, the rail infrastructure does not.

The gravity approaches for tourism flows depict a reverse dependency regarding the distance and a positive impact of the GDP's. However, a common border or language show a positive relationship with incoming tourists (Kosnan et al., 2013; Khadaroo & Seetanah, 2007).

Shepherd and Wilson (2007) depict spill over effects of physical infrastructural developments in Albania, Hungary, and Romania to the other countries in the region.

The trade increases in the area by 30% due to a better transit connection in these countries.

Johan Fourie and María Santana-Gallego (2013) analysed the causes of African tourism inflows. Therefore, the authors are using a static and dynamic gravity formula for a panel that involves 175 countries including 43 African nations. They figured out that the determinants that influence tourism inflows do not show any vast difference in comparison to other continents. Also, they found a significant relationship between tourism inflows and repeated tourism. That means tourists are more likely interested in visiting African countries if they already have visited the continent. Furthermore, their findings show the common negative connection between distance, and the positive association of the income, in origin countries as well as the destination country, on tourism inflows. Other determinants are the land size, a mutual border, and partners in trade agreements, religion and language as well as former colonial ties (Fourie & Santana-Gallego, 2013). Inbound-tourists to Africa seem to be more price-elastic than Within-African travellers. The reason for that could be the expensive intercontinental flight costs in Africa. Even though the travelling expenses in the regions will be cheaper and more efficient, the prices of flying remain high.

The issue with expensive flights is given in New Zealand as well. Therefore, the classical assumptions of the gravity model that distance and GDP are essential for the trade of goods and services were underlined by Law et al. (2013) throughout their study if the trade of services, in particular, tourism, is dependent on New Zealand diaspora and migration to New Zealand. Again, the travelling around New Zealand will get cheaper, but the air connection is still an expensive factor as well as the influential New Zealand dollar.

3. Data & Methodology

The following data and methodology section aims to introduce the cross-sectional data and econometric tools that will be used to analyse the following hypotheses that were created according to the knowledge accumulated in the literature review:

1. The higher the GDP of the EU-member, the more tourist inflows can be expected in the destination countries.
2. A well-developed infrastructure of roads, railways, air services and ports has a positive impact on tourism inflows originating from EU-countries.
3. The One Belt and One Road initiative will have a positive effect on potential EU-tourist inflows for the participating members in the future.

The data used for the thesis will be introduced in the following part. Afterwards, the methodology that is required for the cross-sectional gravity analysis is presented.

3.1 Data

This thesis attempts to find out if the improvement of transport infrastructure has a positive effect on the tourist inflow to the OBOR countries. The initiative had been announced in 2013 as such, the most recent year where OBOR was not a factor is used for the cross-section dataset. The necessary variables for the estimation are summarised in table 4 and described below.

Firstly, the dependent variable is going to reflect the tourism inflows, originating from EU-member countries to countries from all continents. Necessary reports for the EU-28 countries were purchased from UNWTO e-library and summarised in one data set. The dataset is limited to the EU-28 countries because more data would have

required more private financial expenditures to receive the data. Methodological wise, there have been several issues regarding the data. As described by Helpman et al. (2008), zero trade flows are a common problem for gravity analysis. Therefore, it is not surprising that the data, collected from the UNWTO e-library, has the issue of zero tourist flows as well. The reasons could be of various nature, either because of no tourist flows or because some countries do not maintain their statistics properly. However, the PPML estimator is the right tool to solve the issue. Nevertheless, the estimator cannot solve the issue of different approaches to accumulate the specific data. Some countries use the country of residence, others the nationality of a tourist to define the origin country.

Secondly, the dataset includes the “classic” gravity components that have been repeatedly shown to be influential (e.g. Kosnan et al., 2013; Khadaroo & Seetanah, 2007). From the World Bank server, the gross domestic products (GDP) for the country of origin and the destination country are covered in the database to be able to test the first hypothesis that the higher the GDP of a EU member country is, the higher are the tourist outflows from this country. The CEPII database gives the information for the distances between a country pair and if there is a common border respectively language, or if a country-pair shares a colonial history. Also, the database offers a dummy that notes if a country is landlocked or not.

Thirdly, since this study is going to analyse the effects of OBOR on the transport infrastructure, applicable proxies that measure the transport infrastructure of a country are required to clarify the hypotheses two and three. For the second and third hypothesis, five different variables are added to the data set — one for each mode of transport to test the second hypothesis as well as one index for the overall transport infrastructure to examine the third hypothesis. The percentage of paved roads in a

country serves as the proxy for the general road infrastructure. This data as well as the information about the port infrastructure and the overall availability and quality of the transport system is available in the Global Enabling Trade Report 2014 by the World Economic Forum (Hanouz, Geiger & Doherty, 2014) and was manually included in the dataset.

Table 4 Collection of variables needed for gravity model of trade

Variable	Definition	Source
Tourist	Amount of tourists travelling from country of origin to destination country	UNWTO Tourism Statistics Database
lngdpo	Logarithm of gross domestic product of the country of origin	Worldbank; * Taiwan, data from the Directorate-General of Budget, Accounting and Statistics (DGBAS)
lngdpd	Logarithm gross domestic product of the destination country	Worldbank; * Taiwan, data from the Directorate-General of Budget, Accounting and Statistics (DGBAS)
lndist	Logarithm distance between two countries	CEPII Geodist Database
contig	Dummy for shared border	CEPII Geodist Database
comlang_off	Dummy for common language	CEPII Geodist Database
colony	Dummy for colonial relationship	CEPII Geodist Database
landlocked	Dummy if destination country is a landlocked country	CEPII Geodist Database
itransport	Index for availability and quality of transport infrastructure. Values from zero to six, where six accounts for high quality	World Economic Forum: The Global Enabling Trade Report 2014, Executive Opinion Survey, 2013 and 2014 editions
road	Percantage of paved roads in the destination country	World Economic Forum: The Global Enabling Trade Report 2014
air	Registered carrier departures worldwide that are registered in the destination country.	World Develeopment Indicators; The World Bank Group
iport	Index for the quality of port infrastructure. Values from zero to six, where six accounts for high quality	World Economic Forum: The Global Enabling Trade Report 2014, Executive Opinion Survey, 2013 and 2014 editions
rail	Length of the railway network in kilometres	World Develeopment Indicators; The World Bank Group; *Cyprus & Malta manually added zeros according to European Commission (2013)

The variables for the port and the overall transport system are entered as indexes that stretch from one to seven, in which higher numbers account for better quality. However, for the study, the indexes are transformed to have values between zero and six. The index for the port quality is based on the perceptions of business executives in several countries and the index for the overall quality and availability of transport

infrastructure is the result of a calculation by the World Economic Forum, which includes road, rail, port and air service availability and quality. The amount of worldwide departing air carriers that are registered in the destination country serve as the proxy for the air service infrastructure. It was obtained from the World Development Indicators by the World Bank Group. The proxy for the railway network was collected from the same source. The variable describes the total length of the railway network in 2013.

3.2 Methodology

This subchapter will explain the methodology, which is used to examine the created dataset and, which is applied to test the hypotheses. At first, the micro-founded gravity model by Anderson and Wincoop (2003), presented in the literature review under 2.4.1, will be the foundation for the generated gravity equation, with the aim to analyse the impacts of tourism inflows, originating from EU-member countries to destinations in Africa, Asia and Europe. Afterwards, the calculation method for tourism flow potentials is displayed, on the one hand for the status quo, and on the other hand for an improved infrastructure due to the OBOR initiative.

3.2.1 PPML estimation

To analyse the previously mentioned data an appropriate estimator is necessary. As mentioned in the literature review under 2.4.2, the PPML estimators are regarded as the proper tool for the analysis of gravity models. In comparison to the PPML estimator, OLS regression is most likely to produce biased and inconsistent results (Shepherd, 2016). Thus the PPML estimator suggested by Silva and Tenreyro (2006; 2011) is used because it can handle the typical issues of gravity model approaches of heteroscedasticity as well as the zero trade flows. There is no need to create the

logarithm of the dependent variable, which equals tourism outflows from EU-members to countries in Africa, Asia and Europe.

Although a few of the planned projects under the OBOR umbrella are finished, most of them are under construction or at the stage of planning. That is why this research follows a cross-section analysis of the year when the OBOR initiative was announced. The gravity model that the thesis is going to estimate follows Anderson's and Wincoop's (2003) micro-founded gravity approach. Morley et al. (2014) bring the theoretical justification that the model of Anderson and Wincoop (2003) is utilisable for tourism flows as well.

The augmented version of the traditional gravity model contains the MRT as already thoroughly described before. Since the inward and outward multilateral resistance terms can be added directly to the equation, this thesis follows the approach of fixed effects estimation with country dummies (Shepherd, 2016). According to Peter Egger (2002), fixed effects models are consistent and handle the issue of endogeneity.

Before developing the gravity model for the estimation, it is necessary to control the variables toward correlations between them. The correlation-matrix in table 5 depicts that some of the transport infrastructure variables have a correlation that is higher than the critical value of 0.7. Therefore, the variables, that proxy the modes of transports will be added separately to the model.

Table 5 Correlation matrix of independent variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) lngdpo	1.00											
(2) lngdpd	-0.00	1.00										
(3) lndist	0.01	-0.31	1.00									
(4) contig	0.03	0.12	-0.38	1.00								
(5) comlang_off	0.05	-0.07	0.03	0.10	1.00							
(6) colony	0.22	-0.01	-0.01	0.10	0.44	1.00						
(7) landlocked	0.00	-0.08	-0.11	0.04	-0.01	-0.02	1.00					
(8) itransport	-0.00	0.65	-0.28	0.13	-0.00	0.01	-0.19	1.00				
(9) road	-0.00	0.42	-0.48	0.14	-0.04	-0.01	-0.10	0.73	1.00			
(10) rail	-0.00	0.55	0.15	0.02	0.05	0.08	-0.15	0.33	0.11	1.00		
(11) air	-0.00	0.44	0.03	0.01	0.01	0.04	-0.10	0.34	0.18	0.92	1.00	
(12) iport	-0.00	0.43	-0.19	0.07	0.01	0.02	-0.36	0.80	0.42	0.17	0.20	1.00

With the aim to check for heteroscedasticity, the Breusch-Pagan test is the appropriate tool to analyse trade data and confirmed the assumption that heteroscedasticity is a common issue of trade analysis with the gravity model. Therefore, the usage of the PPML estimator is one more time justified.

Table 6 Breusch-Pagan test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
chi2(1) = 15.79
Prob > chi2 = 0.0001

Subsequently, the five equations with the several transport infrastructure variables will be estimated separately and look as follows.

(4) $tourists_{ij} = \alpha_0 + \alpha_1 \ln(gdp_i) + \alpha_2 \ln(gdp_j) + \alpha_3 \ln(dist) + \alpha_4 \text{contig}_{ij} + \alpha_5 \text{colony}_{ij} + \alpha_6 \text{comlang\_off}_{ij} + \alpha_7 \text{landlocked}_{ij} + \alpha_8 \text{itransport}_j + \alpha_9 d\_origin_i + \alpha_{10} \text{d\_desti}_j + \varepsilon_{ij}$

(5) $tourists_{ij} = \alpha_0 + \alpha_1 \ln(gdp_i) + \alpha_2 \ln(gdp_j) + \alpha_3 \ln(dist) + \alpha_4 \text{contig}_{ij} + \alpha_5 \text{colony}_{ij} + \alpha_6 \text{comlang\_off}_{ij} + \alpha_7 \text{landlocked}_{ij} + \alpha_8 \text{road}_j + \alpha_9 d\_origin_i + \alpha_{10} \text{d\_desti}_j + \varepsilon_{ij}$

(6) $tourists_{ij} = \alpha_0 + \alpha_1 \ln(gdp_i) + \alpha_2 \ln(gdp_j) + \alpha_3 \ln(dist) + \alpha_4 \text{contig}_{ij} + \alpha_5 \text{colony}_{ij} + \alpha_6 \text{comlang\_off}_{ij} + \alpha_7 \text{landlocked}_{ij} + \alpha_8 \text{rail}_j + \alpha_9 d\_origin_i + \alpha_{10} \text{d\_desti}_j + \varepsilon_{ij}$

(7) $tourists_{ij} = \alpha_0 + \alpha_1 \ln(gdp_i) + \alpha_2 \ln(gdp_j) + \alpha_3 \ln(dist) + \alpha_4 \text{contig}_{ij} + \alpha_5 \text{colony}_{ij} + \alpha_6 \text{comlang\_off}_{ij} + \alpha_7 \text{landlocked}_{ij} + \alpha_8 \text{air}_j + \alpha_9 d\_origin_i + \alpha_{10} \text{d\_desti}_j + \varepsilon_{ij}$

(8) $tourists_{ij} = \alpha_0 + \alpha_1 \ln(gdp_i) + \alpha_2 \ln(gdp_j) + \alpha_3 \ln(dist) + \alpha_4 \text{contig}_{ij} + \alpha_5 \text{colony}_{ij} + \alpha_6 \text{comlang\_off}_{ij} + \alpha_7 \text{landlocked}_{ij} + \alpha_8 \text{iport}_j + \alpha_9 d\_origin_i + \alpha_{10} \text{d\_desti}_j + \varepsilon_{ij}$

As typical in gravity research, the variables of distance and GDP are included as logarithms. However, Silva and Tenreyro (2006; 2011) propose not to use the logarithmic form for the dependent variable. The country dummies d_origin and d_desti account for the MRT in the gravity equation and take the value one if a specific origin or destination country trades with another country.

3.2.2 Estimation of tourism flow potentials

Because just a few projects of China's infrastructure project are finalised and the rest is either on the stage of planning or construction, a panel regression would not be the right instrument to observe possible OBOR effects on tourism flows. Because of this reason simulations regarding the transport infrastructure improvements of the OBOR initiative have been already accomplished by several authors (Herrero & Xu,2016; Lu et al., 2018). For the analysis of the OBOR initiative, this thesis follows a similar approach. Lu et al. (2018) assume that the transport infrastructure will increase by 10%. Since the proxy for transport infrastructure is an index in the presented model, a definite improvement of 10% would not make sense. Countries that have already a high score because of the availability and quality of their infrastructure system would gain more by the 10% raise than more underdeveloped countries. Therefore, the index for the simulation is adjusted based on the theory of the catch-up effect, that developing

countries can achieve economic growth easier than developed countries because of diminishing capital return for the big economies (Papava, 2014):

(9) $simulated\ itransport = (6 - itransport) * 0.1 + itransport$

There will be an increase of 10% on the difference from the maximum of the index and the score of the status quo of the infrastructure added to the real score. For instance, a countries score for the transport infrastructure equals 5.4, the value for the simulated index would be 5.46. However, if a country would have an index of 0.8, the simulated index increases by 0.52 score point to 1.32.

With the goal to make effects of the OBOR visible, tourism flow potentials will be calculated. The tourism flow potential is the difference of the predicted flows, based on the estimates of the regression, and the real tourism flows received at the UNWTO e-library. This calculation is carried out two times, once for the year 2013 and once for the simulation with an increase of transport infrastructure.

(10) $$TP2013_{ij} = predicted\ tourist\ flows_{ij} - real\ tourist\ flows_{ij}$$

(11) $$TPOBOR_{ij} = predicted\ tourist\ flows_{ij} - real\ tourist\ flows_{ij}$$

Subsequently, the value of tourism potential depicts if a destination country receives already the full potential of incoming tourists. In case the sign is negative, more tourists are arriving from the origin country i to the destination j than the estimation would predict.

If the OBOR initiative will have an impact on the tourist arrivals in a destination country can be calculated by the subtraction of the two calculated tourism potentials.

(12) $$\Delta Tourism\ potential = TPOBOR_{ij} - TP2013_{ij}$$

Finally, to measure the chance in percentage one last step will be carried out:

(13) $$Change\ in\ \% = \frac{\Delta Tourism\ potential}{TP2013_{ij}} * 100$$

However, the OBOR initiative by China is not a plan that is limited to the countries that are included in the simulation. Instead, the New Silk Road project can be seen as a national policy with a global scope. Nevertheless, this distinction was applied to illustrate the potentials for the official members because, probably, they will benefit the most from OBOR in the next years.

4. Analysis of estimation results

Before taking a closer look at the PPML estimates it is beneficial to have a detailed illustration of the transport infrastructure variables and how they differ between the regions. Afterwards, the PPML estimates will be presented and subsequently, the tourist-potential analysis performed.

4.1 Descriptive comparison of transport infrastructure variables

Throughout this subchapter, the transport infrastructure variables will be analysed for the EU-members, the rest of Europe as well as Africa and Asia. For the descriptive analysis, the command *summarize* by Stata is used.

Table 7 Transport infrastructure statistics for EU

	Mean	St.Dev	min	max
itransport	3.44	1.01	1.7	5.3
road	76.44	28.49	17.9	100
rail	7536.47	8609.82	0	33449
air	211606	290262.3	1824	1052640
iport	4.01	.92	2	5.8

Beginning with the statistics for the European Union members, the best scores on the index for the overall transport system are from Germany, France and Spain. Though, Romania, Poland and Estonia suffer from a lacking infrastructure. It is observable in table 6 that the countries have a high share of paved roads with 76.44% on average. A closer look at the data shows that especially the Baltic states do not have a high share of paved roads. The smallest proportion has Estonia with 17.9%. However, eleven countries have a very well-developed road network. Among them are, e.g., the Czech Republic, Germany, France and Spain. When it comes to the length of the railroad network, Germany and France are on the top of the list in the EU again. Both countries have over 30 thousand kilometres of rails. Although Luxemburg has the shortest existing railway network with 275 kilometres in the European Union, Malta and Cyprus do not have any railroad (European Commission, 2013).

Regarding the departing air carriers registered in the countries, United Kingdom is on the top with more than one million, followed by Germany with approximately 100 thousand less. Slovakia accounts for the lowest amount with 1824. The best quality of their ports in the European Union is visible in the Netherlands and Finland with almost the maximum score on the index. Not surprisingly, the countries that do not have access to the ocean have lower values.

Table 8 Transport infrastructure statistics for rest of Europe

	Mean	St.Dev	min	max
itransport	2.66	.92	1.4	4.7
road	75.51	21.59	39	100
rail	13313.08	24789.32	423	85266
air	181621.8	250212.3	552	678071
iport	3.01	1.21	.8	5

Switzerland achieves the maximum score in table 7 regarding the overall transport and the state of paved roads. The lowest score on the index for the overall transport infrastructure has Albania, which also has the least share of paved roads among the countries, for which the data has been available. As the largest country in the group and with very diverse geography, Russia has a total railway network of approximately 85 thousand kilometres, when Albania has just 423 kilometres. Furthermore, most air carriers that are registered in the country and departing worldwide are in Russia, followed by Turkey and Switzerland, when Bosnia and Herzegovina account just for 552 air carriers. In the countries outside of the EU, Bosnia and Herzegovina achieve the lowest value on the index for port quality as well. Compared with that, Iceland and Norway get the highest scores on the index.

Table 9 Transport infrastructure statistics for Asia

	Mean	St.Dev	min	max
itransport	2.9	1.26	.8	5.5
road	63.02	32.52	6.3	100
rail	9022.11	17383.62	417	66585
air	191586.5	476294.6	852	3073450
iport	3.2	1.26	.3	5.8

Myanmar accounts for the minimum score of the quality and availability of the overall infrastructure in table 8. In Asia, the forerunner regarding the proportion of paved roads and their score on the transport infrastructure index is, e.g., Singapore and the United Arab Emirates as well as Hong Kong. On the other side, Mongolia, Bangladesh, Yemen and Cambodia have less than 10% of their roads paved. The most

extensive railroad systems have China and India. However, with an average of approximately 9000 kilometres, Asian countries, in general, do not have a well-developed railway network. In 2013, China had more than three million air carriers departed worldwide that were registered in the country and is thus, by distance, on the top in Asia. Armenia, Georgia and North Korea have less value in this category. The ports with the best quality are situated in Singapore, Hong Kong and the United Arab Emirates and furthermore, Bahrain, Korea as well as Oman. However, the worst scores were achieved by landlocked countries like Bhutan or Mongolia.

Table 10 Transport infrastructure statistics for Africa

	Mean	St.Dev	min	max
itransport	1.74	.6	.9	3.3
road	28.64	25.56	.8	98
rail	3814.13	5074.95	622	20500
air	25242.31	36127.42	72	184763
iport	2.7	.71	1.5	4.3

The index for the availability and quality of the transport infrastructure in Africa depicts that there is potential for improvements. However, Morocco and Mauritius have the highest scores on the index, when Guinea and Chad share the other end of the list. Overall, the mean of the share of paved roads in Africa is quite low. Although countries like Mauritius or Egypt have 98% respectively 92% of their roads paved, the majority of Africa's nations do not have a developed paved road system like them. On the bottom of this list, according to the available data, is Chad with not even 1% paved roads. Even though railroad data is just available for 14 African countries, one can observe that the continent does not have a well-developed railway system. South-Africa has the most extended rail network with over 20 thousand kilometres. The shortest railway system has Burkina Faso with 622 kilometres. In Africa, South Africa also has the highest value for the variable air carrier, followed by Egypt and Kenya. Again Chad is the country with the least amount of registered air carriers in the country departing worldwide. Also,

the score regarding the quality of the ports is the worst in Chad. Gabon and Algeria are just slightly better. However, the ports in Namibia and Morocco achieve the highest score in Africa with up to 5.3.

In comparison with the other regions, the countries in the EU have in average the best transport infrastructure. The statistic shows for all variables the highest mean. Even though the rest of Europe has more paved roads and a more extensive railroad compared to Asian countries, Asia enjoys in average a better quality of their ports as well as more registered air carriers in the several countries and overall better availability and quality of the transport infrastructure. Africa suffers the most from a lack of transport infrastructure, considering the statistics in table 9. The continent has for all variables the lowest average.

4.2 PPML estimator Results

Following the suggestion of Silva and Tenreyro (2006; 2011), the dependent variable for tourism flows is not included in the logarithmic form. The PPML regression results in table 10 back up the argument that it is possible to apply the gravity model of trade on tourism flows. Variables that are included in logarithmic form can be interpreted as simple elasticities and the other variables as semi elasticities (Shepherd, 2016).

For all models, the standard gravity model coefficients have been estimated. On the one side, there are the positive coefficients for the GDP's of the destination country as well as the country of origin and on the other side the negative coefficients for the distance variable. That means that the higher the GDP of a tourist's home country and the higher the GDP of the destination country, the higher is the chance of tourist inflows from the EU to the destination country. Furthermore, it is more likely that a tourist from

the EU travels to a country that is close to the home country than if it is far away. All three variables are highly significant on the 1% level. Thus, the first hypothesis, that a higher GDP of a EU-member leads to more tourist inflows at the destination country, is proven.

Table 11 PPML estimators

	(1) tourists	(2) tourists	(3) tourists	(4) tourists	(5) tourists
lngdpo	0.884***	0.884***	0.877***	0.882***	0.884***
	(0.047)	(0.047)	(0.048)	(0.047)	(0.047)
lngdpd	0.438***	0.443***	0.672***	0.296***	0.579***
	(0.038)	(0.038)	(0.047)	(0.036)	(0.023)
lndist	-0.737***	-0.737***	-0.742***	-0.686***	-0.753***
	(0.109)	(0.109)	(0.110)	(0.104)	(0.110)
contig	1.320***	1.320***	1.352***	1.370***	1.298***
	(0.172)	(0.172)	(0.174)	(0.175)	(0.175)
comlang_off	0.553**	0.553**	0.511**	0.541**	0.540**
	(0.219)	(0.219)	(0.238)	(0.220)	(0.213)
colony	0.451**	0.451**	0.416**	0.442**	0.467**
	(0.205)	(0.205)	(0.208)	(0.204)	(0.206)
landlocked	-1.775***	-0.825***	1.979***	-1.865***	-5.972***
	(0.355)	(0.247)	(0.291)	(0.255)	(0.093)
itransport	0.154***				
	(0.051)				
road		0.014***			
		(0.005)			
rail			6.20e-06***		
			(0.000)		
air				1.96e-07***	
				(0.000)	
iport					-0.201***
					(0.078)
_cons	-19.159***	-19.210***	-26.568***	-16.272***	-21.506***
	(1.834)	(1.898)	(1.691)	(1.814)	(1.612)
Obs.	3304	3304	2100	3614	3291
R-squared	0.849	0.849	0.847	0.853	0.849
Country dummies	yes	yes	yes	yes	yes

Standard errors are in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

The dummy variables are common for gravity model approaches and show the expected coefficients in all five models as well, and they are all significant at least on the 5% level. A shared border and language have a positive impact on tourist flow from EU countries. If a EU country has a colonial history with the destination country, then it leads to more tourism inflows from the specific country. Except model three (3), the dummy for a landlocked destination country has a negative coefficient. In model three

(3), the length of the railway is included in the estimation, when the dummy coefficient turns positive.

Model one (1) includes the index for the availability and quality of the overall infrastructure. It includes 3304 observations with destination countries from all continents. A list of the observed countries is attached to the appendix. There have been 48 destination countries included in the model that are no member of OBOR. However, 62 of the tourism inflow countries are part of the initiative. The most of them are situated in Asia.

The value for R^2 is quite high with 0.85, what can be observed for the other models as well. The coefficient is significant on a 1% level and indicates a positive relationship between the transport infrastructure of the destination country and the tourism inflows departing from EU countries.

To test the second hypothesis, that a well-developed infrastructure of roads, railways, air service and ports would have a positive impact on the tourism inflows, the models two (2) to five (5) have been estimated. The amount of observation is for model three (3) lower than for the other models because the data for rail infrastructure is rare. However, model four (4) enjoys more observations since more comprehensive data was available the World Bank Group. The value for R^2 is constant for all models.

Following the estimations, the hypothesis is proved in the case of roads, railways and air services. Though the coefficient of quality of ports is negative and thus, it states a negative relationship with tourism flows from EU-countries. All coefficients for the transport infrastructure variables are significant on the 1% level. Except for the coefficient for the quality of the ports, the findings are in line with the study of Khadaroo and Seetanah (2008). Kosnan et al. (2013) depict a negative relationship of

the length of the rail line with tourism inflows for Myanmar. The estimation for a broader sample in Model (3) does not match with the calculations of the authors because it shows a minimal positive relationship. The coefficients for the length of the railway and the air carriers, departing worldwide that are registered in the destination country, are rather small as well. Nevertheless, one can observe that a well-developed infrastructure of roads, railways as well as air services are preferred by EU tourists and leads, therefore, to higher tourism inflows from them. This finding goes in line with Prideaux (2000), who stated that tourists from higher developed countries appreciate the same level of transport infrastructure when they go on holiday.

4.3 Tourism potentials for OBOR participants

The analysis of tourism potentials is necessary to evaluate the third hypothesis that the OBOR initiative has a positive impact on the tourism inflow potentials for the participating countries. Therefore, a simulation has been carried out. Based on the estimates of model one (1) in table 10, trade potentials have been calculated. Stata offers the command predict to accomplish this task. Firstly, as described in more detail in the methodology part of this thesis, the predicted tourism flows of the real data were calculated and afterwards the predicted values for the adjusted data. Later, a proportional change in trade was determined. The results are presented throughout the following subchapter.

Once the simulation on the transport infrastructure variable has been applied, the change of tourism potentials has been calculated. Figure 1 displays the top ten winners of the improvement of transport infrastructures due to OBOR. The group of the most benefited countries note an increase in tourist inflow potentials of EU citizens by 7.01% to 8.34%. However, it is observable that most of the countries are situated in Asia. Madagascar and Libya are the only two African nations respectively Albania the only

European country in the list. The country that is affected the most is Myanmar, which would enjoy an increase of 8.34% of tourism inflow potentials, originating from the EU members.

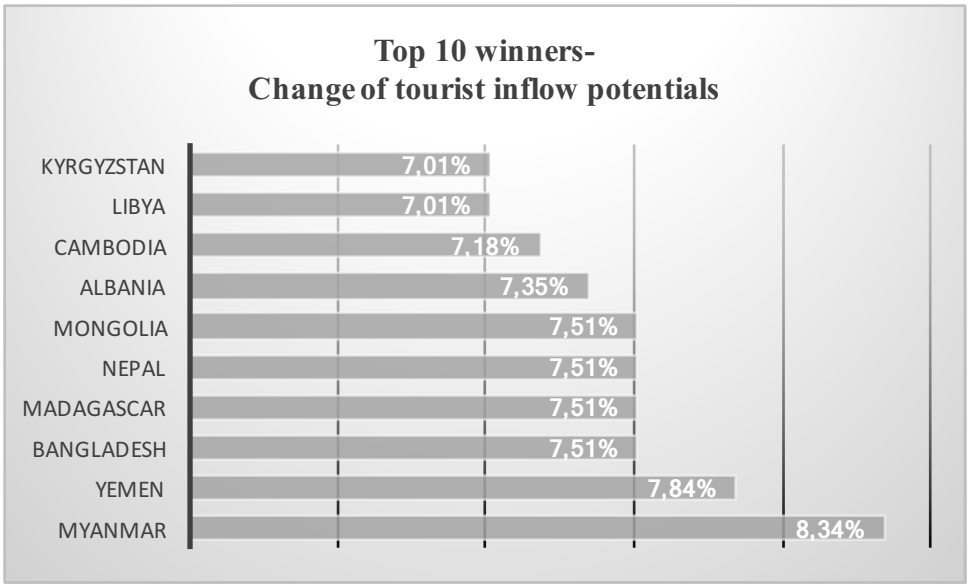

Figure 1 Top 10 winners regarding the change of tourist inflow potentials, Source: own calculations

Figure 2 depicts the OBOR countries with the least expected improvements of tourism inflows from EU-countries. The United Arab Emirates, as well as Singapore, gain 0.8% of potential tourists coming from the EU. The Czech Republic has a potential of 3.9% of more incoming tourists resulting from the simulated improved quality and availability of the transport infrastructure in the country.

It is observable that a country with an already very well-developed infrastructure has less potential in improving the infrastructure. Therefore, it is realistic that countries like Myanmar or Yemen have a higher change in potential EU-tourist inflows than the United Arab Emirates or Singapore.

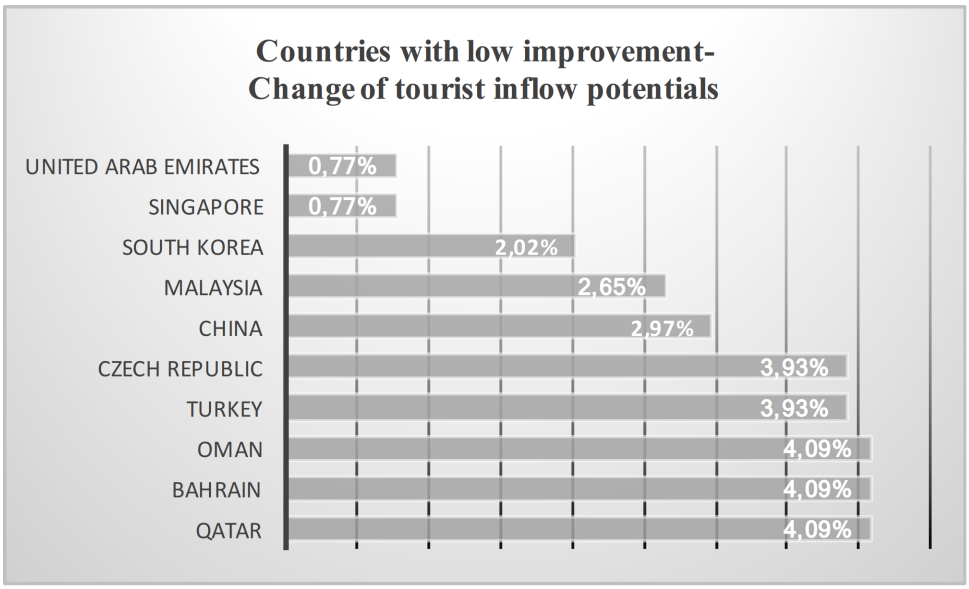

Figure 2 Countries with low improvement regarding the change of tourist inflow potentials, Source: own calculations

Furthermore, a comparison of the regional changes in tourist potentials can show, in which areas the tourism industries might enjoy a boom in the future. Figure 3 shows the change in tourism potentials for eight regions. Africa is not divided into more regions because of a lack of data. Otherwise, it would lead to biased results. However, the highest change in tourist potentials from EU tourists can be observed in Central Asia with 6.20%. Already back in 2013, when the OBOR initiative has been announced, China acknowledged the vital role of Central Asia for OBOR. Subsequently, China's investments in Central Asia are already more advanced than in other regions. According to the results, the tourism industries in this area can expect significantly more EU citizens who want to travel the region as a result of China's initiative.

The impact of OBOR on Southern Asia is just slightly less with a change in tourist inflow potentials of 6.17%. In this region, Pakistan plays a crucial role in China's initiative with the already mentioned investments of around 60 billion USD. Though, to achieve this degree of growth, countries like Afghanistan have to take care of the security issues and the existing infrastructure in the country.

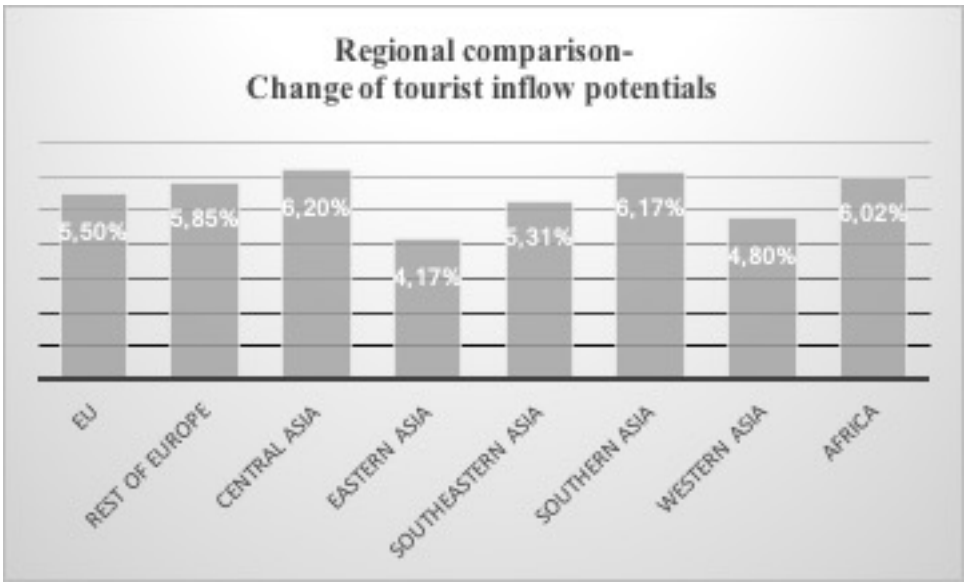

Figure 3 Regional comparison regarding the change of tourist inflow potentials, Source: own calculations

African countries enjoy a change of EU-tourists' inflow potentials of 6.02%. On average, African countries suffer from a massive lack of transport infrastructure as displayed before and therefore, OBOR can be a solution to foster the tourism industries at the same time as well.

The lowest potential for tourism improvement is in Eastern Asia. That is caused by the well-developed infrastructure, which is already available in the region. The role of South Korea regarding infrastructure projects on their ground is still not clear. The reason is that a connection with the rail network in Russia is not possible at the moment because of the tense situation with North Korea.

For Western Asia, the estimated change in tourist inflow potential is 4.80%. Countries like the United Arab Emirates, Qatar, Oman and Bahrain are in possession of high-quality transport infrastructure systems. A significant change of the potential for tourist inflows of EU citizens in West Asia is harder to achieve than in Central Asia, where the status quo is worse. Also, not many infrastructure projects have been announced in this region as part of OBOR what can be a sign for less demand for improvements.

In South-East Asia, the ASEAN plays an essential role for fostering tourism in the region. However, the number of tourists can grow even more with higher quality and availability infrastructure. Caused by OBOR, the effect could be a 5.31% change in EU-tourist inflow potentials in the region.

However, both European regions, depicted in figure 3, are ranked in the middle of the displayed regions with quite similar numbers regarding the possible change of EU-tourist inflow potentials. That can be explained by the location of the European OBOR participants. All considered countries are situated in Central-Eastern and Eastern Europe as well as the Baltics and the Balkans. As previously described many of those countries share a common communist past. This history had its influence on the transport infrastructure systems as well as on tourist flows. Since the status quo is on average similar in the region, similar changes in inflow potentials of EU-tourists can be expected. Though, when regarding the countries separately, vast differences can be found.

The previous explained findings go in line with the expectation that the OBOR would have a positive effect on potential EU-tourist inflows for the participating members in the future. Thus, the results correspond with the third hypothesis.

5. Conclusion

The OBOR initiative by China is a vast infrastructure project on a global scope. After the presentation of the plan in 2013 in Central Asia, more and more countries joined China's framework. However, this thesis had the goal to find out how OBOR and its attempt to improve infrastructure impacts EU-tourist flows to participating countries. Subsequently, the following Hypotheses were supposed to be tested throughout the thesis:

1. The higher the GDP of the EU-member, the more tourist inflows can be expected in the destination countries.
2. A well-developed infrastructure of roads, railways, air services and ports has a positive impact on tourism inflows originating from EU-countries.
3. The Belt and Road initiative will have a positive effect on potential EU-tourist inflows for the participating members in the future.

The motivation for the topic was based on the fact that tourism promotes social development that is caused by the cultural exchange while travelling. Furthermore, the touristic sector is essential for the global economy and creates jobs respectively pushes the GDP of a country.

Therefore, a comprehensive dataset was developed to examine the influence of road, rail, air service as well as port infrastructure on the tourist travel behaviour. A micro-founded gravity model approach was chosen for the analysis of the data. With it, a PPML estimation of the gravity equation was carried out and found that except the quality of ports, all other modes of transport have a positive impact on EU-tourist flows. Also, the index for overall availability and quality of transport infrastructure had shown to have a significant influence on EU-tourist flows.

The same index was used, afterwards, to perform an OBOR simulation. The findings show that countries with a high level of transport infrastructure will have a lower change in potential for EU-tourist inflows than countries with a less developed land-, air- and waterway infrastructure. The regions that will enjoy the most change in potential EU-tourist inflows are Central Asia, South Asia as well as Africa.

This thesis contributes to academia because there has not been a simulation for OBOR yet, regarding its impacts on tourist flows to the participating countries. The

former studies of the initiative were mainly focused on the trade of goods instead of the trade of services. Furthermore, gravity applications related to the tourism industry did not focus on the importance of the tourist outflows from EU-countries like it has been carried out throughout this thesis.

However, the future of OBOR is not manifested due to its early stage. This study assumes that all the participating countries want to receive Chinese loans to improve their infrastructure. Though, the initiative might become a burden for underdeveloped countries as well. Sri Lanka had to hand over a port to China because the country was not able to pay the money back. That could be a deterrent example for other Silk Road participants and could lead to a slowdown of the improvements regarding the transport infrastructures. Nevertheless, to estimate the real impact of China's OBOR on the tourist flows, a panel data analysis should be carried out in the future when more transport infrastructure will be built due to OBOR.

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Appendices

Appendix a: Countries included in Model 1

Destination countries

Region	OBOR members	other countries	Region	OBOR members	other countries
EU	Bulgaria	Belgium	**Central Asia**	Kazakstan	
	Croatia	Cyprus		Kyrgyzstan	
	Czech Republic	Denmark			
	Estonia	Finland	**Eastern Asia**	China	Hong Kong
	Greece	France		South Korea	Japan
	Hungary	Germany		Mongolia	Taiwan
	Latvia	Ireland			
	Lithuania	Italy	**Southeastern Asia**	Cambodia	
	Poland	Luxembourg		Indonesia	
	Romania	Malta		Lao People's Democratic Republic	
	Slovakia	Netherlands		Malaysia	
	Slovenia	Portugal		Myanmar	
		Spain		Philippines	
		Sweden		Singapore	
		United Kingdom		Thailand	
				Viet Nam	
Rest of Europe	Albania	Iceland			
	Bosnia and Herzegovina	Norway	**Southern Asia**	Bangladesh	
	Macedonia	Switzerland		Bhutan	
	Moldova, Rep.of			India	
	Russian Federation			Nepal	
	Turkey			Pakistan	
	Ukraine			Sri Lanka	
Africa	Egypt	Algeria	**Western Asia**	Armenia	
	Ethiopia	Angola		Azerbaijan	
	Libya	Benin		Bahrain	
	Madagascar	Botswana		Georgia	
	Morocco	Burkina Faso		Iran	
	Rwanda	Burundi		Israel	
	Senegal	Cameroon		Jordan	
	South Africa	Chad		Kuwait	
	Tunisia	Côte d'Ivoire		Lebanon	
		Gabon		Oman	
		Gambia		Qatar	
		Ghana		Saudi Arabia	
		Guinea		United Arab Emirates	

	Kenya Lesotho Liberia Malawi Mali Mauritania Mauritius Mozambique Namibia Nigeria Tanzania, United Rep. of Uganda Zambia Zimbabwe		Yemen

Countries of origin

Region	OBOR members	other countries
EU	Bulgaria Croatia Czech Republic Estonia Greece Hungary Latvia Lithuania Poland Romania Slovakia Slovenia	Belgium Cyprus Denmark Finland France Germany Ireland Italy Luxembourg Malta Netherlands Portugal Spain Sweden United Kingdom