MENDEL UNIVERSITY IN BRNO
FACULTY OF REGIONAL DEVELOPMENT AND INTERNATIONAL STUDIES

Relationship between remittances and selected socio-economic indicators among largest receivers of remittances

DIPLOMA THESIS

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Abstract

Remittances represent one of the major international financial resources in the world. Therefore remittances become more internationally discussed among researchers, particularly due to the impact on countries' development.

This thesis, therefore, aims to investigate the interaction between remittances and socioeconomic indicators. Using a panel data covering a sample of ten countries (largest receivers of remittances), over a period 2010 – 2015. One of the objectives is to grouped countries based on the selected socioeconomic indicators and the amount of remittances (% of GDP). Another aim is to investigate the impact of selected socioeconomic indicators to the amount of remittances and finally, whether remittances influence the economic growth.

Keywords: remittances, composite indicators, cluster analysis, multiple regression analysis

Abstrakt:

Remitence představují jeden z hlavních mezinárodních finančních zdrojů a staly se tak jedním z mnoha diskutovaných témat, převážně mezi odborníky zabývajícími se rozvojem zemí.

Práce si klade za cíl zjistit vztah mezi remitencemi a vybranými socio-ekonomickými indikátory, v rámci panelových dat v období 2010 – 2015 na základě zemí s nejvyšším příjmem remitencí. Jedním z cílů je seskupit země podle vybraných indikátorů a podle podílu remitencí na HDP. Dalším cílem je zjistit, jak významně vybrané indikátory ovlivňují velikost přijatých remitencí a na závěr, zda mají remitence vliv na ekonomický růst.

Klíčová slova: remitence, kompozitní indikátor, shluková analýza, vícenásobná regresní analýza

TABLE OF CONTENT:

1 Introduction and Objectives

International migration leads to be increasingly one of the most debatable phenomena, especially due to remittances, which play an important role as one of the sources of income in developing countries. Remittances are defined as migrant's earning sent from the country of destination to the country of origin. According to the World Bank, remittances have reached $552.317 billion, in 2015 and are lower than the income of the official development assistance (ODA). The issue of remittances has attracted the interested of researchers and policy makers. Researchers focus especially on whether remittances have an impact on reducing poverty and economic growth and thus as a potential tool for development.

As well as, the author of the thesis has been attracted by the influential role of remittances, primarily within the largest receivers.
The main objectives of the thesis are following:

- To investigate the interaction among the size of remittances as share of GDP and the socioeconomic conditions of country
- To investigate the influence of socioeconomic indicators to the amount of remittances
- To investigate whether remittances have an impact on economic growth

On the basis of the set of objectives mentioned above, the following three hypotheses have been formulated:

1. Countries with less favorable conditions are more dependent on remittances (higher share of remittances to GDP)
2. The selected socioeconomic indicators influence the value of remittances
3. Remittances have a positive impact on economic growth

The issue of remittances is closely related to migration and both of them are clarified within literature review. The literature review points out the main conceptual approaches to describe the phenomenon of the thesis, according to the several authors interested in it. The theoretical part of the thesis also highlights the current global trends in terms of remittances and migration. The last part of theoretical framework deals with the related socioeconomic indicators, as well as the current trends of the examined countries (India, China, Philippines, Mexico, Nigeria, Pakistan, Vietnam, Bangladesh, Lebanon and Egypt).

The methodological part includes the outline of composite indicator, cluster analysis and multiple regression analysis.

Another part is dealing with the main objectives of thesis. Using of composite indicators in order to rate the countries among each other, by the socioeconomic indicators. Further divide countries in clusters by adding the share of remittances to GDP, using cluster analysis. Multiple regression analysis is applied in order to examine the relation among socioeconomic factors (net migration rate, unemployment and human development index) and remittances. Finally, will be examined if remittances have an impact on economic growth, using multiple regression analysis. The last analysis is applied within clusters.

In the last part of thesis, the results are summarized and discussed with the other authors.

2 Literature overview

2.1 Remittances - definition and types

Remittances are recently one of the most monitored indicators within migration and development. Thanks to remittances there is a close connection between migration and development. Last researches have shown the high growth over the past decade and theirs connection with development of developing countries is growing too. Remittances are financial or good transfers sending by migrants from the destination they have moved, back home for their families, relatives or friends.

The IMF (International monetary funds) defines the remittances within two items from the Structure of Balance of Payment:

- Income received by workers, non-residents in given country, or the income from employer who do not have a residence in the country of worker.
- The transfers from residents of one economy for residents of different economy.

Following division of remittances is based on IMF (Definition of remittances):

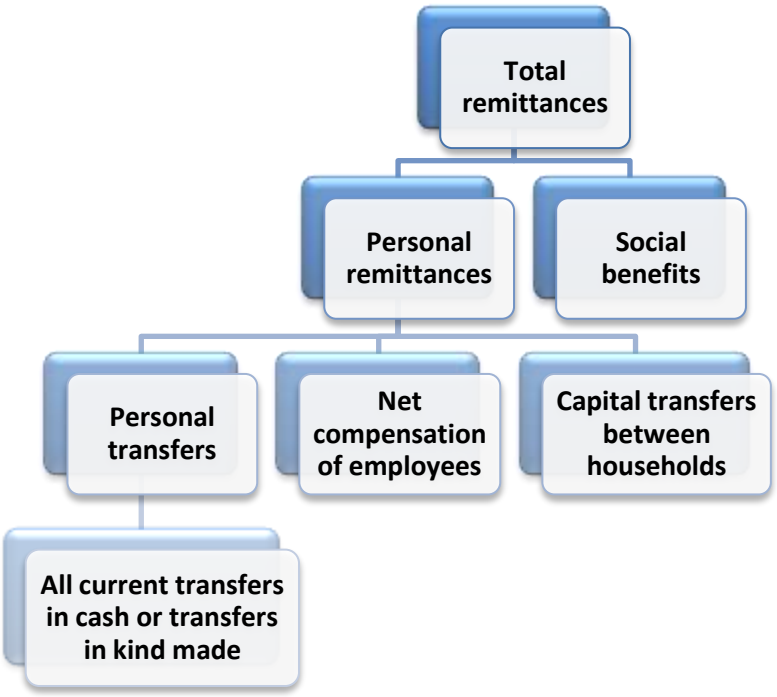

Figure 1: Types of Remittances, Source: IMF, own work

- Total remittances include a sum of personal remittances and social benefits directly to households from other institutional sectors.
- Personal remittances (worker's remittances) comprise of personal transfers between the households of residents including the net compensation of employees.
- Social benefits are social insurance and social assistance benefits received by households with the aim to provide the needs that arise from specific situations such as sickness, retirement, unemployment or family circumstances.
- Personal transfers include all current transfers from resident to non-resident households in cash or in kind made. Independently of the source of income of the sender, the relationship between the households or purpose for which the transfer is made.
- Net compensation of employees is the income, pay in cash or in kind made or other compensation from employee

- Remittances in cash are the financial transfers. The currency is sent to another country.
- Remittances in kind are transfers in a form of goods or services.

There are several different types transfers of remittances to countries of origin based on the types of senders and recipients, according to Carling (2005).
One of the most important flows are the intra – family, friends and relatives transfers as well as the Migrant's deposit or investments characterized as a migrant's transfers of money serving for their own use in form of depositing in bank account in their home country or their savings from abroad. The following types of transfer are less common:

- Charitable donations – migrant's send the remittances in order to donate the charity, not only in the time of crisis but also for long-term purposes in the country of origin
- Collective investments in development – these transfers are sent by organization (made by migrants in country of destination together with the partners in country of origin).
- Taxes or levies – transfers made between migrants and government or public institutions, for example schools or hospital in order to cover the costs of their family.
- Pensions – the regular transfer from government or private business from the former employment in country of destination
- Social security transfers – social benefits sent from the country of destination to the country of origin after retiring there.

2.1.1 Motivation and impact of remittances

What stands behind the sent remittances? There are many researches explaining why migrants sending their earnings back home and what could be the consequence of the sent remittances.

Even if the remittances are intended for consumption, it is obvious that remittances contribute to the prosperity of their recipients. It is very difficult to find out the exact

use of remittances but the important is that remittances have a positive impact on the reducing of poverty, based on statistical data. Remittances are used for the development of the infrastructure and could be thus the progressive impulse in order to sustain the development. (Novosák, Stojanov, 2008)

At the micro – economic level, the motivation of sent remittances is explained primarily by the relation with the family and relatives and how they use the remittances received. Migrant's motivation of sending remittance could be following: altruism, self-interest, and insurance. The altruistic behavior denotes that migrants care about their families and relatives and their well-being. Self – interest stands on the basis of their connection with the heritage or other sources in the family and thus the motivation do not lose it. And remittances as an insurance for families if something goes wrong in a country of destination. (Agunias, 2006)

Naturally, there are other motives such as saving money for accomplishing the goals – reconstructions of houses, its establishments, to repay the loans (particularly the loans from migration) and the dowry. After all those motives there is an important strategy in most of the southern developing countries such as Mexico, Turkey, India or Philippines, saying: "Go away and stay away but do not forget us". (Novosák, Stojanov, 2008)

The International organization for migration is using also the term of "social remittances (transfers)" which means that ideas, attitudes, behaviour, know-how and knowledge are spread through migrants to family, friends, and communities. This is also the part of the migration, because social remittances can support the changes in particular society.
The increase of income can be inspiring for others from the community (in the country of origin) and contribute with emigration especially in the short horizon of time but it can be assumed that remittances tend to increase the standard of living and decrease the migration flows in the longer horizon of time. (Adamcová, Němečková, 2009)

At the macro-economic level, remittances are the sources of foreign exchange and the macroeconomic stability. The multiplying effect of the economy occurs because of the

variety of remittance's use. Remittances are identified as an additional income which can be saved, consumed or invested. (Adamcová, Němečková, 2009)

The impact of remittances occurs within the multiplier effect through a household's consumption of goods and services, investment in human capital – leads to improve labour productivity; and investment in gross capital formation. (United Nations, 2007)

Rating agency the Fitch Rating also says that the flows of remittances can have the positive impact on the country's rate due to its potential low volatility[1] and vulnerability, because the Fitch Ratings take into account these aspects. When the rate is increasing the country has easier access to gain a loan, or to be more attractive for investors and have a better access to the capital market. (Adamec, 2014)

As well as the negative impact of remittances can occur, when the amount of remittances is year by year higher and stable, such as the dependency on remittances. It can cause that people will rely on remittance and will be less motivated to find the employment and it leads to the increase of unemployment. Not only the households could suffer of dependence of remittances, but also whole the country could suffer as well. It occurs when country rely on this kind of income and postpone or avoid to make an economic reforms, which are necessary for long-term economic development.

If the remittances inflow is large it can have an impact on the real exchange rate´s appreciation and raise the international price of export and make imports more expensive. But this impact is probably large in small economies. (Ratha, MPI, 2007)

The impact of remittances on economic growth has been widely discussed issue among policy makers. The following main channels are summarizing on the basis of literature review. The main channels are displayed as though which remittances enhance the economic growth and reduce poverty:
(Qayyum A. et al., 2008)

[1] „Volatility si a statistical measure of the dispersion of returns for a given security or market index. Volatility can be measured either by using the standard deviation or variance between returns from

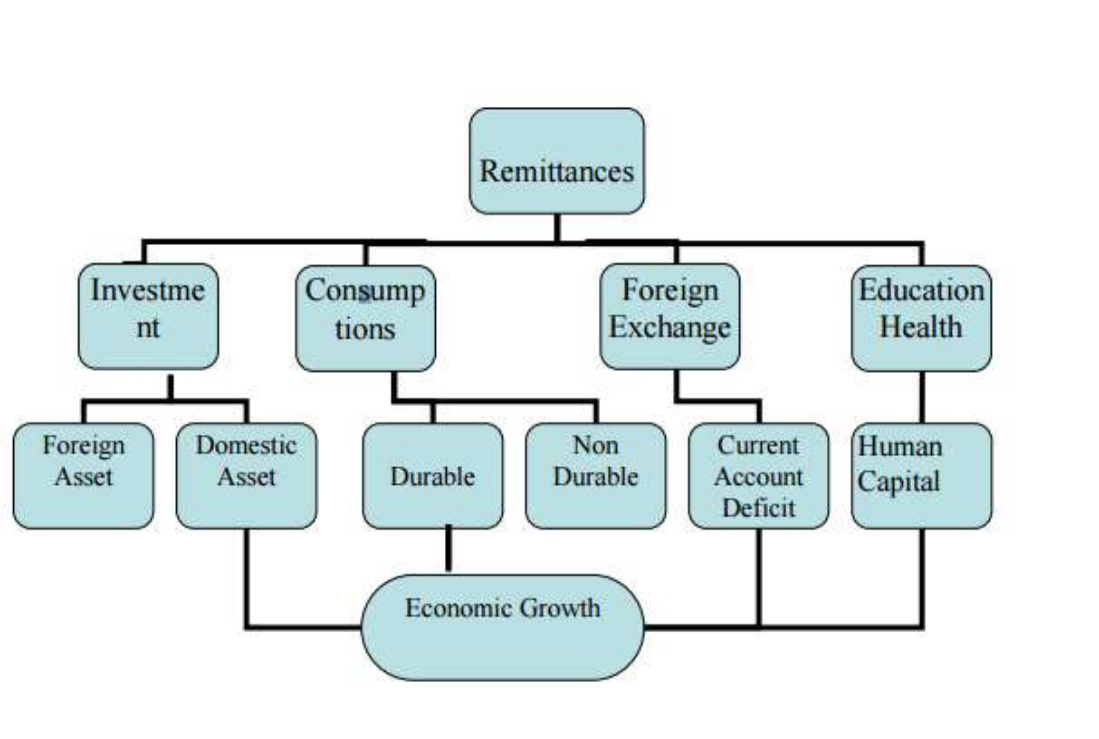

Figure 2: Main channels of Remittances; Source: Quayyum A. et al, 2008

2.2 Methods of remittance's measurement

The amount of cross – border remittances is very difficult to measure precisely as well as other variables associated with migration.

There are numerous of small transactions through a large variety of formal channels. IMF states that formal remittances channels are officially authorized institutions (banks, money transfers operators etc.) and semi - formal remittances channels include institutions outside of regulatory mechanism of the country authorities. These institutions are not controlled by any financial services authority but are stable in transferring money.

The channels above mentioned are official and best for measurement. It is estimated that remittances sent through informal channels fluctuate in the range 8-85% of total sent remittances. Data of informal channels are not thus a part of statistical data. (Drbohlav, 2015) Informal remittance channels are not under the financial regulation

but often legal. Official and formal channels include also intermediaries who do not act as a formal business and this type of channel is marked as a least official remittance channels (IMF, 2009).

How are the data collected?

IMF are using four methods to obtain accurate data such as an international Transaction System – ITRS, the system of institutional data collector of many countries, direct reporting by remittance service provider, surveys of Households and the indirect (secondary) source of data as macroeconomic, administrative and demographic.

The International Transaction system is data collection system that obtains data from banks and firms and captures theirs single cash transaction. The institutions (banks, firms) operating with foreign actives or trade with foreign currencies have to post this information regularly and compulsory according to the rules of national legislation. ITRS is perceived as an effective and significant source of data about remittances. (Drbohlav, 2015)

The second system of the monitoring is direct reporting by money transfer operators (MTO). MTO are financial companies (not banks) using its own internal system of access to another cross-border banking network. MTO have not that strict methods to identify them, and they are specialized for smaller financial contribution. The remittances are delivered in cash, by checks or promissory notes. The well-known companies of MTO are for example the Western Union or Money Gram. The advantage (in contrary with ITRS) of MTO is the direct reporting of remittance's transaction which means the better quality of information about the total money flows including the geographical distribution. Each transaction has data about the dates – when and where are remittances sent, in contrary with ITRS. MTO system, therefore, plays more important role in remittance's industry. (Drbohlav, 2015)

Surveys of household belong to valuable observed data providing more detail understanding of the nature of flow and their impact. The weaknesses of this method can be its low representativeness, high costs or wrong choice of the research sample.

Last methods of data collection are the secondary data, obtained due to incomplete data gained by direct observe. Source of secondary data can be used the economic or demographic data. The following mathematic models reflect three different approaches:

• Demographic models – derive mainly from population registers, census, and researchers of population

• Econometric models – based on important parameters of remittances is feasible to create these mathematic models

• Residual models – these models estimate remittances pursuant to accounting or financial data. (IMF, 2009)

2.3 Cost of remittances

How are the remittances sent?

There is large a number of different transfer systems for a monetary mechanism. It includes:

- Institutions which take care about transfers globally such as banks, money transfer agencies, credit unions, postal banks
- The mechanism which carry the transfer from one place to another including electronic money transfer mechanism – SWIFT, checks and bank drafts and money orders.
- The cash collection via automated teller machines (ATM's), fixed and mobile phones, the Internet. (Novosák, Stojanov, 2008)

The size of remittances, form (financial, in-kind made) and the way, how they are sent is very depending on the functioning of banking system in both countries of origin and destination and on the migrant's awareness about the system; The level of official exchange rate of domestic currency against the exchange rate of the country of destination.; As well as the possibility of financial transfers and its fees. (Adamcová, Němečková, 2009) The cost of remittances charged by money transfers agents could have a major impact on poor migrants, who remit less but have to pay proportionally more. The competition between financial institutions is growing and fees are going to be decreased. There is also still a large amount of migrants in host countries and their families in the country of origin without bank registration and they do not have an access to insurance options, savings, and credits offered by the financial system. (Maimbo, Ratha, 2005)

The average cost of sending remittances worldwide was about 9-10% of the transaction, in 2011. The highest fee among developing countries was in Sub-Saharan Africa, to

send $200 cost $25 and the lowest fee was in Latin America and the Caribbean. (Caprio, 2013)

Remittance Prices Worldwide monitors remittance prices globally since 2008. According to the report from December 2015, the average total cost of sending remittances was recorder at 7, 37%. The cost of remittances has decreased about 3% since 2008. The most meaningful change was a decline in the Middle East and North Africa. South Asia keeps its position as least costly region to send money to (5, 43%), while the most expensive region is still Sub-Saharan Africa (below 10%)

Each of the financial channels cost differently to send money. The cheapest way is sending money through a post office (5, 88%) while using banks is still the most expensive way (11, 12%). The cost of sending money through Money Transfers Operators is 6, 24%.

2.4 Global remittances trends

Following chapter describes current remittances trends based on World Bank's data. Countries are divided by income using the World Bank Atlas method based on GNI per capita. Low-income economies are those with GNI per capita $1,025 or less, lower middle-income economies are those with GNI per capita between $1,026 and $4,035; upper middle-income economies are those with a GNI per capita between $4,036 and $12,475; high-income economies are those with a GNI per capita of $12,476 or more. (World Bank, 2017)

Recipients of remittances

Officially recorded total remittance flows are estimated to have reached $552.317 billion in 2015. Graph below confirms the rapid increase over the last decades (almost over $299.577 billion). The largest recipient of remittances (countries by income) is the middle-income group of countries that has reached $402.197 billion and since 2005 has grown nearly three times. Followed by high-income countries that has reached $130,984 billion and its income of remittances has not rapidly increased over the last decade ($80.066 billion in 2005). The group of countries with the low-income is the lowest recipient of remittances ($19,136 billion in 2015). The flow of remittances has decreased mainly in 2008 – 2009 due to global financial crisis.

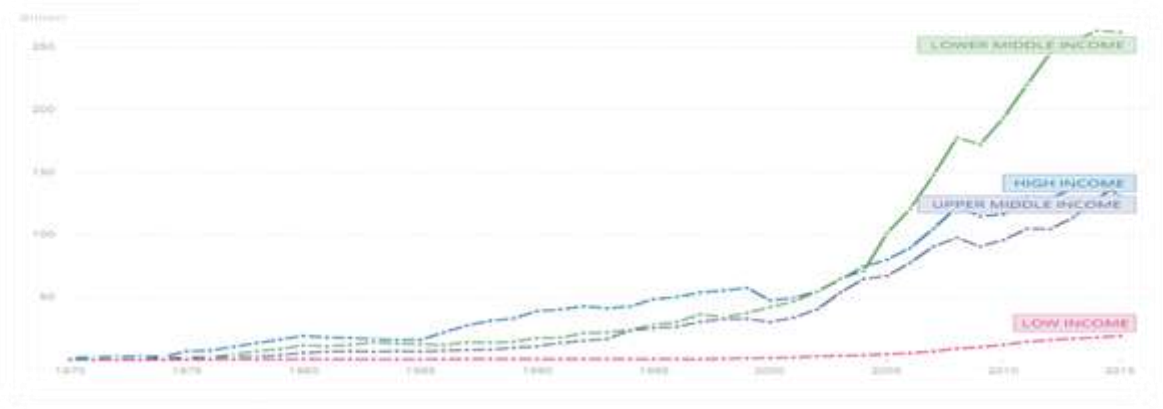

Figure 3: Personal Remittances receiveid (current US$); Source: World Bank

The most significant recipient of remittances in absolute term, are the big countries including India, China, Philippines, and Mexico. The graph bellows shows 10 countries most received remittances, in 2015

If we take into account the remittances as a percent of national GDP the higher income of remittances (as a share of GDP) is in low-income and small countries (the poorest economy). Remittances as a share of GDP rose from 0,95 percent in 1995 to 1.75 percent in 2010. The significant increase occurred between 1996 and 2003.

The dependency in low-income countries was 5, 5 % of GDP whereas in high-income countries 0, 3% of GDP and 1, 6 % in middle-income countries in 2015.

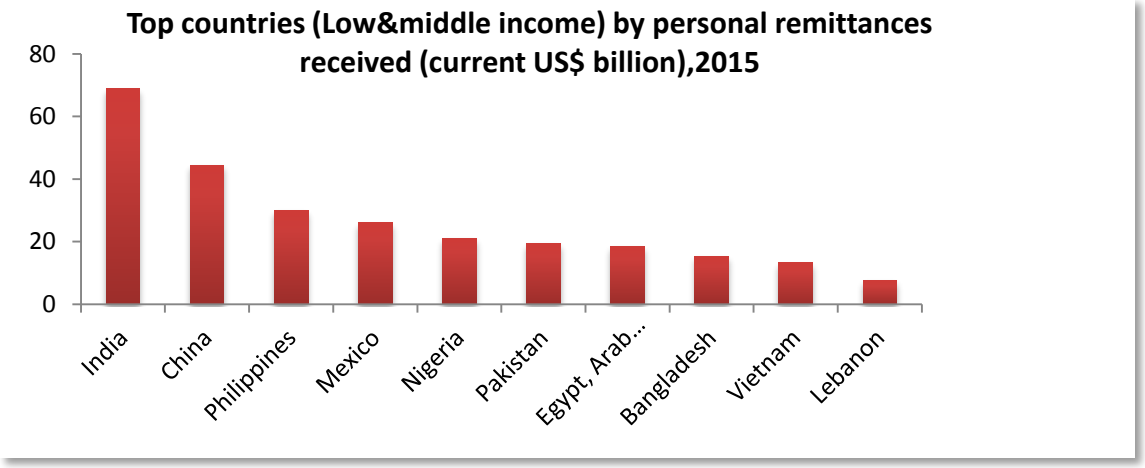

Figure 4: Graph of top countries by remittances received; Source: WB, own work

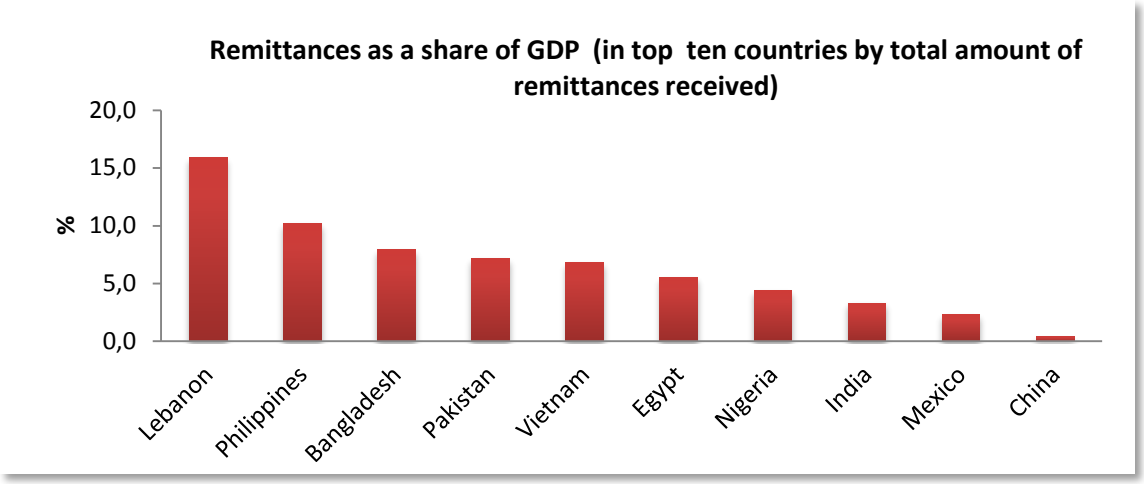

Figure 5: Graph of remittances as share of GDP; Source: WB, own work

Source of remittances

The largest sources of worker's remittances are mainly from big or developed countries. The United States ($61 billion), Switzerland ($24 billion), Germany ($18 billion) or France. As well as China ($20, 4 billion) became part of the largest sources of remittances in 2015 and the amount of remittances paid, increased up to four times compared with the previous year. Other largest sources of remittances are the oil-producing countries including Saudi Arabia ($38 billion), Russia ($19, 6 billion), Kuwait ($15 billion) or Oman.

The United States is the highest source of remittances for *Mexico ($24, 3 billion*) with 12 million of immigrants, *China ($16, 3 billion)* with more than 2 million of immigrants, and *India ($11 billion)* with 1, 9 million of immigrants. Saudi Arabia is the second largest source of remittances for Immigrants from *India ($10, 5 billion*) with almost 2 million of migrants and for *Egypt's migrants ($7, 6 billion*).

Bangladesh has received most remittances from India, Saudi Arabia and United Arab Emirates. Lebanon's sources of remittances are Saudi Arabia and United States. United States is the largest source of remittances for Philippines, as well as the United States is the biggest source of remittances for Nigeria and Vietnam. Pakistan received remittances mostly from Saudi Arabia and United Arab Emirates. (Migration Policy, 2015). According to World Bank 10 – 29% of remittances come to the developing countries from the developing middle-income countries.

Comparison with the other financial flows

Due to rapid globalization, there is an extreme international flow of financial resources, in main three forms: 1) private foreign direct investments (by large multinational or transnational corporations) and portfolio investments (e.g. stocks, bonds and notes); 2) remittances of earnings by international migrants; and 3) public and private development assistance (foreign aid), from individual national governments and multinational agencies, and from nongovernmental organizations (NGO's). (Todaro, 2009)

The graph below states that remittances play currently the second most significant financial role in developing world after foreign direct investments. The flow of remittances is higher than official development assistance and private non - FDI flows.
The amount of remittances depends on the economic cycle in the country of the destination than of the country of origin, in contrast with the other financial flows (FDI, loans). (Adamcová, Němečková, 2009)

Remittances have a tendency to rise when the country of origin suffers due to an economic crisis, natural disaster or political conflict. Migrants send thus more funds in order to support their relatives. For instance, remittances in Philippine household increased after the 1997 financial crisis. They rose as well due to financial crisis in Mexico in 1995 and after natural disaster in Bangladesh. Remittances also increased due to Hurricane Mitch in Central America, and were a critical means of support during Lebanon's civil war. (UNPD)

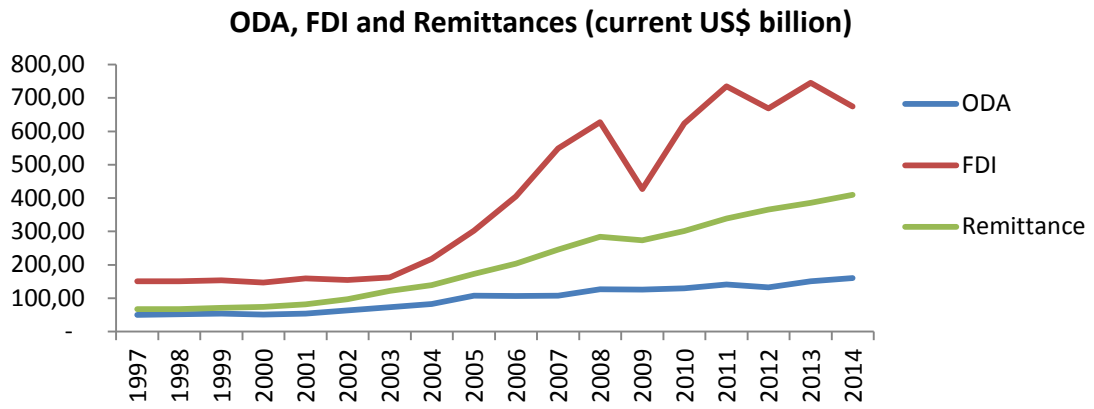

Figure 6: ODA, FDI and Remittances; Source: WB, own work

2.5 International migration

The International migration is the current complex and interdisciplinary phenomenon leads to the determining topic in this century. The current question is whether to take or not to take a part of the migration but the current question is how to manage it effectively in order to reduce their negative impact and support its benefits. (Adamcová, Němečková, 2009)

Currently, there is not a theoretical framework to explain the complexity of migration, because of its multidisciplinary. This phenomenon is studied by anthropology, law, demography, economy, geography, history and sociology. In terms of this paper, the migration will be taken mainly from an economic and social point of view.
Basic terms, according to OSN:
International migration is the crossing of the boundary of a political or administrative unit for a certain minimum period of time. OSN defines migrant as a person who changes the origin country for another country including the movement of refugees, displaced persons, uprooted people as well as the economic migrants. The duration is obviously more than one year. Migration takes place from the country of origin through the transit country to the host country. Emigrant is the person leaving the country and immigrant is the person coming into the country. The migration rate is the difference between emigrants and immigrants within the country for a certain period of time.

Global migration trends according to the International Migration Report 2015:

- The number of international migrants has reached 244 million in 2015, up from 222 million in 2010.
- Nearly two-thirds of all international migrants live in Europe (76 million) or Asia (75 million). Northern America hosted the third-largest number of international migrants (54 million), followed by Africa (21 million), Latin America and the Caribbean (9 million) and Oceania (8 million).
- Most migrants originate from middle-income countries (157 million) in 2015.
- 104 million (43%) of migrants were born in Asia, 62 million (25%) were born in Europe, followed by Latin America and the Caribbean (15%) and Africa (14%).

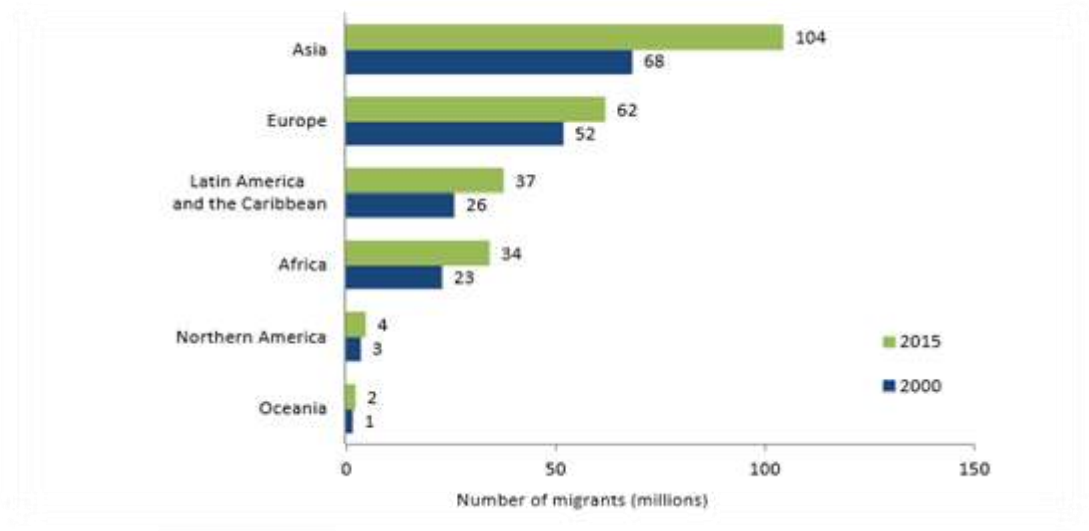

Figure 7: Number of international migrants by major area of origin, 2000 and 2015.
Source: International Migration Report 2015: Highlights

2.5.1 Types of migration

The various kinds of migration depend on range of different reasons. Most commonly used division of migration depend whether the migration is in within one country (internal) or outside of the country (external), whether the migration is voluntary or forced and circular (temporary or permanent return).

Voluntary and forced migration

The most well-known concepts divide the migration according to the circumstances of leaving the country and the possibility to make a choice if migrate or not, called voluntary and forced (involuntary migration). Voluntary migration is the action of people made by their own choice, for example, labor migration, non-immigration, and chain migration. But we can consider the labour migration as involuntary if the people migrate due to the low job opportunities in their home country. The migration is near to forced migration because they have to support their families by sending remittance. (Novosák, Stojanov, 2008)

Forced migration includes the conditions which directly or indirectly force the people to leave their home. There are two different views. Man-made causes comprising poverty, wars, political prosecution, angst and environmental disasters such as flooding, volcano

eruption, famine, tsunami etc. Obviously, the causes (man-made and natural disasters) can blend together in the case of poverty or climate change. (Stojanov and col., 2008, p. 55)

"By the end of 2015 65.3 million people were forcibly displaced due to persecution, conflict, generalized violence or human rights violations. This reflects an increase in absolute terms of 5,8 million people over 2014 and represents the greatest level of forced displacement ever recorded," according to the research of International Organization for Migration (IOM).

Circular migration

In general, the circular migration is the temporary or permanent return of migrants to the host country, usually for employment.

"The Circular migration refers to repeated migration experiences between an origin and destination involving more than one migration and return. Effectively, it involves migrants sharing work, family, and other aspects of their lives between two or more locations" as Graeme Hugo states (MPI - Policy Brief, 2013).

Theory of Circular migration is relatively new research phenomenon, which is viewed by some part of the public with scepticism but by many experts in migration field and development see it as a positive type of migration which can bring benefits to the origin countries, destinations and also migrants themselves if it is well-managed. Circular migration is ever more one of the important tools to decrease the inequalities increases the development in low-income countries. The circular migration can bring the economic benefits and help to decrease the poverty and has thus the positive impact on both countries of origin and destination. It helps to destinations to have the labor in the shortages in a specific skill area or seasonal workers. The positive point for a country of origin is that this type of migration can reduce the risk of brain drain. (Hugo, 2013)

The impact of circular migration on development tends to be positive when the migrants gained skill and saved money while abroad, when the situation in countries of origin has improved and if the return has been planned and entirely voluntary. (Stojanov and col., 2008)

2.5.2 Causes of migration

„Push“ and „Pull“ model theory

The “push” and “pull” model theory is the most common and important theory in migration.

This theory describes causes of migration within the number of negative factors, called “push” factors which force the migrants to leave their home country and the positive factors called “pull” factors that appeal to migrate to a new destination. The push factors include elements such as economic, social and political difficulties mainly in developing countries. In contrary, the pull factors characterized the advantages in receiving country. Examples of pull factors are higher wages, high education, social and health insurance, better standard of living, the country’s security, etc. (Novosák, Stojanov, 2008)

List of push and pull factors vary depending on each of country.

“Push” and “pull” model and neoclassical economic theory (micro approach) explain the migration as an individual decision based on an individual comparison of benefits and costs. These approaches explain the migration theory based on wages differences of countries. Another concept reflects also the duality of labor markets in developed countries (segmented labour market theory) or reflects the overall working of world economy and globalization. (Adamcová, Němečková, 2009).

Cumulative causation theory

In contrary, the cumulative causation theory, or theory of social migration network do not consider the migration as an individual decision but as dynamic chain process. These approaches are based not only on economic relations but also on cultural and historical relations. It means that the tendency of an individual to migrate is rising directly proportional with each another migrant in the particular country. It causes another international migration flow. (Adamcová, Němečková, 2009)

In some societies, migration becomes part of the value system of the community caused by the change of tastes and motivations due to the experience of migrants gained in the country they have moved. (Novosák, Stojanov, 2008)

2.5.3 Impact of labour migration

International migrant workers are the biggest "group" of migrants and have reached over 150 million in 2013 or about two-thirds of the total international migrant stock, according to IOM estimates. It has the positive and negative impact in both sending and receiving countries. There is a new phenomenon called brain drain and brain gain.
The sending countries perceive the emigration as a negative impact, because of losing their human capital and investment in education called brain drain and thus the skilled emigrants are perceived by those left behind as harmful, especially if the education was financed by public funds. (Novosák, Stojanov, 2008)
These losses of skilled residents can be compensating by profits of financial remittances in sending countries.
Currently, there are new terms as „brain exchange" means that in one region is brain gain but at the same time there is an inflow of other foreign experts. If the migrants are repeatedly coming back in the country of origin and destination, we call it as "brain circulation".

Some countries of origin have a different view on emigration of their citizens; some of them see it as negative whereas other countries consider the emigrants as one of the significant development strategies. (Migrace a rozvoj, 2011).

In the other hand the "brain gain" is one of the positive impacts in receiving countries. Many of developed countries even have special programs to attract the foreign employees. ("Headhunting" politics, particular websites, etc.) (Migrace a rozvoj, 2011). Brain drain and brain gain is the concept also known within developed world.

2.6 Selected countries

Following chapter will introduce the selected countries in terms of migration, remittances and current socio-economic situation in the country. Data characterizing each of country are displayed in the table 11 and 12, in the attachments.

India

India with the second largest number of inhabitants (1,2 million) has the largest number of emigrants in the world. More than 16 million of people were living outside of country of origin, as well as the amount of received remittances was the highest (68,9 billion US$) in 2015. India's biggest sources of remittances are the United States, Saudi Arabia and United Arab Emirates (UN-Migration Reports, MPI)

The Indian economy is growing at fast pace and India currently belongs among to the fastest – growing G20 economies. Due to the recent accelerated structural reforms and the macroeconomic policy framework, India is sustaining longstanding rapid economic expansion. (OECD, 2017) Despite of the recent rapid GDP growth, India belongs to the group of lower-middle income countries. With the HDI value 0,6 is the country in the medium human development category, at 131 out 188 countries. Since 1990 the value of HDI has increased by 45,7%. (UNPD)

China

China has the second largest number of emigrants (10 million) with second highest amount of remittances received in 2015 (44,4 billion US$). (UN-Migration Reports, 2015) The biggest sources of China's remittances is the United States with $16,3 billion and China, Hong Kong SAR ($15,6 billion) (MPI)

Chinese economy has grown fast, but slowing gradually, while GDP per capita is still growing rapidly. China belongs to the group of upper-middle income countries as well as it is has high human development. Social safety has improved over the past decade and leading to reduce poverty, but the income inequality remains high. (OECD, 2017)

Philippines

Philippines have received more than $28 billion of remittances, in 2015, mainly from United States. Remittances have reached over 10% as a share of GDP and are thus an important source of income in many households. More than 5,3 million of citizens of Philippines live outside of their country (5,01%) of which almost 2 million of citizen live in the US. The amount of remittances sent from the US was $9,7 billion (MPI)

Since 2013 the Philippines economy has growing, is among the groups of lower middle income countries, with $3,5 thousand GNI per capita. Country suffers from high degree of poverty and inequality, with the value of HDI 0,6 belongs to the group of medium human development countries. Philippines is one of the countries suffering of natural disasters in the world – typhoons, earthquakes, volcanic eruptions and flooding, what could be one of the reasons to migrate, as forced migration. Another reason to migrate is constantly high unemployment rate compared to neighbouring countries. (OECD)

Mexico

Mexico has the second largest number of emigration in the world (12 million), mostly concentrated in United States of America. Almost 12 million of Mexican's migrants stay in the United States and it is about 98% of all Mexican migrants. (United Nations, 2015) By the amount of remittances is Mexico in fourth place with the $26, 171 billion in 2015. (WB)¨

Mexico is 11th largest economy (in terms of GDP measured at PPP) and is increasingly becoming an international trade hub. Despite of this, Mexico suffers due to rising of disparities between highly productive economy in the North and in the Centre and low productivity in the South. The high income inequality remains many families live in poverty. (OECD)

Nigeria

Nigeria with more than 1 million of emigrants has received about $20, 4 billion in 2015 from which the highest amount of remittances has received from United States, United Kingdom and Cameroon. Overall, the remittances were 4,4% as a share of GDP. (MPI)

Nigeria is the second biggest economy and the biggest oil producer in Africa. According to the GNI per capita remains in lower middle income group of countries. Nigeria's HDI value is 0,5 which put it to low human development categories positioning. HDI value has increased from 0,4 in 2004. According to the UNPD 50.9% of the population live in the multidimensional poverty[2] and 18.4 live near the multidimensional poverty

Pakistan

The outward migration from Pakistan grew to 5,9 million of citizens. Pakistan's migrants live mainly in India and Saudi Arabia and together with United Arab Emirates were the biggest source of Pakistan's remittances. The total amount of remittances was over $19 billion and 7,1% of GDP. (MPI) Pakistan, with the increasing number of working-age population, is placed as a second-largest grouping of workers in South Asia (after India), mainly to the Gulf region. Pakistanis rely heavily on labour migration as a way to reduce poverty and decrease unemployment. (ILO)

In terms of the GNI per capita, Pakistan belongs to the group of countries with lower middle income. The index of Human Development is medium and nearly 39% of people lives in multidimensional poverty. (UNDP)

Egypt

Egypt has received about $18,3 billion of remittances, mainly from countries as Saudi Arabia, Kuwait and United Arab Emirates. (MPI) Egyptians GDP is slightly growing after the implementation of the Sustainable Development Strategy and ongoing macroeconomic reforms. Reforms have been implemented due to its political instability in addition to regional and social security risk with the negative impact, especially on tourism. (African economic outlook, 2016)

Egypt suffers of high unemployment rate, especially among youth Egyptians.

According to the HDI, Egypt is among Medium Human Developed countries.

[2] MPI identifies depriviation accros the same dimensions as HDI – Health, Education and Standard of living, shows the percent of people who are multidimensionally poor (UNPD)

Bangladesh

Citizens from Bangladesh working abroad have sent in country of origin about $15,3 billion as remittances, mainly from India, Saudi Arabia and United Arab Emirates, in 2015. The overall outward migration from Bangladesh was over 7,2 million of citizens. As a share of GDP Remittances are of 7,9% in Bangladesh, what shows the dependency on remittances, which is slowly decreasing, compared to 2012 (10,2 % of GDP). (IOM, MPI)

Vietnam

Remittances send to Vietnam has reached $13 billion in 2015, the largest amount was sent from the United States, where the immigrant population represented the sixth largest immigrant group. (MPI)

Since 1990 Vietnam's GDP per capita growth have been among the fastest in the world, among 6% in 2015. Vietnam has also reduced poverty and people living below national poverty line reached 13,5% in 2014, compared to 60% in 1993. Vietnam's citizens are more healthy and educated. (WB)

Lebanon

Lebanon is the largest recipient of remittances as proportion to GDP (15, 9% in 2015), in terms of selected countries and the total amount has reached $7,4 billion**.** Remittances to Lebanon were sent mainly from Saudi Arabia, US, Australia, Germany and Canada. (MPI)

It is necessarily to emphasize, that Lebanon is known as a country of both, large emigration and immigration country. Lebanon is struggling with a great continual emigration, as well as a big influx of refugees and asylum seekers, which is mainly due to Lebanon's location, riddled with wars. It confirms the obtained data, between 2013 and 2014 the net migration has changed from very low (negative) to very high (positive) value (more people came in the country than left), as a result of the huge income of Syrian refugees. In 2015, the number of Syrian refugees has reached over 1 million in Lebanon, which has the highest refugees to host. (Kukrety, 2016)

The Syrian crises have also an impact on Lebanon's economic and social factors - worse poverty and widen income inequality. GDP growth on Lebanon has reached only 1,3 % in 2015. (WB)

2.7 Integrated Indicators

2.7.1 Balance of payments and GDP

Remittances influence the balance of payment and often cover part of its deficit.

The balance of payments is a statement, summarizing nation's financial transaction with the rest of the world for the particular time period.

The following description displays the content of balance of payment account according to M. Todaro and S. Smith.

BOP is divided into two parts as current account and capital account (financial account). Current account comprises of export (A) and imports of goods and services (B), especially the value of imports from exports and the investment income received from abroad (C), the debt service payments (D), private and public net remittances and transfers (E). The total current account balance (F) is the result of A – B + C – D + E. If the balance is positive is called surplus and negative is a deficit.

The capital account balance contains the direct private investments (G) and foreign loans (private and public) minus amortization (H), increase in foreign assets of the domestic banking system (I) and resident capital inflow (J). The total capital balance (K) is then the result of G + H - I – J. The cash account or international reserve account (L) is the item for balance and includes also the errors and omissions (L – F – K).

GDP (gross domestic product) is one of the primary indicators states the health of a state's economy and measures the total value of products and services, produced in a country in a given period of time, within the borders of country. Obviously is calculated on an annual basis or quarterly basis, as well.

The GDP is measured by two approaches: either by income method or expenditure method. The expenditure method includes the value of purchases made by final users – for example the consumptions by households, the investments in machinery by companies or the purchases made by government and net exports. The income approach is the sum of incomes, for example the compensation of employees, gross profit and tax less any subsidies. (IMF, 2012)

The expenditure approach includes four main components:

GDP = C + I + G + (X-M), where:

Consumption - personal consumption expenditures – durable goods, non-durable goods and services
Investment – gross private investment - fixed investment and changes in business inventories
Government consumption - this category includes all government spending in the current period of time
Net Export – Net export is calculated by subtracting a nation imports from exports

GDP growth (Economic growth rate) is expressed as a comparison in percentage with the previous year and therefore it is a valuable indicator for detecting how fast the country's economy is growing.
Economic growth rate demonstrates the change in a nation's or larger economy's income over a specified period of time. The formula for counting the GDP growth is following:
Economic growth = $\frac{GDP2-GDP1}{GDP1}$.

2.7.2 Household final consumption expenditure

The household final consumption expenditure is the part of GDP, as mentioned above. According to definition by OECD, 2009, it is typically the largest component of final uses of GDP, representing in general around 60 % of GDP. It includes all purchases made by resident household to meet their everyday need: food, clothing, housing services (rents), energy, transport, durable goods (notably cars), spending on health, on leisure and miscellaneous – services. It also includes a number of imputed expenditures, for example agricultural products produced for own-consumption but the most significant imputation is typically owner-occupiers' imputed rent. Households' actual individual consumption is equal to households' consumption expenditure plus those

(individual) expenditures of general government that directly benefit households, such as healthcare and education.

2.7.3 Human Development Index

One of the widely used indicators to measure the socioeconomic development is presented by United Nations Development Programme (UNPD), as a Human Development Index (HDI). "HDI is a geometric mean of normalized indices for each of the three dimensions", according to the UNPD. The reason of creating HDI is to emphasize that people and their capabilities should be the final criteria to evaluate the development in the country, not only by economic growth.

The measures summarize three sub-indicators, as the key dimensions of human development:

- Healthy life is measured as a life expectancy at birth
- Education is expressed by average years of schooling among adults aged 25+ years and expected years of schooling for children of school entering the community

  Decent standard of living is measured by the gross national income per capita (GNI) (Human Development Reports, 2016)

The equation is following:

$HDI = (I_{health} \times I_{education} \times I_{income})^{1/3}$

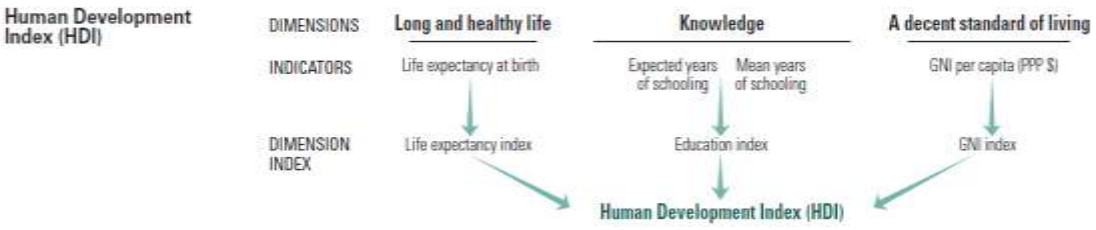

Figure 8: HDI; Source: UNPD, 2016

Countries are divided into four groups according the index from 0 to 1:

Very high human development	0,800 and above
High human development	0,700 – 0,799
Medium human development	0,550 – 0,699
Low human development	0,550 and below

2.7.4 Net migration rate

Net migration could be estimated, due to missing of accurate figures for immigration and emigration of many countries. Sometimes countries do not have the figures at all and the net migration is calculated as the difference between the total population change and the increase of population during the year. The fact is that net migration does not give an indication of the relative scale of the separate immigration and emigration flows and from a country. Country may state low net migration but experience high immigration and emigration flows (Eurostat, 2015)

The net migration rate is an indicator, usually calculated over a one-year period, expressing the difference of immigrants and emigrants of an area, in a period of time and divided per 1000 inhabitants (considered on midterm population). More the value is positive, it means that more people are entering the country and more the value is negative means that people are leaving the country than entering. The neutral migration rate means that the amount of immigrants and emigrants is equal.

The migration rate gets the overall evaluation of the migrant's flows in a specific country and allows compare countries between each other. In terms of the measurement of migrants, there is a group of migrants, such as refugees, which is difficult to measure or it is not measured at all, for example if they do not seek for asylum.

2.7.5 Unemployment

The definition of the unemployed person, according to the International Labour Organization is following:

- someone aged 15 to 74, without work during the reference week
- available to start work within next two weeks
- actively having sought employment at some time during the last four weeks.

The unemployment could be expressed as unemployment rate as a number of people unemployed as percentage of the labour force. Labour force or workforce or economically active population includes thus both employed (employees and self-employed) and unemployed people, but not the economically inactive, such as pre-school children, school children, students and pensioners. (Eurostat, 2014)
The high unemployment could cause that some people become discouraged and stop to look for the work, afterward are excluded from labour force. It may affect the fall of unemployment, or stop rising, however there has been a significant improvement in the labour market. (OECD, 2017)

The International Labour organization states that unemployment is one of the main factors force people to migrate especially among young migrants (aged 15-24), as the availability of higher – paying jobs abroad. About 3.6 million young people were enrolled in tertiary education abroad, in 2010.

3 Data and methodology

The main aim of the paper is to analyze the relationship between remittances and selected socioeconomic indicators by using composite indicator, cluster analysis and multiple regression analysis. This part of thesis is an outline of applied methods.

3.1 Data

In general, data has a variety of definitions, depending on its use. Delphi states: "Data are the basic individual items of numeric or other information, garnered through observations; but in themselves, without context, they are devoid of information. Data are symbols organized according to established algorithms. Data are representation of facts about the world". According to Ackoff (1989), data is defined as a symbol that represents a property of an object, an event or of their environment. Data is raw. Data is a product of observation. It simply exists and has no significance beyond its existence. It can exist in any form, usable or not." (Majková, Stehlíková, p.14-15, 2014)

Data used in thesis are secondary type of data, which are collected by individuals or agencies for some other purpose. In contrary, the primary type of data, are collected in order to create the official statistics. (Majková, Stehlíková, p.44, 2014)

Panel data

The analysis is performed by the panel data (or longitudinal data). The main characteristic of panel data is that observations are measured repeatedly through time. Panel data series are in contrast with to cross-sectional (time series) data that are in one dimension only; the single outcome is measured for each individual. (Diggle P., et al, 2002)

Panel data have several advantages, in contrast with time series data. Firstly, we get a lot of observations that are not available by cross-sectional data. Secondly, panel data are not usually too much aggregated as time series data, therefore is possible to analyze more complicated hypothesis of dynamic and mutual behaviour. The panel data set

signifies the set of observations, of which some characteristic properties are very similar, and are somehow related to each other. (Novák P., 2007)

Data are collected from the following sources:

- World Bank – provides global data and statistics, research and publication, concurrently focuses on the fight with extreme poverty. Most of the secondary data were used for this thesis using World Bank's statistics, as follows:

- United Nations Development Programme (UNPD) – provides statistics and reports mainly related to the human development.

- Central Intelligence Agency – CIA – The World Factbook provides information of each of the country worldwide, especially about history, people, government, economy, geography, communication, transportation, military and transnational issues. The data of net migration rate were collected through Index Mundi, which provides data of previous years collected from the World Factbook. Index Mundi contains detailed country statistics, charts, and maps, compiled from multiple sources.

Data	**Source**	**Link**
Remittances (% of GDP)	World Bank	http://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS
Human Development Index	United Nations Development Programme (UNPD)	http://hdr.undp.org/en/data
Unemployment	World Bank	http://data.worldbank.org/indicator/SL.UEM.TOTL.ZS
Net Migration Rate	Index Mundi (CIA World Factbook)	http://www.indexmundi.com/g/g.aspx?c=bg&v=27
GDP growth	World Bank	http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG
Household final consumption expenditure	World Bank	http://data.worldbank.org/indicator/NE.CON.PRVT.KD.ZG

Table 1: Source of Data: Source: own work

3.2 Methodology

3.2.1 Measurement of central tendency

The measures of central tendency characterize typical value of data. They are called as central value or the average value. The well known are median, mode and arithmetic mean. (HENDL, 2009) The arithmetic mean is a sum of all measured data divided by its quantity. The arithmetic mean should be used when the distribution of data is symmetrical.

Median (Me or $\tilde{x}$) is a value which sorts the order of the data into two equally parts. If n is odd number than $\tilde{x} = x_{(n+1)/2.}$ If n is even number than $\tilde{x}$ is 0,5 ($x_{n/2} + x_{n/2+1}$). Median is less sensitive to extreme values in contrast with mean. Median minimizes the sum of absolute deviations of measures from the selected number. Median should be used when data contain extreme and different values. (Hendl,, 2009).

Mode (Mo Or $\hat{X}$) Is A Value That Occurs Most Frequently In Data Set. This Type Of Mean Value Is Characterized To Use By Categorical Values. Mode Is Used When The Word "Average" Means The Most Frequently Value. (Hendl, 2009)

Data are in years 2010 – 2015. An arithmetic mean of selected years was used as a measurement of central tendency for composite indicators and cluster analysis. Except of Lebanon, where the median had to be used, due to its extremely different values in the selected years. Using of average could significantly affect the result, because of the extreme values.

3.2.2 Composite indicators

Minařík and col. (2013) defines composite indicators as an index constructed from sub-indicators, which are often not in the same unit and thus it is not possible to compare them directly, they have a different variability, level and are not equally serious.

Composite indicators are used to measure, evaluate and comparison of regions, e.g. by creation of the descending or ascending order.
Construction of composite indicator consists of another sub steps:

a) Selecting variables

The quality of the result of composite indicator is conditional by underlying variables. It is necessarily to divide the variables by which the maximum values are required to achieve, so called MAX-type variables. And by which the minimum values is required to achieve, so called MIN-type variables. The high correlation between variables can be a problem. Select to variables with the high value of correlation (close 1), it is the same as have one of those two with doubled weight. Using of high correlated variables would be useless. It is required to check the correlation first. (Minařík, 2013) In case of high correlated values it is possible to spread the weight between those indicators. (Jadczaková, 2017)

b) Missing values

By the available secondary data it is common, that some of data are missing.
Missing data often defends the development of robust composite indicators. However, it is not possible to avoid of missing data, but the amount of missing values cannot be over 5%. (Minařík, 2013)
The case of missing values is possible to treat by aggregation, as well by using algorithm (on the basis of relevant indicator). The missing value may be calculated or replaced by the most often occurring value (mode). (Minařík, 2013)

c) Weighting

The easiest way is determine same weights of each indicator, i.e by the number of indicators *(m)* will be its weights constant $w_j > 0;\ j=1,2.....m.$ Each indicator then has either weight 1 (if the sum of weigh is equal to the sum of indicators) or the value $1/m$ (If the sum of weights is equal 1). Those two ways of standardized weights are using if the weights are not constant.
A several techniques of weighting exist:

Matrix of pairwise comparison

One of the widely spread is using of pairwaise matrix, when the square table is used. The square table has a measurement *m x m* , which is filled in lines, in pairs. If the one indicator in row is more important than column indicator, it is assigned by "1" in row indicator and "0" value to column indicator. If the row indicators deemed to be less important, it is assigned by "0" and the indicator in column by 1. If the importance is equal of each indicator, the value will be "0,5" to both of them. The elements on diagonal remain empty. The weights are computed by dividing row sums. (Jadczaková, 2017)

Rating scales

Usually by items with odd number (1,3,5,7,9 – item scales), which can be transform into subjective criteria. For example: 1=below average, 2=average 3=above average, 4=very much above average. The weights are afterwards standardized by dividing each item by sum of items. All standardized weights sum up to one. As well as, each item can be divided by average score. In this case, the sum of weight equal 1. (Jadczaková, 2017)

Preference matrix

The alternative to pairwise comparison is the preference matrix. Weights are assigned in the way to indicate how many times, is one indicator more important than the other indicator. (in a row and column). If the row indicator is two times more important, the assignment will be 2 for row indicator and $\frac{1}{2}$ to column indicator.

Both of the methods – pairwise matrix and preference matrix are used based on the decision of experts of the given issue. (Minařík, 2013)

d) Correlation

The correlation measures the similarity among variables. The high correlated variables could distort the result. As well as it is useless to placed highly correlated variables, as it could be replaced by one variable. (Minařík, 2013)

The correlation is measured by coefficient of correlation r = ≤ 1. The value of r is interpreted as follow: (Řehoř, 2010)

$1.0 \geq r \geq 0.7$	Indicates very high correlation
$0.9 > r \geq 0.7$	Indicates high correlation
$0.7 > r \geq 0.5$	Indicates moderate correlation
$0.5 > r \geq 0.3$	Indicates low correlation

e) Standardization (normalization)

Aim of normalization is to transform the original data into dimensionless values in order to gain easily aggregated variables. There are a several types of methods of normalization:

Ranking

The aim of ranking is to replace original values of cardinal variable X_j by ascending or descending order. The new variable of ordinal nature is created. More specifically, the max type value is ranked in descending order – the greatest value with the lowest rank. The min type indicator is ranked in ascending order. (Minařík, 2013)

Z-score

Z – score replaces values of original indicator X_j, into dimensionless value. Max type by dimensionless Z-scores $Z_j = \frac{Xj - \bar{x}}{\sqrt{\text{var xj}}}$ with zero mean and unit variance

(var $z_j = \sqrt{var\ z} = 1$). The min type by dimensionless Z-score $Z_j = \frac{\bar{x} - Xj}{\sqrt{var\ xj}}$.

(Minařík, 2013)

The min-max method

The min-max method (re-scaling) normalises indicators to have an identical range <0,100>. The MAX indicator is calculated as $Bi = \frac{\text{Xi}-\min(\text{Xi})}{\max(xi)-\min(xi)}$ x 100. The MIN indicator is calculated as $Bj = \frac{\max(xj)-Xj}{\max(\text{xj})-\min(\text{xj})}$ x 100.

The easiest way is to consider the weights of indicators as constant, each of the indicators have the weight either 1, i. e $\sum_{j=1}^{m} wj = m$, in case the sum of weights is equal to amount of indicators, or the weight $\frac{1}{m}$ when $\sum_{j=1}^{m} wj = 1$. (Minařík, 2013)

f) Aggregation

Aggregation is made regardless the used method of standardization. The aggregation is made by the weighted sum approach (for dataset without missing values) or by weighted average approach (if dataset include missing values).

3.2.3 Measurement of similarity - Cluster analysis

The cluster analysis is used in order to measure the similarity (dissimilarity) of the selected countries. The aim of the analysis is to create the clusters based on indicators used in this paper and reveal the inner structure of the set of objects, with following rules: Objects in the same cluster are the most homogenous (resp. the values of variables), in contrary the objects belongings to different cluster are the most heterogeneous (resp. the value of variables). Each object belongs in only one cluster. (Minařík, 2013)

According to OECD: "Cluster analysis is a collection of algorithm to classify objects such as countries, species and individuals. The classification aims to reduce dimensionality of a data set by exploiting the similarities/dissimilarities between cases."

Some difficulties may occur by applying the cluster analysis:

- The result of clustering is unsure and the amount of clusters is not known in advance.

- The clusters do not have to even be created due to missing of similarities between objects.
- The result has to be interpreted accurately.
- The individual variables are obviously in different units, in different level and variance
- It is important to standardized data before running cluster, otherwise the result will be influenced by these differences among variables
- As well as the high correlation among variables can cause that the result will be not accurate. Before running cluster, the assumptions mentioned above have to be proved. (Monadic, 2013)

The next step is to choose the rule (clustering algorithm). By clustering algorithm will be measured the distance between clusters. There are several methods, but the criteria could be different. Hence, different classification may be gained for the same data, even if the same distance measure were used. The main common rules of clustering are following:

- Single linkage – nearest neighbour – the distance of clusters is determined as the distance of two closest elements of different clusters.
- Complete linkage – the distance of cluster is determined as the distance of two greatest elements of different clusters.
- Unweighted pair-group average – distance between two clusters is determined as an average distance between all pairs of objects in two clusters. This method is usually used when the objects naturally form distinct groups
- Weighted pair-group average – this method is similar to unweighted pair-group average, but the number of object is used as a weight for the average distance.
- Ward's method (Ward, 1963) - cluster membership is defined as calculation of the variance of elements; it is the sum of the squared deviations from the mean of the cluster. The main principle is to minimize the heterogeneity of clusters. (OECD, 2008)

There are several types of distance measures, but the most used are following:

- Euclidean distance measure – the squared root of sum of squares of coordinate differences. This measure is not affected by the addition of new objects (outliers), but it is highly affected by difference in scale.
- Squared Euklidean distance among two vectors Y and Z. It is computed by raw data and shares the same advantage and disadvantage of Euklidean distance.

  $V_{yz} = \sqrt{\sum_{i=1}^{k}(yi - zi)^2}$..
- City-block, Manhattan – sum of the absolute values of coordinate differences. This distance has a similar result as Euklidean distance measures.

3.2.4 Multiple regression analysis

The multiple regression analysis is statistical technique used to analyze the statistical dependency (relationship) by model, which includes one dependent and more independent variables. (Hair, et al, 2010). In the case of analysis A, remittances were employed as dependent variable, and HDI, unemployment and net migration rate, as independent variables. Main aim of used analysis is to determine how the socio-economic indicators of the selected countries influence the amount remittances.

In term of the analysis B, the dependent variable is GDP growth (%), Remittances and Household consumption expenditures as independent variables. The aim of analysis B is to determine whether remittances influence the economic growth.

The model is exploratory and will explain the strength of the influence of the selected socio-economic indicators and remittances. (Hendl, 2013) As well as, the model will explain how much of variance of the dependent variable is explained by the independent variables.

The observations are expressed within panel data. The observation period is 5 years break, from 2010 to 2015. Each country includes the data of the same period; it means that the panel is balanced.

The general form of multi-linear regression analyses can be expressed as follow: $Y_1 = X_1+X_2+X3+X4+.....X_n$, where Y pictures the dependent variable and X the

independent variables. (Hair et al, 2010) The exact equation of the multiple regression analysis is $Y = a + b_1 X_2 + b_2 X_2 + b_3 X_3 + ...b_n X_n + e$ (Statsoft, 2017), where:

a= constant number of dependent variable

b_1 = change in dependent variable if the first independent variable change

b_2 = change in dependent variable if the second variable change

X_1 = value of the first independent variable

X_2 = value of the second independent variable

e = residual error

The result of multiple regression analysis is based on calculation of the multiple correlation coefficient, coefficient of determination, standardized regression coefficient and unstandardized regression coefficient.

The multiple regression coefficient (R) among the dependent variable and a set of predictors, expresses the strength of relation. (Statsoft, 2017) The sign (-,+) indicates the direction of relationship. R can assume values between 0 and 1. $0 \leq r_{y*x1....xk} \leq 1$. The value close to 0 indicates the statistical independence, while value close 1 indicates the perfect positive relationship. The value +1 indicates positive relationship, while -1 indicates the negative relationship. Positive relationship means as the independent variable grows, the dependent variable grows, too. The negative relationship means, as the independent variable grow, the dependent variable decreases. (Hair et al. 2010)

The coefficient of determination (R^2) is an indicator measures how well the model fits the data. It measures the proportion of variance of the dependent variable that is explained by the independent variables set as whole. The value of R^2 varies between 0 and 1 and measures the proportion of variance of the dependent variables explained by set of independent variables. The value is expressed by percent. (Statsoft, 2017)

Adjusted R^2 coefficient of determination is modified measure of the coefficient of determination taken in the account number of independent variables and the sample size. (Hair et al. 2010)

The partial - regression coefficient (b), where b_0 is the absolute value and the coefficient b_j is a value, by which the dependent variable will change, if the independent variable change by 1 unit. Beta coefficient is expressed in terms of units of the associated variable. A standardized regression coefficient b* express the relative strength of

influence of an individual independent variables to a dependent variable. Therefore we can say which of the independent variables have a greater impact on the variance of a standardized dependent variable. The standardized beta coefficient allows a direct comparison between coefficients and thus it is obviously used in a multiple regression analysis. (Hendl, 2009; Hair et al. 2010) The coefficient b* tell us if the independent variable change by one standard deviation the dependent variable changes by the number of standard deviations. (Field, 2009)

It is necessary to determine not only a practical significance, but also a statistical significance of beta coefficient (using t-test and significance) in order to reject the insignificant predictors. A value of significance (Sign.) and a t-test is using to determine the significance. The smaller the value of sign. (< 0,5) and the larger the value of t, the greater the contribution of predictor. To determine the significance we formulate hypothesis:

- A null hypotheses - H0: beta coefficient is zero and alternative hypotheses - Ha: beta coefficient is different from zero
- If the p-value < 5% - we reject H0, what means that beta coefficient is different from zero, statistically significant
- If the p-value > 5% - we do accept (do not reject) H0, what means that beta coefficient is equal zero, statistically insignificant (Jadczaková, 2017; Field 2009)

Before we run the multiple regression analysis, several assumptions have to be fulfilled:

a) Dealing with influential points

The influential points have to be detected in order to obtain adequate result.

The outliers and extremes are displayed through box plot, however the detection of outliers and extremes do not have to signify as influential point. Influential observations are detected also through standard residual values which are outside of the interval <+3;-3>.

b) Absent of multicollinearity among the individual independent variables

Multicollinearity occurs, when any single independent variable is highly correlated with a set of other independent variables. The case of multicollinearity (correlation of 1.0)

occurs when one independent variable is perfectly predicted by another independent variable. The estimates of regression coefficient are thus unstable. (HENDL, 2009; Hair et al. 2010)

Multicollinearity can be detected by correlation matrix. Correlation matrix is very useful for getting an idea about relationship between predictors, and the outcome.

If the value is more than 0,9 it has been detected collinearity. Another way how to identify the collinearity is through the Variance inflation factor (VIF = 1/T) and its inverted values – Tolerance. Tolerance is calculated by regression line. One predictor is estimated according to the rest of predictors, 1- R^2 - index of determination. Tolerance should not be less than 0,2; and/or the value of VIF should not be higher than 5**.** **(**Jadczaková, 2017)

c) Absent of autocorrelation.

Autocorrelation means the dependence of predictors and it is detected by Durbin-Watson test D, which tests for serial correlations between errors. If D is in the interval <1,75;2,25>, it means no autocorrelation. If D < 1.75 = residual values correlate positively and if D > 2.25 residual values correlate negatively.

Field (2009) states, that: "The size of the Durbin-Watson statistic depends upon the number of predictors in the model and the number of observations. As a very conservative rule of thumb, values less than 1 or greater than 3 are definitely cause for concern."

d) Linearity, normality and homoscedasticity

The relationship between predictors and dependent variable has to be linear. As the name of the analyses suggest, the relation among variables (dependent and independent) should be linear, thus it making the critical issue in regression analysis. Linearity represents the degree to which the change in the dependent variable is integrated with the independent variable. (Hair et al. 2010)

All variables have to be normally distributed. If the assumption of normality is not fulfilled, the result may be inaccurate.

Missing of the linearity could cause that also the important relations among variables will be not revealed.

The variance of dependent variables should be more or less constant at all level of the independent variable. This assumption is called homoscedasticity (homogeneity of variance) and its violation is called heteroscedasticity. (Jadczaková, 2017; Hair et al. 2010)

4 Results and Discussion

Countries are selected based on the amount of remittances received – ten countries with the highest amount of remittances, in 2015: Bangladesh, China, Egypt, India, Lebanon, Mexico, Nigeria, Pakistan, Philippines and Vietnam.

The observations will be compared to each other by raking of theirs socio-economic indicators using composite indicators and classify them into the groups (clusters) using the multivariate statistical method – cluster analysis.

The relation between remittances (% of GDP) and social-economic indicators (HDI, Net migration rate, unemployment) will be analyzed by multiple regression analysis. As well as the multiple regression analysis will be applied in order to determine whether the remittances have an impact on growth of GDP.

4.1 Result of composite indicators

a) Selected variables

Data of composite indicators are displayed as an arithmetic mean of five - year period, except of Lebanon, where the median is used due to its extremely different values in the selected years. Using of average could significantly affect the result, because of the extreme values.

Table 3 displays the variables and the specifying data according to MIX and MAX type.

MIN type: Unemployment (%) – it is desirable to achieve the lowest value

MAX type: GDP growth (yearly, in %), HDI, Net migration rate and Household final consumption expenditure (% of GDP) – it is desirable to achieve the highest value

Country	Unemployment (%)	GDP Growth (%)	Net Migration Rate (Per 1000 Pop.)	HDI	Household Cons. Exp. (% Of GDP)
Type of indicator	MIN	MAX	MAX	MAX	MAX
Bangladesh	4,53	4,94	-1,05	0,57	73,91
China	4,38	7,75	-0,33	0,73	35,68
Egypt	12,15	0,76	-0,25	0,69	79,37
India	4,37	5,96	-0,50	0,61	57
Lebanon	6,24	2,83	-7,44	0,77	76,33
Mexico	4,93	1,79	-2,89	0,76	67,22
Nigeria	7,54	2,45	-0,20	0,51	68,76
Pakistan	5,33	1,59	-1,88	0,54	80,86
Philippines	6,97	4,51	-1,30	0,67	73,37
Vietnam	2,40	4,88	-0,36	0,67	65,35
MAX	12,20	7,80	-0,20	0,77	80,86
MIN	2,40	0,80	-7,44	0,51	35,68
Range	9,75	6,99	7,24	0,26	45,18

Table 2: Sub-indicators, max-type and min-type; Source: own work

b) Missing values

Data do not include the missing values.

c) Correlation and weighting

	Unemployment (%)	GDP growth (%)	Net migration rate	HDI	Household Cons_Exp_ (% of GDP)
Unemployment (%)	1,000000	-0,600923	0,077625	0,004665	0,439461
GDP growth (%)	-0,600923	1,000000	-0,081212	0,025168	-0,812792
Net migration rate	0,077625	-0,081212	1,000000	0,406667	0,167953
HDI	0,004665	0,025168	0,406667	1,000000	-0,119806
Household Cons_Exp (% of GDP)	0,439461	-0,812792	0,167953	-0,119806	1,000000

Table 3: Correlation of indicators; Source: Own work

Correlation matrix figured in table 4 displays high correlation between GDP growth and household final consumption expenditure. The value of correlation has reached high

correlation -0,80. The dual effect of those two high correlated indicators will be removed by weighting.

d) Standardization (normalization)

In terms of normalization the min-max method is used for the data set in order to transform the original values to hundred point scale <0;100>.

Data will be constant, except of those high correlated. The weight 1 has to be spread among the variables. The indicator GDP growth and the Household Consumption Expenditure are multiplied by 0,5 in order to spread the weight.

e) Aggregation

The weighted sum will be applied, because data set does not include missing values.

Country	Unemployment (%)	GDP Growth (%)*0,5	Net migration rate per 1000 pop.)	HDI	Household final consumption expenditure, etc. (% of GDP)*0,5	SUM	Rank
Type of indicator	MIN	MAX	MAX	MAX	MAX		
Bangladesh	78,15	29,90	88,3	21,96	42,31	260,58	6
China	79,69	50,00	98,2	84,71	0,00	312,60	2
Egypt	0,00	0,00	99,3	69,02	48,35	216,68	8
India	79,79	37,20	95,9	37,25	23,59	273,70	4
Lebanon	60,62	14,81	0,0	100,00	44,99	220,41	7
Mexico	74,05	7,37	62,8	94,90	34,90	274,07	3
Nigeria	47,28	12,09	100,0	0,00	36,61	195,98	10
Pakistan	69,95	5,94	76,8	9,41	50,00	212,09	9
Philippines	53,13	26,82	84,8	60,39	41,71	266,86	5
Vietnam	100,00	29,47	97,8	59,61	32,84	319,70	1

Table 4: Composite indicators – result; Source: Own work

Table 5 displays the final ranking of countries according to the selected sub-indicators. The serial numbers of countries are in the last column, in ascending order. Number one is the country with the highest value of indicator and number ten with the lowest value of indicator. The result indicates the higher is the value of indicator, the more favourable are the socio-economic condition of the country.

The value of composite indicator is expressed comparatively in relation to its average value, shown in the graph (figure 10). The average of the indicator is equal to 255,27. The index is interpreted by percentage. For instance, the value of Vietnam was counted as follows: $\frac{319,7}{255,27}$ = 1,25 *100 = 125 %. The figure 10 displays the graph of division of countries according to the average of the indicators.

Both, the value of composite indicators and the index of countries are significant only by relationship of the observed countries. The high or low value of index expresses the emplacement of the current set of objects. It does not evaluate the objects in absolute term. (Minařík, 2005)

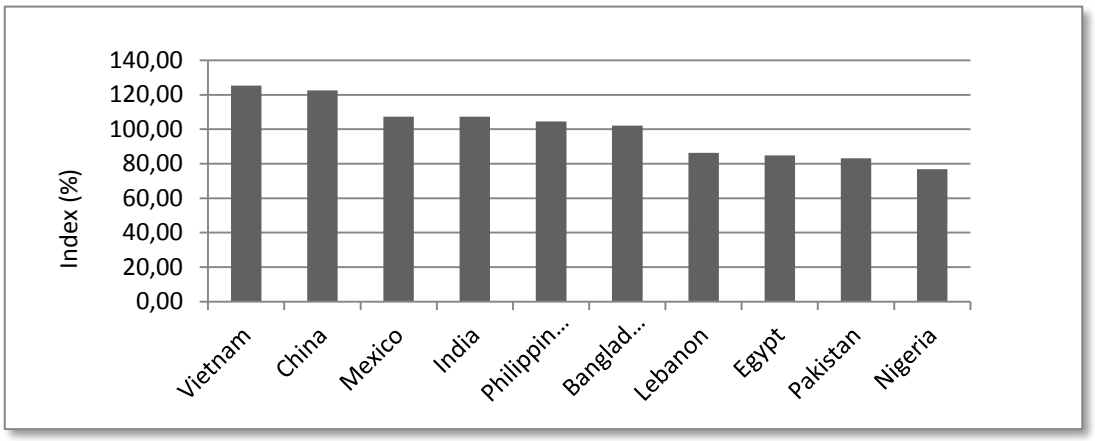

Figure 9: Graph of final ranking of countries according to the index; Source: Own work

Countries under the limit of 100% are Lebanon, Egypt, Pakistan and Nigeria. Those countries have the higher unemployment rate, low GDP growth and low Human Development Index, in the case of Pakistan and Nigeria. The rest of the countries are over or just above to the average. Vietnam, with the highest value of indicator has the lowest unemployment rate and one of the lowest (highest) net migration rate. Second highest value of indicator has China due to the largest value of GDP growth, low (high) net migration rate and one of the highest value of HDI. The value of indicator of Mexico, India, Philippines and Bangladesh is close to each other. Theirs values of indicators are around the average.

4.2 Result of Cluster analysis

Data for cluster analysis include also the indicator - remittances, as share of GDP, unlike composite indicator (displayed by table 6). The main aim is to divide countries based on socioeconomic indicators, as well as by the percent of remittances (% of GDP).

Data are in different units and has to be standardized before running cluster, by transforming them into dimensionless values. Z-score method is used, where the mean is equal 0 and standard deviation is equal 1. Standardized values are better to compare among each other. (Meloun, 2008)

Due to a high correlation among the variables GDP growth and household final consumption expenditure (same case of the composite indicator), the weight has to be spread among those two indicators. Data are multiplied by 0,5 after standardization.

Country	Remittences (% of GDP)	Unemployment (%)	GDP Growth (%)	Net Migration Rate	HDI	Household Final Cons.Expenditure
BGN	9,20	4,5	4,9	-1,1	0,6	73,91
CHN	0,25	4,4	7,8	-0,3	0,7	35,68
EGY	6,17	12,2	0,8	-0,3	0,7	79,37
IND	3,49	4,4	6,0	-0,5	0,6	57
LBN	16,59	6,2	2,8	-7,44	0,8	76,33
MEX	2,02	4,9	1,8	-2,9	0,8	67,22
NGA	4,48	7,5	2,5	-0,2	0,5	68,76
PAK	6,33	5,3	1,6	-1,9	0,5	80,86
PHL	10,17	7,0	4,5	-1,3	0,7	73,37
VNM	6,60	2,4	4,9	-0,4	0,7	65,35

Table 5: Entry data of the cluster analysis; Source: Own work

To determine the cluster's membership Ward's method is used in order to minimize the heterogeneity of clusters.

Squared Euklidean distance is applied as a form of measures (the table of Euklidean distance measure is displayed in the annex of thesis).

The figure 9 shows the process of clustering, illustrated by dendogram. Dendogram demonstrates whole process graphically. Countries are plotted on the x-axis and distance at which clusters were combined, on the y-axis. Process of clustering ended by creating of four clusters as the optimum number of clusters is largely subjective. (OECD, 2008)

In terms of similarity, the most homogenous is a pair of Pakistan and Nigeria. The most heterogeneous is a pair of Lebanon and China, according to the squared Euclidean distance measure.

A dendogram, displayed by figure 10 is created according to the amalgamation schedule (Table 15 in attachments). Firstly, Nigeria and Pakistan have been jointed, secondly Bangladesh and Philippines, after that India and Vietnam of which was created cluster four. Cluster three consists of Pakistan, Nigeria, Philippines and Bangladesh. Egypt and Lebanon have stayed isolated as cluster one and two.

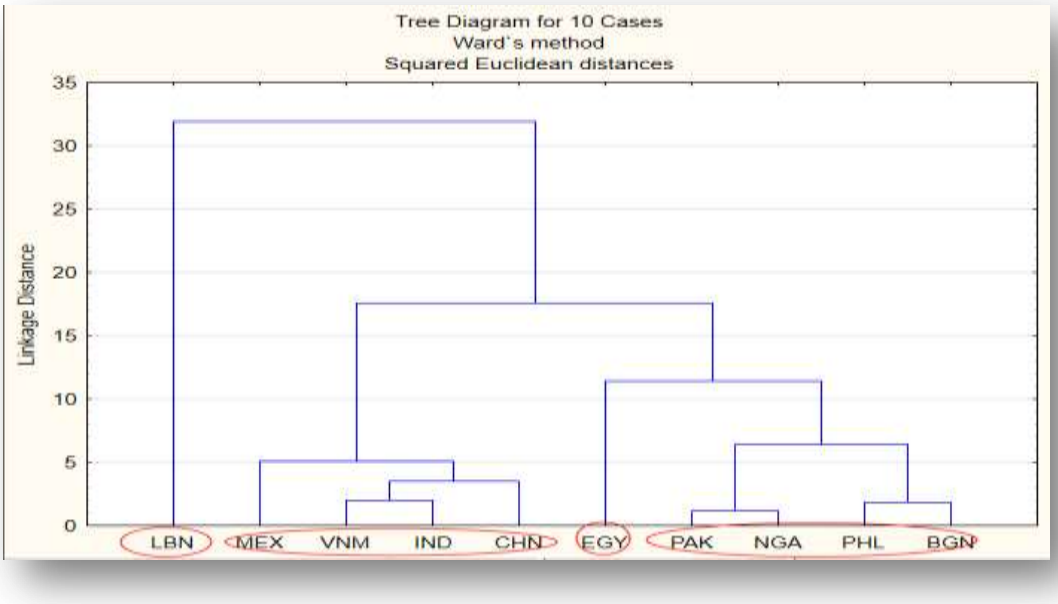

Figure 10: Tree Diagram of running cluster; Source: Statistica software

The figure 11 expresses the values of means for the interpretation of clusters. The graph includes the means of the standardized indicators of each of the cluster. The horizontal line represents the clusters and the vertical line represents the standard deviation of the

variable and shows the homogeneity of cluster based on the relevant indicator. (Minařík, 2013)

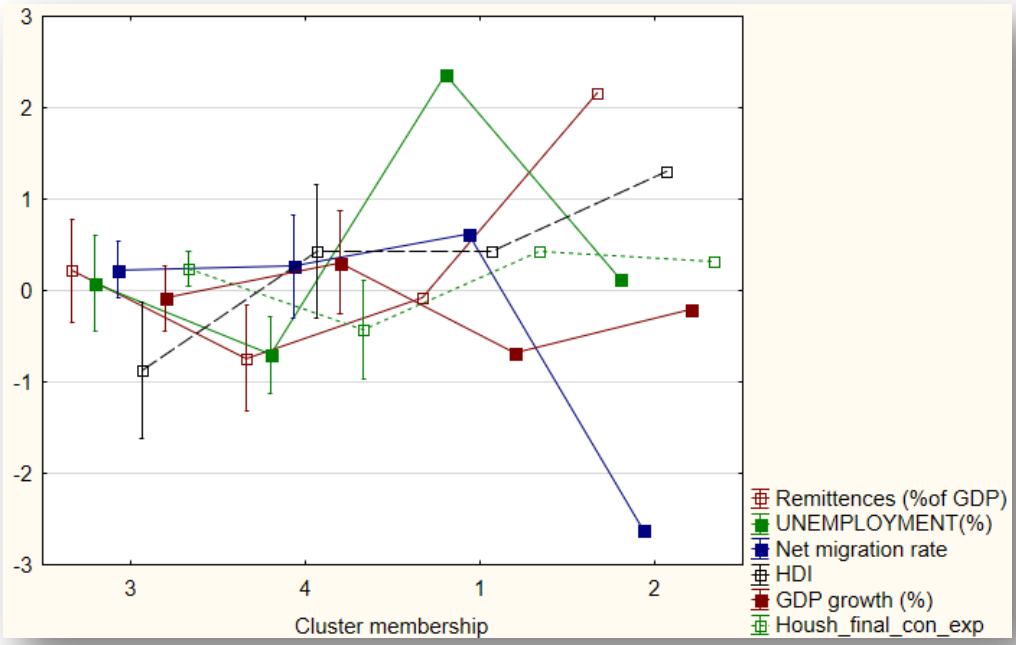

Figure 11: Profile diagram, heterogeneity of clusters; Source: Statistica software

Egypt (cluster one), has stayed separately due to the highest value of unemployment and the lowest value of GDP growth. Lebanon (cluster two) has stayed isolated due to high (low) net migration rate and highest value of remittances as a percent of GDP. It says that Lebanon is the most dependent on receiving remittances, compared to selected countries. Some of the variables of those two countries, staying separately in cluster analysis, are very diverse, compare to other countries. This diversity is expressed in the box plot, where countries stay as outliers.

Cluster three includes Pakistan, Nigeria, Philippines and Bangladesh, with higher value of remittances (% of GDP). Based on composite indicators, countries were ranked in the last position, as with the least favourable conditions (both economic and social). Countries are, according to the World Bank, in the group with lower middle income.

The fourth cluster including Mexico, China, Vietnam and India have a low value of Remittances (% of GDP) by average; it means that those countries are less dependent on remittances. Compare to composite indicator, countries where ranked as with the most favourable conditions (both economic and social). Such as low unemployment rate and

higher GDP growth. As well as is this group of countries has a high or very high human development.

The following table summarizes the clusters and its distinctive features.

Clusters membership	Involved countries	Clusters characteristic
1	Egypt	Cluster 1 is characterized by the highest value of unemployment and the lowest value of GDP growth.
2	Lebanon	Cluster 2 is characterized by the lowest net migration rate and the highest value of remittances (% of GDP)
3	Pakistan, Nigeria, Philippines and Bangladesh	Cluster 3 is characterized by higher value of remittances (%of GDP), higher unemployment rate, lower HDI, lower growth of GDP and high household consumption expenditures
4	Mexico, China, Vietnam and India	Cluster 4 is characterized by the highest growth of GDP, the lowest unemployment rate and the lowest remittances (% of GDP)

Table 6: Result of clusters; Source: Own work

Based on the results of composite indicator and cluster analysis, we can admit, that countries with the low value of remittances, as a share of GDP, are countries with more favourable condition (socio-economic), less dependent on receiving remittances.
In contrary, countries with higher value of remittances (as a share of GDP) have less favourable condition (socio-economic), and are more dependent on receiving remittances.

4.3 Result of the multiple regression analysis (A)

The multiple regression analysis (A) has been formed within ten countries, by panel data series (2010 – 2015). Verification of the assumptions of the model prevents to run the regression analysis.

The regression model includes one influential point. The maximum value of standard residuals is over 3 belonging to Lebanon14. The observation is influential and has to be removed; otherwise the result will be not accurate. The analysis will be done without the influential observation. The rest of outliers and extremes are not considered as influential points.

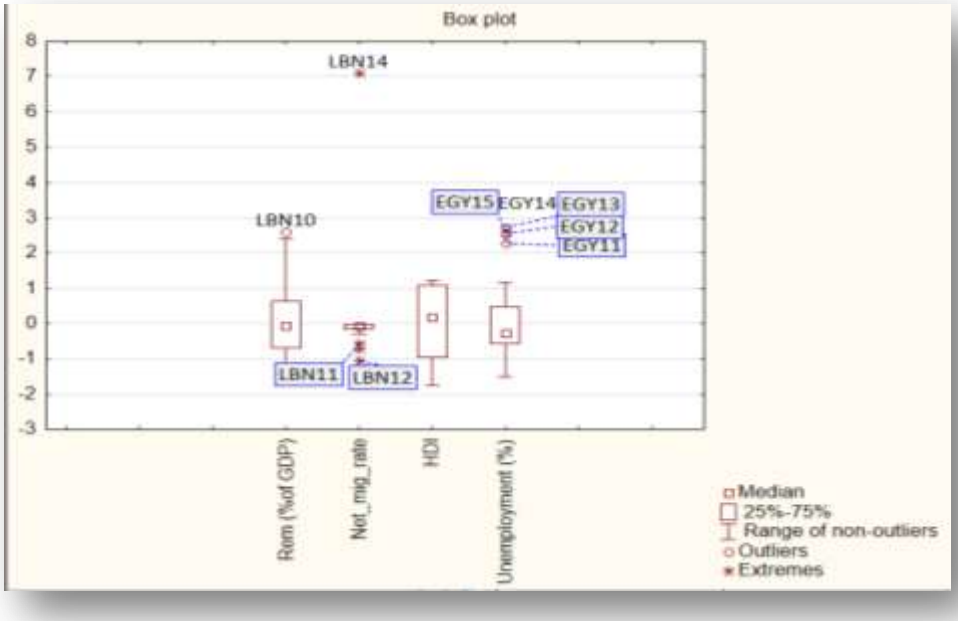

Figure 12: Box plot of variables with extremes and outliers; Source: Own work using Statistica software

From the table below we can admit that the multicollinearity does not exist among the independent variables. As well as the rest of assumption is fulfilled.

Variable	Redundancy of Independent Variables; DV: Remittances (% of GDP) (R-square column contains R-square of respective variable with all other independent variables			
	Toleran.	R-square	Partial Cor	Semipart Cor.
Net migration rate per 1000 pop.)	0,917032	0,082968	-0,586452	-0,579755
HDI	0,910079	0,089921	-0,174932	-0,142268
Unemployment (%)	0,990618	0,009382	0,193765	0,158152

Table 7: Test of multicollinearity; Source: Own work using Statistica software

The multiple correlation coefficients (R) express the strength of the relationship between dependent and independent variables. R= 0, 59 indicates a mediocre to high intensity of relationship. The quality of the model is expressed by coefficient of determination - R^2 = 0,35. It says that 35 % variance of remittances is explained by the selected indicators. Adjusted R^2 is modified coefficient of determination and have to be same or close to the common R^2, in our case 0,31 indicating that the model is not oversized. Model is also very significant as whole, expressed by p-value (level of signification), where p < 0,008.

	Regression Summary for Dependent Variable: Remittances (%of GDP) R= ,59901994 R2= ,35882489 Adjusted R2= ,31875145 F(3,48)=8,9542 p<,00008 Error of estimate: 3,2719					
	b*	Std. Err. (of b*)	B	Std. Err. (of b)	t(46)	p-value
Intercept			7,48238	3,555579	2,10440	0,040605
NET MIG. RATE per 1000 pop.)	-0,605414	0,120691	-1,10761	0,220806	-5,01622	0,000008
HDI	-0,149131	0,121151	-6,40473	5,203102	-1,23095	0,224341
Unemployment (%)	0,158899	0,116122	0,22516	0,164544	1,36838	0,177565

Table 8: Multiple regression analysis - result (A); Source: Statistica software

In terms of the significance of the predictors, there takes place the p-value. Generally, if the value of significance is less than 0, 05 (5%) then the predictor is making a significant contribution to the model. In the case of the individual predictors, the most significant predictor is NET MIG. RATE (p= 0, 00008), however significance of HDI is 0,22 and the and the significance of unemployment is 0,17. It says that there is risk of error of 22% and 17% and the variables are not significant on the level of significance 5%. It means that there is 22% and 17% risk of error of I. type – incorrect rejection of true H0.

A value of significance is relatively low therefore I suggest to included those indicators into interpretation; however the risk of error has to be taken into account.

The dependency of each of the independent variable and dependent variable is represented by beta coefficient, standardized or original beta coefficient.

B-values are the part of the equation of regression model, as several unknown quantities. The replaced b-values in the equation are represented as follows:

$$\text{Remittances (\% GDP)} = b_0 + b_1\text{NET\_MIG\_RATE}_i + b_3\text{HDI}_i + b_4\text{UNEMPL}_i$$

$$\text{Remittances (\% of GDP)} = 7{,}48 + (-1{,}1\ \text{NET\_MIG\_RATE}_i) + (-6{,}4\text{HDI}_i) + (0{,}22\text{UNEMPL}_i)$$

The standardized beta coefficient b* expresses the relative, and thus the comparable contribution of a predictor. Beta coefficient explains the change of standardized dependent variable when the standardized independent variable will change by one standard deviation and all variables in the model are standardized.

Net migration rate with the value of -0,6 has stronger, but negative impact on remittances. A negative value means that lower the value of net migration is the value of remittances is higher and vice versa.

If the net migration will increase by one standard deviation 2,15, remittances decrease by -0,60 standard deviation. The standard deviation of remittances is 4,48. This constitutes a change of -2,68%, because [4,48 x (-0,6)]. If the net migration will decrease by -2,15, remittances will increase by **2,68% of GDP.**

Beta coefficient b* of HDI is -0,14 and detects weak and negative relation to remittances. If HDI increase by one standard deviation 0,09, remittances will decrease by 0,62% [4,48 x (– 0,14)] and thus if HDI decrease by one standard deviation 0,9, remittances will increase by **0,62%.**

Unemployment has also weak, but positive impact on remittances with the value of beta coefficient b*= 0,15. If the value of unemployment rise by one standard deviation 2,69, the value of remittances will rise by 0,15 standard deviation. Thus the remittances will change by **0,67%** (4,48 x 0,15).
This interpretation of each variable is true only if the rest of variables held in constant.

Based on the obtained results of the analysis, we can admit that the selected independent variables have impact on remittances, while the most significant and higher impact has the migration rate.

4.4 Result of multiple regression analysis (B)

The second multiple regression analysis is applied in order to examine whether remittances have a significant impact on the economic growth.
Analysis was applied separately within clusters in order to gain more detailed result, as countries have been divided into clusters according to socioeconomic factors and value of received remittances. Only cluster three and four have been examined because the rest of two clusters include only one country. Cluster three includes Bangladesh, Nigeria, Pakistan and Philippines. Cluster four includes China, India, Mexico and Vietnam. Egypt and Lebanon are not included within the second multiple regression analysis.

The assumptions (influential point, multicollinearity, autocorrelation, linearity, homoscedisticity) of following analysis have been fulfilled.

Result of cluster 3

Table 10 shows the result of multiple regression analysis (B) of cluster 3, where the number of observations is 24 (4 countries x 6 years period).

N=24	Regression Summary for dependent Variable: GDP growth (%) R= ,67034754 R2= ,44936583 Adjusted R2= ,39692448 F(2,21) = 8,5689 p<,00000 Error of estimate: 1,3319					
	b*	Std. Err. (of b*)	B	Std. Err. (of b)	t(21)	p-value
Intercept			13,09783	3,573920	3,66483	0,001444
Household cons_exp_ (% of GDP)	-0,478479	0,162614	-0,14047	0,047741	-2,94243	0,007779
Remittances (% of GDP)	0,515432	0,162614	0,34921	0,110171	3,16967	0,004617

Table 9: Multiple regression analysis - result (B) of cluster 3; Source: Statistica software

Multiple coefficient of correlation (R= 0,67) indicates mediocre to high intensity of relationship among variables (dependent and independent). The coefficient of determination (R^2 = 0,44) indicates that independent variables can explain 44% of variance of the dependent variable. The adjusted R^2 is close to R^2. Considering the value of significance, the model is very significant as whole. The value of standardized beta coefficient b* found that household consumption expenditure has slightly strong and negative relation with the growth of GDP (%) and remittances has slightly strong and positive impact on the growth of GDP. Both of the independent variables are significant in the model, according to the p-value.

According to the standardized beta coefficient, if expenditures increase by one standard deviation 5,52 %, the GDP growth decrease by -1,09 standard deviation (1,62) and thus GDP growth will decrease by -1,76%.

If remittances increase by one standard deviation 2,39 % of GDP, GDP growth will increase by (1,62 x 0,51) = **0,82%.**

This interpretation of each variable is true only if the rest of variables held in constant.

According to the obtained result, remittances have impact on economic growth within cluster 3 consists of Bangladesh, Pakistan, Philippines and Nigeria.

Result of cluster 4

The result of multiple regression analysis of cluster 4 is represented in table 11. Number of observation is 24 (4 countries x 6 years).

N=24	Regression Summary for dependent Variable: GDP growth (%) R= ,82474445 R2= ,68020341 Adjusted R2= ,64974659 F(2,21)=22,333 p<,00001 Error of estimate: 1,3706					
	b*	Std. Err. (of b*)	B	Std. Err. (of b)	t(21)	p-value
Intercept			15,96944	1,489249	10,72315	0,000000
Household cons_exp_ (% of GDP)	-1,09240	0,166355	-0,20314	0,030935	-6,56668	0,000002
Remittances (% of GDP	0,57917	0,166355	0,56265	0,161612	3,48153	0,002227

Table 10: Multiple regression analysis - result (B) of cluster 4; Source: Statistica sofware

The analysis is very significant as whole, where p<0,00001 and the coefficient of correlation is 0,8 determines high intensity of relationship among independent and dependent variables. The set of independent variables can explain 68% (R^2=0,68) variance of dependent variable, as well as adjusted coefficient of determination has reached 64%. So values of coefficients of determination are close to each other, determining that model is not oversized.

The standardized beta coefficient b* of household consumption expenditure has strong and negative relation (-1,09) and standardized beta coefficient b* of remittances has

slightly strong and positive relation (0,57). Both of the independent variables are significant in the model, the p-value <5%.

If the expenditures increase by one standard deviation 12,45%, the GDP growth decrease by -1,09% standard deviation (2,31) and thus GDP growth will decrease by 2,51%.

If remittances increase by one standard deviation 2,38, GDP growth will increase by (2,31% x 0,57) = **1,31%.**

This interpretation of each variable is true only if the rest of variables held in constant.

According to the result, remittances have an impact on economic growth within cluster 4, including China, India, Mexico and Vietnam.

Comparing both cluster, the multiple coefficient correlation has reached higher value (0,82) in cluster 4, while 0,67 in cluster 3. In terms of coefficient of determination, the independent variables can explain greater variance of dependent variable, in cluster 4 (68%) than cluster 3 (44%).

By the obtained results of cluster 3 and cluster 4, remittances have higher impact within countries in cluster 4 by **0,49%.**

In overall, we can admit that remittances have a significant impact on economic growth (GDP growth) within following countries: **Bangladesh, Nigeria, Pakistan, Philippines, China, India, Mexico and Vietnam.**

As well as, the results of both clusters indicate negative relation of household consumption expenditure to GDP growth.

Discussion

By the analytical part of the thesis, several facts have been examined and confirmed within ten countries most receiving remittances.

The selected observations are countries with the highest income of remittances (total amount of remittances, in 2015) and thus countries are selected globally and vary in terms of the socioeconomic conditions and development status. By the composite indicators and cluster analysis countries have been divided according to its development and economic status, due to the diversity of countries.

The dependency on remittances is related to the amount of remittances as a share of GDP. According to the literature review, the poorest and less developed the countries are then the countries are most dependent on them, expressed by percent of remittances of GDP.

The multiple regression analysis (A) confirmed that there is a relationship between selected indicators and remittances (share of GDP). The most significant is relation among net migration rate and remittances. As well as HDI and unemployment have the impact on the value of remittances received in the country. More people emigrate from the country, respectively based on the indicator, the lower is the net migration rate, the higher is the share of remittances to GDP.

Analyzing the impact of socioeconomic factors on the size of remittances is less common and therefore it was difficult to find similar study including this type of analysis. Most of the studies focus on how the remittances influence the development of countries, hence with those studies the second analysis is compared. Nevertheless, the result is according to the expectation, worse is the socioeconomic condition of the country, the amount of remittances (as a share of GDP) rise.

In terms of multiple regression analysis B, the main aim was to verify whether remittances could influence the economic growth. The model also includes the household consumption expenditure as a control variable, which is part of GDP. Even though the household consumption expenditure could be expected to be positive (+), the regression analysis found it negative (-). A possible reason is that the number of

observation is only 24 (from which 4 countries x 6 years) within panel data in years 2010 – 2015.
According to the analysis of India, written by Indian Journal of Economics and Business, 2011 have been found that between final household consumption and GDP growth is a causal relationship in the long-run while negative in short-run.

As the last and main result, the positive impact on economic growth has been detected.
It is necessary to state that the second analysis has been done within countries of cluster 3 and cluster 4, and except Lebanon and Egypt.
There are several studies focused on whether remittances play important role in economic growth. Studies have been focused on a group of countries or separately. The variety of results has been examined depending on country, group of countries as well as whether the time data series (long-run, short-run) or panel data were used. Most of them found out that remittances influence the economic growth. Hence, some of them are further compared with the result of this thesis.

The result is consistent with a study, written by Matuzeviciute K., and Butkus M., 2016 which was performed on the sample of 116 countries, in a period 1990 – 2014. It was figured out that remittances have a positive impact on an economic growth but the impact differs due to country's economic development level. Countries below 11% of remittances as a share of GDP are those, with the highest possibility to use remittances for promoting long-run economic growth, because those countries are developed enough to use remittances in the right way. In contrary countries with the value of remittances above 11% are the least developed and have the lowest likelihood of experiencing a positive effect on economic growth. This study is not given insight into all aspects of remittances 'impact on economic growth and it is more descriptive. Nevertheless, it is consistent with this paper, because examined countries (cluster 3 and 4) have reached the value of remittances maximum of 10,59% and the impact on economic growth has been confirmed. Moreover, the impact of remittances on economic growth in Cluster 4 has been bit bigger with stronger multiple coefficient correlation.

The impact of remittances in Pakistan was studied by Qayyum A. et al., 2008. The study has been analyzed within the period 1973 – 2007, by Autoregressive Distributed Lag (ARDL), a technique more appropriate for small sample size.
It was determined, that in the long run remittances affect economic growth positively and significantly and playing an active role in Pakistan economy. The significant and positive impact of remittances on poverty reduction has been examined as well.

Another study, written by Mintah S., Nikoi N., was examined in Ghana, during the period 1992 – 2012 (20 years period), by employed multiple regression analysis. The econometric model was composed of GDP growth as a dependent variable and remittances, HDI, GDP and inflation rate as an independent variable. The study found out the positive and significant impact of remittances on GDP growth (%). Even though Ghana was not a part of our research, the result is comparable. Remittances have reached a maximum of 5% of GDP, in an examined period, which is similar to the value of remittances investigated by this research.

Most of the analysis mentioned above has been carried out by using a longer period of time (decades), and thus the results can be considered as more relevant. Even if the analysis by this paper has been carried out by using panel data in the period of 6 years, the result is comparable, but the more relevant result would be using an extended period.

The role of remittances is a wide topic among researchers and it is needed to take in consideration that the results could differ not only due to the type of statistical analysis used, the scale examined period but also the result may be depended on which variables are involved.

5 Conclusion

The diploma thesis studied an issue of remittances focusing on ten major remittances recipients, specifically ten countries. The main aim was to analyze the relation among remittances and selected socioeconomic indicators. There are big differences among selected countries, but one in common is the great value of receiving remittances (total amount). Countries belong to the group of low & middle-income countries, according to the World Bank selection.

Three hypotheses have been testing within the analytical part of thesis:

1. Countries with less favorable conditions are more dependent on remittances (higher share of remittances to GDP)
2. The selected socioeconomic indicators influence the value of remittances
3. Remittances have a positive impact on economic growth

First hypotheses have been confirmed using composite indicators and cluster analysis. While the ranking of countries was carried out by composite indicators in terms of indicators used further for the other analysis. The cluster analysis has divided countries into groups adding the value of remittances (as a share of GDP) by each country. The observations have been grouped together into four clusters as the result of analysis. Cluster one and two includes only one country of each (Lebanon and Egypt), due to its different values of some indicators. Cluster three consists of four countries (Bangladesh, Nigeria, Pakistan and Philippines) and the rest of countries (China, India, Mexico and Vietnam) are together in cluster four. Countries with the less favourable conditions and higher income of remittances (% of GDP) are in cluster 3, while countries with more favourable conditions and lower value of remittances (% of GDP) are in cluster 4.

The thesis has evaluated the relationship between remittances and selected socioeconomic indicators, from both sides, literally. Two main questions have been answered by the analysis. Which of the selected indicators influence the size of remittances (as a share of GDP) and do remittances positively and significantly affect the economic growth?

The second hypothesis has been confirmed, according to the result of multiple regression analysis (A). The net migration rate has the most significant impact on remittances (in terms of selected indicators), while considering HDI and unemployment, those variables have a less significant impact on remittances.

By the multiple regression analysis (B) the third hypothesis has been proved, but it has to be mentioned that among the observation have not been included Lebanon and Egypt. The third hypothesis thus cannot be deemed as true in terms of the whole set of observations. The analyses have been performed in clusters separately in order to gain more detailed result. Even if the analysis has been done separately, the result is quite similar. In overall, remittances have an positive impact on economic growth in Bangladesh, Nigeria, Pakistan and Philippines, China, India, Mexico and Vietnam.

Even though it seems to be a positive effect of remittances, it should be emphasized that the impact of remittances is sensitive to country-specific conditions and how well the households can use them in order to increase the profitability. By profitability is meaning that the remittances should more invest than consume and hence create a new jobs opportunity in the country of origin. Many researchers have examined that remittances are more used for consumption what leads to reduce the poverty. The examined countries are more developed than other poor countries (for example, countries with the value of remittances over 15% of GDP – with much higher dependency), thus their conditions allow more to use remittances to invest than consumptions.

The households should not rely on remittances as one of the main earnings, rather more invest and save for future.

Remittances are supposed to increase in coming years and it has to be taken into consideration that the large remittances inflow can cause the currency appreciation. It is caused by increasing demand for the local currency and it may affect the competitiveness of countries' economy. Consequences of appreciation could cause a decrease of exports and increase of imports. Therefore, the government should focus to avoid the consequences in advance.

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7 Attachments

Table 11: Selected countries - overview; Source: WB, CIA, UNPD

	Bangladesh	**China**	**Egypt**	**India**	**Lebanon**
Population, total (2015)	160,995,642	1.371 billion	94,666,993	1.266 billion	6,237,738
Area, total (sq km)	148,460	9,596,960	1,001,450	3,287,263	10,400
Destination	South Asia	East Asia & Pacific	Middle East & North Africa	South Asia	Middle East & North Africa
GNI per capita (current US $,thousand)	1,1	7,9	3,3	1,6	7,7
Income (World Bank Atlas method)	Lower middle income	Upper middle income	Lower middle income	Lower middle income	Upper middle income
GDP growth (2015) %	5,28	6,36	2,00	6,28	1,30
Remittances received (billion of US$),2015	15,388	44,445	18,325	68,910	7,481
Remittances (% of GDP)	7,90	0,4	5,5	3,3	15,9
HDI	0.579	0.738	0.691	0.624	0.763
Human Development	Medium Human dev.	High Human Dev.	Medium Human dev.	Medium Human dev.	High Human dev.
MPI, % of people in Multidimensional poverty	40,7	5,2	4,2	55,3	

Table 12: Selected countries - overview; Source: WB, CIA, UNPD

	Mexico	**Nigeria**	**Pakistan**	**Philippines**	**Vietnam**
Population, total	123,166,749	186,053,386	201,995,540	102,624,209	95,261,021
Area, total (sq km)	1,964,375	923,768	796,095	300,000	331,21
Destination	Latin America & Caribbean	Sub-Saharan Africa	South Asia	East Asia & Pacific	East Asia & Pacific
GNI per capita (current US $,thousand)	9,7	2,8	1,4	3,5	1,9
Income	Upper middle income	Lower middle income	Lower middle income	Lower middle income	Lower middle income
GDP growth (%)	2,46	2,65	4,71	5,91	6,68
Remittances received (billion of US$), 2015	26,171	20, 459	19, 306	28, 483	13, 000
Remittances received (% of GDP)	2,30	4,4	7,1	10,2	6,8
HDI	0.762	0.527	0.550	0.682	0.683
Human Development	High Human Dev.	Low Human dev.	Medium Human dev.	Medium Human dev.	Medium Human dev.

Table 13: Entry data of multiple regression analysis; Source: Own work

COUNTRY CODE	Remittences (%of GDP)	Net migration rate per 1000 pop.)	HDI	Unemployment (%)	GDP Growth(%)	Household final consum. expenditure, etc. (% of GDP)
BGD10	9,41	-2,12	0,55	4,5	5,57	74,43
BGD11	9,38	-1,57	0,56	4,5	6,46	75,06
BGD12	10,59	-1,04	0,56	4,5	6,52	74,49
BGD13	9,25	-0,52	0,57	4,5	6,01	73,71
BGD14	8,67	-0,02	0,57	4,3	6,06	72,62
BGD15	7,89		0,57	4,9	6,55	73,12
CHN10	0,22	-0,34	0,7	4,2	10,64	35,92
CHN11	0,22	-0,33	0,71	4,3	9,54	36,75
CHN12	0,2	-0,33	0,72	4,5	7,86	36,63
CHN13	0,19	-0,33	0,72	4,6	7,76	36,63
CHN14	0,29	-0,32	0,72	4,7	7,3	37,16
CHN15	0,4		0,72	4	6,91	37
EGY10	5,69	-0,21	0,68	9	5,14	74,57
EGY11	6,07	-0,21	0,68	12	1,82	75,57
EGY12	6,96	-0,2	0,69	12,7	2,19	80,5
EGY13	6,24	-0,2	0,69	13,2	2,11	80,6
EGY14	6,49	-0,19	0,69	13,2	2,23	82,71
EGY15	5,54	-0,5	0,69	12,8	4,2	82,24
IND10	3,23	-0,5	0,59	3,5	10,26	52,71
IND11	3,43	-0,5	0,6	3,5	6,64	55,88
IND12	3,76	-0,5	0,6	3,6	5,62	57,79
IND13	3,76	-0,5	0,61	3,6	6,64	58,09
IND14	3,45	-0,5	0,61	3,6	7,24	57,95
IND15	3,29		0,61	8,4	7,56	59,57
LBN10	18,19		0,76	6,2	7,96	88,41
LBN11	17,25	-6,4	0,76	6,2	1,98	88,71
LBN12	15,44	-12,08	0,76	6,2	2,2	79,21
LBN13	17,06	-8,48	0,77	6,2	0,9	69,19
LBN14	15,72	83,82	0,77	6,4	1,8	65,86
LBN15	15,89		0,77		1,3	66,59
MEX10	2,1	-3,38	0,75	5,2	5,11	67,49
MEX11	2,01	-3,24	0,75	5,3	4,04	67,42
MEX12	1,97	-3,11	0,75	4,9	4,02	66,23
MEX13	1,86	-2,99	0,76	4,9	1,36	67,04
MEX14	1,88	-1,64	0,76	4,9	2,25	67,3
MEX15	2,29		0,76	4,4	2,46	67,8
NGA10	5,35	-0,1	0,49	7,6	7,84	66,12

NGA11	5,01	-0,1	0,5	7,6	4,89	65,43
NGA12	4,46	-0,22	0,51	7,5	4,28	58,39
NGA13	4,04	-0,22	0,51	7,5	5,39	72,89
NGA14	3,66	-0,22	0,51	7,5	6,31	71,75
NGA15	4,38	-0,35	0,51		2,65	77,96
PAK10	5,46	-2,36	0,52	5,1	1,61	79,72
PAK11	5,74	-2,17	0,53	5,1	2,75	81,15
PAK12	6,24	-2	0,53	5,1	3,51	82,45
PAK13	6,33	-1,84	0,54	5,1	4,4	80,82
PAK14	7,06	-1,69	0,54	5,2	4,67	81,02
PAK15	7,12	-1,21	0,54	6,4	4,71	80
PHL10	10,8	-1,31	0,65	7,3	7,63	71,55
PHL11	10,29	-1,29	0,65	7	3,66	73,47
PHL12	9,84	-1,27	0,66	7	6,68	74,21
PHL13	9,83	-1,25	0,66	7,1	7,06	73,35
PHL14	10,07	-1,23	0,66	7,1	6,22	72,5
PHL15	10,19	-1,45	0,66	6,3	5,91	75,15
VNM10	7,12	-0,37	0,76	2,6	6,42	66,53
VNM11	6,35	-0,35	0,76	2	6,24	68,47
VNM12	6,42	-0,34	0,76	1,8	5,25	63,33
VNM13	6,42	-0,33	0,76	2,2	5,42	65,01
VNM14	6,44	-0,32	0,76	2,3	5,98	63,63
VNM15	6,82	-0,44	0,76	3,5	6,68	65,2

Table 14: Descriptive statistic, Data of Multiple Regr. An "A"; Source: Statistica software

	Descriptive statistic			
Variable	**Mean**	**Minimum**	**Maximum**	**Standard deviation**
Remittences (%of GDP)	6,52867	0,1900	18,19000	4,485029
Net migration rate per 1000 pop.)	-1,40906	-12,0800	-0,02000	2,150920
HDI	0,65433	0,4900	0,77000	0,093779
Unemployment (%)	5,85000	1,8000	13,20000	2,690154

Table 15: Descriptive statistic, Data of Multiple Regr. An "B", ClUSTER 3; Source: Statistica software

Variable	Descriptive statistic			
	Mean	**Minimum**	**Maximum**	**Standard deviation**
GDP Growth(%)	5,30583	1,61000	7,84000	1,621564
Remittences (%of GDP)	7,54417	3,66000	10,80000	2,393437
Household final consumption expenditure, etc. (% of GDP)	74,22333	58,39000	82,45000	5,523313

Table 16:Descriptive statistic, Data of Multiple Regr. An "B", ClUSTER 4; Source: Statistica software

Variable	Descriptive statistic			
	Mean	**Minimum**	**Maximum**	**Standard deviation**
Remittences (%of GDP)	3,08833	0,19000	7,12000	2,38395
GDP Growth(%)	6,21667	1,36000	10,64000	2,31597
Household final consumption expenditure, etc. (% of GDP)	56,56375	35,92000	68,47000	12,45424

Table 17: Cluster membership; Source: Statistica software

	Cluster Membership (Sub-indicators – Rem) Linkage distance = 6,64048 Ward`s method Squared Euclidean distances						
	Cluster Membership	Remittances (% of GDP)	Unemyployment (%)	Net migration rate	HDI	GDP growth (%) *0,5	Household Cons_Exp * 0,5
BGN	4	0,573638609	-0,519059521	-0,326955291	-0,5581563106	0,257022286	0,229605786
CHN	3	-1,34923238	-0,55667253	-0,178573438	0,3721042004	0,910850908	-1,20350918
EGY	1	-0,0773445315	2,37714216	-0,162086566	0,3721042004	-0,667356111	0,434282943
IND	3	-0,6531316	-0,55667253	-0,213608042	-0,5581563106	0,505026246	-0,404293616
LBN	2	2,16134996	0,120361628	2,80039834	1,30236471	-0,21643982	0,3203235
MEX	3	-0,968955104	-0,368607486	-0,706153359	1,30236471	-0,441897965	-0,0211799623
NGA	4	-0,440434138	0,609330742	-0,15178227	-1,48841682	-0,284077263	0,0365494924
PAK	4	0,0429691842	0,218155451	0,498006593	-1,48841682	-0,486989594	0,490138065
PHL	4	0,782039152	0,421265698	0,378476768	0,3721042004	0,166839028	0,20936299
VNM	3	0,0150392145	1,30893271	0,184756015	0,3721042004	0,257022286	-0,0912800144

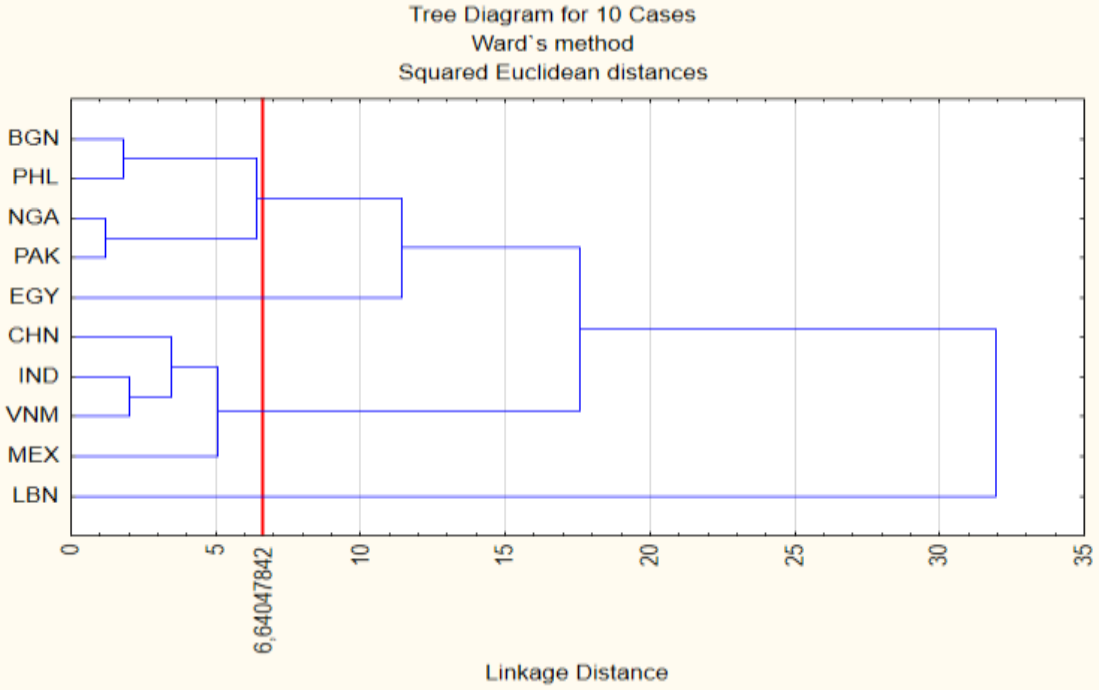
Table 18: Amalgamation Schedule; Source: Statistica software

linkage distance	Amalgamation Schedule (Sub-indicators - Rem) Ward`s method Squared Euclidean distances									
	Obj. No. 1	Obj. No. 2	Obj. No. 3	Obj. No. 4	Obj. No. 5	Obj. No. 6	Obj. No. 7	Obj. No. 8	Obj. No. 9	Obj. No. 10
1,209499	NGA	PAK								
1,804224	BGN	PHL								
2,038048	IND	VNM								
3,484866	CHN	IND	VNM							
5,077936	CHN	IND	VNM	MEX						
6,424208	BGN	PHL	NGA	PAK						
11,44381	BGN	PHL	NGA	PAK	EGY					
17,57572	BGN	PHL	NGA	PAK	EGY	CHN	IND	VNM	MEX	
31,94169	BGN	PHL	NGA	PAK	EGY	CHN	IND	VNM	MEX	LBN

Table 19: Squared Euklidean distance; Source: Statistica software

Case No.	Squared Euclidean distances (Sub-indicators - Rem)									
	BGN	CHN	EGY	IND	LBN	MEX	NGA	PAK	PHL	VNM
BGN	0,0	7,1	10,6	2,0	16,4	6,6	3,5	2,0	1,8	1,9
CHN	7,1	0,0	15,4	2,2	26,1	4,6	8,6	10,2	8,1	4,1
EGY	10,6	15,4	0,0	11,9	20,0	9,8	7,0	10,3	5,4	14,7
IND	2,0	2,2	11,9	0,0	22,0	4,9	3,1	3,2	4,4	2,0
LBN	16,4	26,1	20,0	22,0	0,0	22,5	23,6	23,7	13,1	16,8
MEX	6,6	4,6	9,8	4,9	22,5	0,0	9,4	9,0	5,1	3,5
NGA	3,5	8,6	7,0	3,1	23,6	9,4	0,0	1,2	5,3	7,7
PAK	2,0	10,2	10,3	3,2	23,7	9,0	1,2	0,0	5,1	5,6
PHL	1,8	8,1	5,4	4,4	13,1	5,1	5,3	5,1	0,0	3,7
VNM	1,9	4,1	14,7	2,0	16,8	3,5	7,7	5,6	3,7	0,0

Table 20: Tree Diagram; Source: Statistica Software



LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

BOP	Balance of payment
CIA	Central Intelligence Agency
FDI	Foreign direct Investments
GDP	Gross domestic product
GNI	Gross National Income
HDI	Human Development Index
IMF	International Monetary Fund
IOM	International Organization for Migration
MPI	Migration Policy Institute
MTO	Monetary Transfers Operators
ODA	Official development assistance
OECD	Organization for Economic Co-operation and Development
UNPD	United Nations Development Programme
WB	World Bank