

ABSTRACT

The Kyrgyz Republic is among high remittances receiving country in the world. Generally, the effects of these financial inflows have been considered as positive to the economy. However, much fewer studies were done on identifying possible adverse effects of these inflows. One of such potential negative effects is known as Dutch Disease, when large financial inflows lead to real exchange rate depreciation. Thus, the economy, where so called Dutch Disease is occurring, loses its competitiveness. The paper attempts to identify the symptoms of the Dutch Disease in Kyrgyz economy. The main methodology approach is Vector Autoregressive model (VAR). This method is chosen, because it allows effectively identify both short-run and long-run effect of remittances to the economy. Additionally, the paper employ the Granger causality test and Impulse response function in the estimations. Initial hypothesis is that remittances do not contribute to real exchange rate appreciation in the short-run but do so in the long-run.

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LIST OF ACRONYMS:

| | |
|--------------|--|
| CIS | Commonwealth of Independent States |
| FDI | Foreign Direct Investment |
| FRED | Federal Reserve Economic Data |
| IMF | International Monetary Fund |
| KR | Kyrgyz Republic |
| NBKR | National Bank of the Kyrgyz Republic |
| USAID | The United States Agency for International Development |
| WB | World Bank |
| WDI | World Development Indicators |

INTRODUCTION

The role of the migrants' remittances became significant issue in economic discussions. The volume of remittances has drastically increased in the last decades. According to the World Bank estimates, remittances flow has risen more than 98 times from 1970s to 2018 (World Bank 2018). Directions of the remittances are predominantly from advanced economies to low and middle income countries. Increasing tendencies raised question of their impact to an economy. For those developing countries, the inflow of remittances has become main sources of foreign currency earnings. Moreover, for countries volume of the remittances has become larger than the other type of financial inflows such as the Foreign Direct Investment or the Official Development Assistance and others (Muktarbek kyzy, 2012). These dynamics have leaded to studies which argued about beneficial effects of remittances. Many researchers have found that remittances facilitate in reduction of the absolute poverty, improve human capital indicators, reduce economic inequality, increase of entrepreneurship activities, improve standard of livings contribute capital accumulation and to economic growth (Fajnzylber and López, 2008; Fayissa and Nsiah, 2010; Meyer and Shera, 2017; Adams and Cuecuecha, 2013). However, the large flows of remittances have also raised a question on whether they could have

deteriorating effects. The most discussed adverse effect of remittances is that it can lead to real exchange rate appreciations and, consequently, to the loss of international competitiveness.

This phenomenon of real exchange rate appreciation was called the Dutch Disease. The name is derived from the discovery of the large deposit of natural gas in Netherlands. The theoretical model of how this process occurs is developed by Corden and Neary's (1982). The mechanism of the model is that discovery of the deposits leads to higher economic activity in the sector and as a result, nation's currency becomes stronger than its neighbors'. In turn, a country's exports products become more expensive while import products cheaper. Thus, nation loses its international competitiveness. The main reason for real exchange rate appreciation is the additional revenue from growing sector. Therefore, researchers consider that any essential financial inflows could cause the Dutch Disease. For instances, in the country with the large deposits of certain natural resource, the increase of the price for that resource, the foreign currency inflows from foreign direct investment or from foreign government assistantship. And relatively recently, the remittances is also being considered as a source of the Dutch Disease. Since they are also foreign currency inflows and their size have increased significantly.

There have been quite vast studies on the linkage of economy and remittances. Topics such as remittances role in economic development, in human capital development, reduction of poverty, reduction of income inequality and many others have been and still explored. However, relatively fewer studies on the remittances and the Dutch Disease are done. Therefore, the scope of studies covering this topic is comparatively limited.

The present paper attempts to shed a light on the Dutch Disease and the remittances in case of the Kyrgyz Republic. The Kyrgyz Republic is one of the post-Soviet countries, which became independent in 1990s. The uniqueness of countries Kyrgyz Republic in the context of economic studies is that they are experiencing transition from the central planned economy to the market economy (so called transition economies). The limited studies on the Dutch Disease and the remittances are especially visible if we consider them in the context of the transition economies. There have been researches on this topic focusing transitional economies in Eastern Europe (Edmira, Luciana and Pranvera, 2013; Blouchoutzi and Nikas, 2010; Ito, 2017). However, the reality of Central Asian countries as Kyrgyz Republic is quite different. One important difference is that the Kyrgyz Republic does not have strong economic ties with western European countries. This factor might imply different research outcomes for these two regions. Another important factor for studying the

Kyrgyz Republic is the volume of remittances it receives. Although, many developing countries receive much higher volumes of remittances, Kyrgyz Republic is among the top countries in terms of the remittances to GDP ratio. This is important because the remittances might have impact, if their proportion is enough significant to the whole economy.

The paper is aimed to examine the economic impact of migrant remittances in case of the Kyrgyz Republic. The objective is to empirically identify whether remittances lead to the Dutch Disease in the country. The methodological approach is chosen according to the number of similar studies (Taguchi, & Shammi, 2018; Acosta, Larte & Mandelman, 2009; Ito, 2019; Rabbi, Chowdhury, & Hasan, 2013). We refer to time series framework, specifically Vector-autoregressive estimation. In the analysis additionally, we use Granger causality test and Impulse response function. These methodological instruments would help us to find out the nature of the effect of remittances (coefficients sign and magnitude), the existence of the long-run relationship and the response of macroeconomic variables to the changes in remittances flow.

The structure of the paper is the following: the first chapter covers the theoretical framework and literature review of the topic. The second chapter is devoted to

empirical analysis part, where the dynamics of the remittances and others data are analyzed and the econometrical model is estimated.

CHAPTER I.

THEORETICAL FRAMEWORK AND THE LITERATURE REVIEW:

1.1. Remittances and an economy.

Before discussion the studies about the remittances and Dutch Disease, we consider theoretical and empirical literature about the role of remittances in the economy as a whole. Generally, economists agree that remittances have an impact on the economy. For instances, Esther, Francisco and Lucila (2013) found that remittances is among significant variables influencing Mexican economy. Another study also confirmed the significance of the remittances on the economy, where author employed paned data method for 36 African countries (Fayissa & Nsiah, 2010). According to their results, remittances are beneficial for the economy by providing alternative source of investment and providing additional liquidity to the economy. Meyer and Shera (2017) also found positive effect of remittances on the economy. They focus study on high remittances receiving countries in East Europe and found that remittances increases economic growth. Additionally to economic growth and investment, Adams

and Cuecuecha (2013) found that remittances inflow has positive effect on poverty reduction. According to their results, the families receiving remittances have lower likelihood of living in extreme poverty conditions. Although, the significance of the remittance in the economy is mostly undisputable, the impact of it is still argued among researchers. Since there are also studies showing that remittances can have negative effect. The most discussed adverse effect of remittances is that they can result in real exchange rate appreciation. This effect is also known under the name of the Dutch Disease.

Next, we observe the role of remittances on microeconomics (i.e. motives for remittances) and on macroeconomics (i.e. influence of remittances on the economy as a whole). Rapoport and Docquierin their study 'The Economics of Migrants' Remittances' (March 2005) give quite comprehensive review and analysis of the role of the remittances in microeconomics and in macroeconomics. Therefore, in this subsection we mostly refer to their study. The authors first introduce theoretical models of other researches and their own model, and then compare results of modeling with empirical findings.

1.1.1. Microeconomics of remittances. Motives.

Discussing the remittances in microeconomics, the vast literature observed by the authors allowed outlining of the following main reasons for migrants to send remittances:

- Altruism
- Exchange
- A strategic motive for remittances
- Insurance and moral hazard
- Family loan arrangements: the investment motive
- Inheritance as an enforcement device
- Mixed motives

The first motive - *Altruism* is quite easily understandable. Most of the migrants send money to their home countries to help their families, relatives and other close ones. According to the Hillel and Frédéric, this motive has been more assumed rather than observed by empirical models. The authors construct model, which considers optimal utility for the sender and for the receiver of the remittance. According to the model, remittances are positively related to senders income and his or her degree of altruism. On the other side, remittances are negatively related with recipient's income and his or her degree of altruism. In general, this outcome is quite expectable, only the part of

recipient's altruism could be little bit puzzling. It is explained that if receiver of the remittances is altruistic toward senders, he or she should ask less transfer. That is if the receiver starts to "care" more about the sender (increase of altruism toward sender), he or she would reduce their transfer from the sender.

Exchange motive is well defined by Piracha and Saraogi (January 2012) as "The exchange motive involves a contractual agreement between the migrant and the remittance-receiving household. Under this motive, remittances represent payments to the household at home for the services provided by them e.g. childcare, managing migrant's assets or handling other financial arrangements". Additionally, Rapoport and Docquier say that exchange motive occurs, when individual may find profitable to pay for the service in informal way (sending remittances). This happens when there is market imperfection and transaction costs could be avoided by referring to the interpersonal informal agreement between migrant and receivers (performer of the service) about the payment. That is the amount of the transfer should be between market price of the service to be performed and the opportunity cost of the receiver. According to the model in Rapoport and Frédéric study, the increase of the receiver's income positively relates to the amount of the remittances, which is contrasting difference comparing to altruistic motive. Another important finding is that the adverse conditions in the receiver country such as unemployment decreases the

amount of remittances, while in the case of altruistic motive receiver's remittances stay unaffected or even increases.

A strategic motive for remittances model was originally developed by Stark (1995), and it is used in explaining the context of migration. According to the model, in the first period of migration employers in the host country do not know about the level of skills of migrants. While, in order to pay appropriate wage rate they need to know productivity of the worker. For that purpose, they use average productivity, estimated by statistical method, and pay about the same wage rate for all migrants working for them. However, consider that there are skilled and unskilled migrants, for the former it is undesirable to have the same payment as for latter. Therefore, skilled migrants have rational to send remittances to lower skilled counterparts for their agreement to stay at home country. This kind of motivation for remittances is called strategic motive for remittances. A strategic motive for remittances ends when employers would be able to discriminate skilled and unskilled migrants. According to the Ansala (2012), the model predicts that this type of migration brings allocative efficiency, since skilled migrants would be majority of the workers and thus increase productive efficiency in migrants receiving country. It implies positive relationship between the remittances and selectivity; more skilled migrants are selected the larger is the amount of remittances. Because, in that case greater number of skilled workers would

likely to send transfers to secure their workplace and to keep the level of wage rate high, since low skilled migrants would undermine the average wage rate.

Insurance and moral hazard – this motive for remittances describe situation when migrant plays a role of sort of insurance and credit source for the family and other relatives whose main income comes from agriculture. As it is well observed, rural areas in most developing countries are lack access to financial services. Considering environment needed for successful farming – weather, which is quite unpredictable, agriculture business is prone to high risks. Migrant in the face of one of member of the family, therefore, is good source of informal insurance or loan source. Additionally, this kind of arrangement is believed to be very effective, since the risk of being unemployed or any other risks of emigrants is not closely correlated with bad weather conditions risks. The model's prediction by Rapoport and Frédéric points that likelihood of migration and the size of remittances increase in case when the income of transfer receivers is volatile. Additionally, in contrast to altruism motives where remittances fall gradually, insurance motive remittances stay constants and drops sharply in the end of the migration period.

Family loan arrangements: the investment motive – when the remittances are sent to repay the cost of migration or any other loan such as for education it categorized as

investment motive. According to the theoretical model, the flow of transfer by the loan repayment motive should stay constant over time.

Inheritance as an enforcement device – this motive for remittances describe situation when remittances receiving member of the family (parents) control the flow of transfers from migrant member by promising the pass of inheritance. This means that in order to take back the costs spend on migration family members at home may give or refuse inheritance to the one who is outside the country. Sometimes instead of inheritance family members can use social norms, for instance condemning migrant member if he or she stops sending remittances. This is especially effective in rural areas of developing countries, where public affirmation is very important. Theoretical model implies “the amount of remittances increases with (a) the remaining household’s assets and income, (b) the probability of inheriting (which depends on the age of the parents, the number of siblings, etc.), (c) the migrant’s wealth and income, and decreases with (d) the degree of risk aversion, providing that inheritance is more risky than other available forms of savings” (de la Brière et al., 2012).

Mixed motives – as it names states this motive implies different motives coexisting in migrant to send remittances. Worth mentioning part, is that in most instances the altruistic motive makes less visible other motives such as loan repayment/investment or insurance motives. This is because, if the migrant is continuing to send money for

repayment of the loan without having formal agreement to do so, then it is closely related to altruism.

1.1.2. Macroeconomics of remittances. Remittances' impact on economy.

In the economic theory the impact of remittances on an economy is viewed in two perspectives. The first view is the impact of remittances in the short-run, how international transfers affect aggregate expenditure, national output, prices and wage rates. The second view is in the long-run, where the effect of remittances on development is studied.

1.1.2.1. Remittances in the short-run.

There are two views in economic theory, which analyze the effects of remittances on the economy in the short-run. The first is called standard macroeconomic view, which is mainly based on the Keynesian model and focuses on national output and aggregate consumption. And the second view analyzes the impact of remittances on trade and prices, applying international trade theory. In standard macroeconomic view the main emphasize is given on the changes of national output and aggregate demand caused by remittances. From the Keynesian model it is known that shock in aggregate demand causes disproportionate change in national output, whereas this

effect on output depends on the Keynesian multiplier. Additionally to the multiplier, for the changes in national output the sizes of the transfer and recipients propensity to consume are important.

Another model in the analysis of effect of remittances on national output and aggregate consumption is Mundell-Flemming model. In this model the main determinants are exchange rate regime and degree of capital mobility. In the case of perfect capital mobility and complete flexible exchange rate regime, the international transfers (remittances) have no effect on national output (GDP). The reason is that the equilibrium level of GDP is determined in money market. Remittances may induce rise in aggregate consumption, however, this effect is neutralized with by a currency appreciation. In the case of complete fixed regime increase in remittances may induce rise in national output (income). The reason is that equilibrium in this case is achieved by changes in money supply. Additionally to these two views, if households fully aware of expenditure shock, the adjustment speed of wages and prices play important role in the effect of remittances. Fast adjustment of wages and prices on international transfer does not change national output. However, when wages and prices are slow, there is short-term real effect on the economy.

The second view of the effect of remittances in the short-run analysis its impact on international trade and relative prices. The main instrument in doing so is the international trade theory. Generally, the effect of remittances is perceived as being beneficial for economy. However, there are two cases where remittances may have negative impact on trade of the economy. First, one is known as German transfer problem, which postulates that transfers harm terms of trade when they are mostly spent on imports. Second is Dutch Disease, which is quite similar to previous one and it is discussed latter in the paper.

1.1.2.2. Remittances in the long-run.

The analysis of remittances in the long-run view is focused on whether migrants' transfers contribute to economic growth and whether it reduces income inequality. Among researchers it is agreed that if remittances are mainly directed to investment, then it may have positive effect to economic growth. However, if remittances are used for consumption usages, then it would have any or even adverse effect to economic growth. The results of empirical studies on this issue are quite controversial, and therefore there is no definite answer to this question.

There is no specific theoretical framework to study the relationship of remittances and income inequality. Moreover, the results of empirical studies show different

outcomes. For example Stark et al. (1986) claims that migrants' remittances decrease income inequality, if the period of migration is long enough. On the other hand, Adams (1989) shows that income inequality rises with large inflow of transfers from migrants. Other authors such as Barham and Boucher (1998) shows that remittances may have both negative or positive effect on inequality depending on methodology used.

1.2. Theoretical framework of the Dutch Disease.

The term of Dutch Disease was first introduced by the journal 'Economist' in 1977 (The Economist, 1977). In 1959, there was discovery of large natural gas deposit in Netherlands called Groningen. It is stated that the further rise of the economic activity around the natural gas deposit caused decline in manufacturing sector in the country.

The Dutch Disease theory has been elaborated in Corden and Neary's (1982) study. The authors focus on the de-industrialization of one sector due to boom in another sector. For that purpose, theoretical model has been proposed that is now called 'Salter-Swan-Dornbush model'. The authors take example of energy sector and a manufacturing sector. The model shows that when there is boom in the energy sector, due to discovery of new deposits or increase mineral extraction, the manufacturing sector shrinks. According to the model, the shrinkage occurs mainly due to the two

effects. The first one is called the *resource movement effect* and the second one is the *spending effect*.

The Dutch Disease's main adverse effect is the economy's loss of competitiveness. In order to explain this process, Corden and Neary's (1982) introduce sectors tradable and non-tradable goods in their model. Important part of the study are the prices of the goods in that sectors, particularly, the relative price of tradable goods to non-tradable goods. There is no exact separation of tradable goods and non-tradable goods. However, conventionally, service goods such as real estate and rental services, utilities, medical, legal and rental services are considered as non-tradable goods and all other goods are classified as tradable goods. Additionally, Corden and Neary put assumption of small open economy in their model, where the country do not influence on international market prices. In the model, the price of the non-tradable good changes and determined by the domestic market, whereas, the price of tradable goods is independent from the local economy and determined by international market. Conventionally, while studying Dutch Disease the price of tradable goodstaken as a fixed one. Competitiveness loss occurs due to increase of price of non-tradable goods over price of tradable goods. This process, as mentioned before, due to two effects of the Dutch Disease. Specifically, the production capacity moves toward booming sector, in our case it is sector of non-tradable goods. The main

reason is that the boom in the sector of non-tradable goods raise the demand for labor in this sector. The increase of the wage rate in the booming sector, due to higher demand, makes employment in this sector more attractive and labor shifts to this sector. The increase of labor in the non-tradable sector occurs at the expense of tradable sector. Thus, the output in the sector of tradable goods (manufacturing) decrease, leading to the shrinkage of this sector. This process is called the *resource movement effect*. When the boom of the non-tradable sector raises general income, households increase their spending both on tradable and non-tradable goods. Due to higher demand the price of non-tradable goods rises, however, the price of the tradable goods remains unchanged. The later does not change since supply and demand forces of the international market determine it. Therefore, it implies the ratio of prices of non-tradable goods over tradable goods rises, which means real exchange rate appreciation, that is the *spending effect*. Both the shrinkage of the tradable sector and real appreciation of the exchange rate result in the loss of competitiveness of the economy.

Briefly, the Dutch Disease phenomenon can be described as real appreciation of exchange rate due to large financial inflows. Therefore, migrants' remittances are also considered as a source of the Dutch Disease. More precisely, in the original theory of Dutch Disease the financial inflows occur due to the export of natural

resource, whereas, in the case of the remittances, we can perceive that the country exports its labor service. Consequently, the financial inflows are the earnings (the remittances) of the labor (migrants). The main mechanism of real exchange rate appreciation in case of remittances is quite the same as in case of energy sector boom. The remittances increase households', at home country, absorption capacity that leads to more consumption. The consumption is increased for both tradable and non-tradable goods. The higher demand should imply increase in the prices of goods; however, it occurs only for the non-tradable goods. The reason as explained previously, is that the price of tradable goods is determined by international market, whereas the domestic market influences the price of the non-tradable goods. Thus, the relative price of tradable goods to non-tradable goods is increased resulting in real appreciation of exchange rate (spending effect). Additionally, the higher price of the non-tradable goods induce production capacity to move toward non-tradable sector (resource movement effect), thus shrinking tradable sector (Acosta, Lartey & Mendelman, 2009).

1.3. Literature Review on Dutch Disease and remittances.

Much of the Dutch Disease related studies are concentrated on the boom of energy sector and decline in the manufacturing sector. Dutch Disease due to remittances has

started to be studied quite recently. The reason could be that this issue has become more relevant nowadays. As it is said in the previous section, the global migration and consequently remittances have risen dramatically in the last decades. Nevertheless, the scope of the studies is limited if we consider the different features of the countries on which studies were based. Moreover, it is worth mentioning that the evidence of Dutch Disease caused by remittances is still under debate, because, most of the studies have conflicting results. These studies could be categorized on the type of economy, least developed, developing, developed economies and countries like Kyrgyz Republic, which are in transient stage from closed to open economy. The studies also could be classified on their methodologies used. Further structure of the section is following, first, we discuss studies done on Dutch Disease for group of countries and using panel data as a methodological approach. Then we discuss the studies on Dutch Disease focusing individual countries, where various empirical methods have been employed.

The literature studying remittances and the Dutch Disease for the group of countries is more than for individual countries. These studies cover different region and mostly focused on developing economies. For instance, Amuedo-Dorantes and Poso (2004) study the impact of remittances on real exchange rate in Latin American and Caribbean countries. Authors find that in that selected 13 countries migrants

remittances cause appreciation of the real exchange rate, which leads to deterioration of export capacity. Another study takes wider approach and has studied 56 countries from different regions for the Dutch Disease symptoms (Daway-Ducanes, 2018). The author uses Blundell and Bond's system general method of moments and confirms the existence of the Dutch Disease. According to the study, resource effect is highly visible in those countries, which hinders the growth of manufacturing sector. Javaid (2009), studies the Dutch Disease existence in South-East Asian countries. The author adds Foreign Direct Investment and Official Development Aid in his analysis. According to the results, these international inflows lead to real exchange appreciation, resulting in loss of competitiveness in those economies. Acosta, Lartey and Mandelman (2009) study the relationship of remittances and the Dutch Disease under different exchange rate regimes. The authors find that in countries with fixed exchange rate regimes the resource movement effect has larger impact.

On the other hand there are studies, which have different findings. For instance, Comparing to previously studies, Dzansi (2013) finds opposite results. According to the author's study, remittances lead to development in manufacturing sector in analyzed 40 countries. Another study by Owusu-Sekyere, Van Eyden and Kemegue (2014) find that, there are real exchange rate appreciations due to remittances in Sub-

Saharan African countries. However, countries trade competitiveness has been sustained by monetary and fiscal policies.

Studies of Dutch Disease and Remittances focusing on individual countries are also quite various in their findings. Among the most recent studies, Katsuya Ito (2019) found the evidence of the Dutch Disease in post-Soviet economy Georgia. The author has used Vector Error Correction Model method for the quarterly observation from 2000 to 2016. According to the Ito, the inflow of remittances depreciates real effective exchange rate in the short-run, whereas, in the long-run it appreciates real effective exchange rate of the country. Rabbi, Chowdhury and Hasan (2013) have proved the existence of the Dutch Disease in Bangladesh by using Vector Error Correction Model method. Taguchi and Shammi (2018) have achieved to similar findings. They have found the existence of the Dutch Disease in Bangladesh for the period of 1976-1995. The approach used by the authors is the Vector Autoregression (VAR) Framework. However, the study reveals that starting from 1996 the inflow of remittances had positive effect on the economy by contributing to the capital accumulation in the country. Authors believes that this positive impact occurred due to policy new regulations aimed to induce capital accumulation. Another study (Makhlouf & Mughal, 2013) found evidence of Dutch Disease by employing IV Bayesian analysis in Pakistani economy. The authors suggests that the Dutch Disease

is caused mainly by the remittances, whereas, financial inflows from Official Development Assistance and Foreign Direct Investment do not cause loss of competitiveness or tradable goods' sector decline.

CHAPTER II.

EMPIRICAL ANALYSIS OF THE REMITTANCES AND THE DUTCH DISEASE IN THE KYRGYZ REPUBLIC

2.1. Dynamics of the Remittances.

Migrants from Kyrgyz Republic are working in different regions; consequently remittances come from many countries (Table 1). However, the prevailing part of the migrants is in Russia and other neighboring countries. As we can see from Table 1, 98 percent of remittances come from Russia and second largest source of inflows is Kazakhstan 0.09 percent. The countries outside of Commonwealth of Independent States (CIS, former soviet countries excluding Eastern European states) in total account only for 1.66 percent. Russia and other post-soviet countries are favored, because they have strong historical, political and geographical relations with the Kyrgyz Republic. Therefore, Kyrgyz workers have the minimum barriers such as language, cultural, legal and border regulations to migrate to Russia.

Table 1. Flows and the sources of the remittances

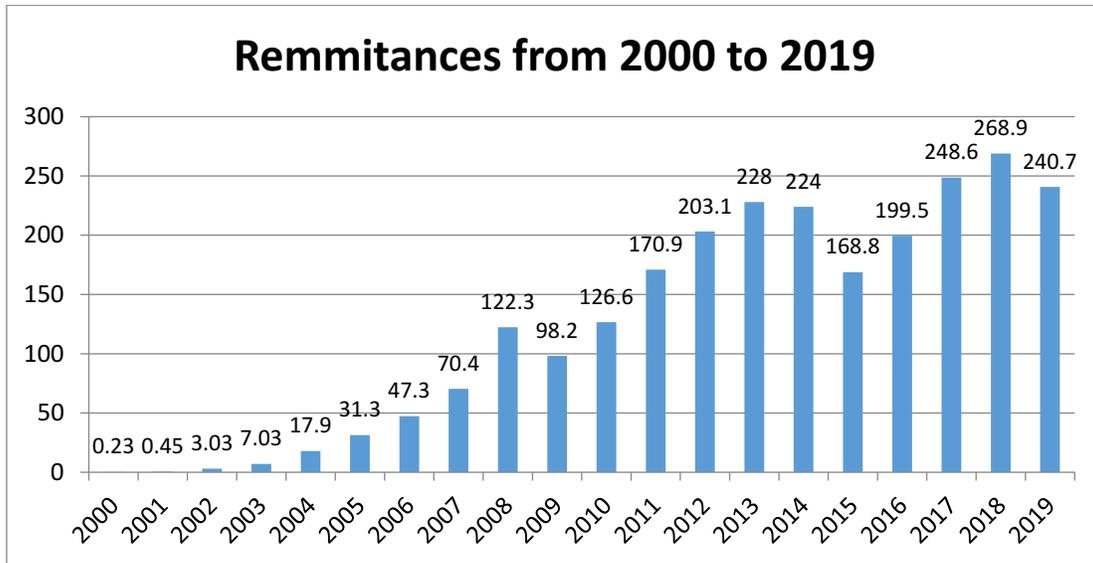
| | in mln of US dollars | in percentage |
|-------------------|-----------------------------|----------------------|
| Net inflow | 2,142.8 | |

| | | |
|-------------------|---------|---------------|
| Inflow | 2,685.1 | 100.00 |
| CIS countries | 2,640.5 | 98.34 |
| Kazakhstan | 2.2 | 0.08 |
| Russia | 2,638.2 | 98.25 |
| Others | 0.1 | 0.00 |
| Foreign countries | 44.6 | 1.66 |
| Belgium | 0.0 | 0.00 |
| Great Britain | 0.0 | 0.00 |
| Germany | 0.0 | 0.00 |
| USA | 26.7 | 1.00 |
| Others | 17.9 | 0.67 |

Source: National Bank of Kyrgyz Republic. Statistics. Remittances.

Throughout the observed period Kyrgyz Republic is experiencing steady growth of remittances inflow (Figure 1). The increasing tendency of remittances has been reduced in three periods. The first is in 2009 and the second is in 2015, where in both times subsequent inflows were resumed to its growing tendency. Reduction of remittances in 2009 is mainly due to global financial crisis. In the second and third cases, the reason could be assigned to the devaluations of Russian rubble in 2014-2016 and in 2019. Majority of Kyrgyz migrants are in Russia, therefore, devaluation of the rubble has significantly reduced remittances value.

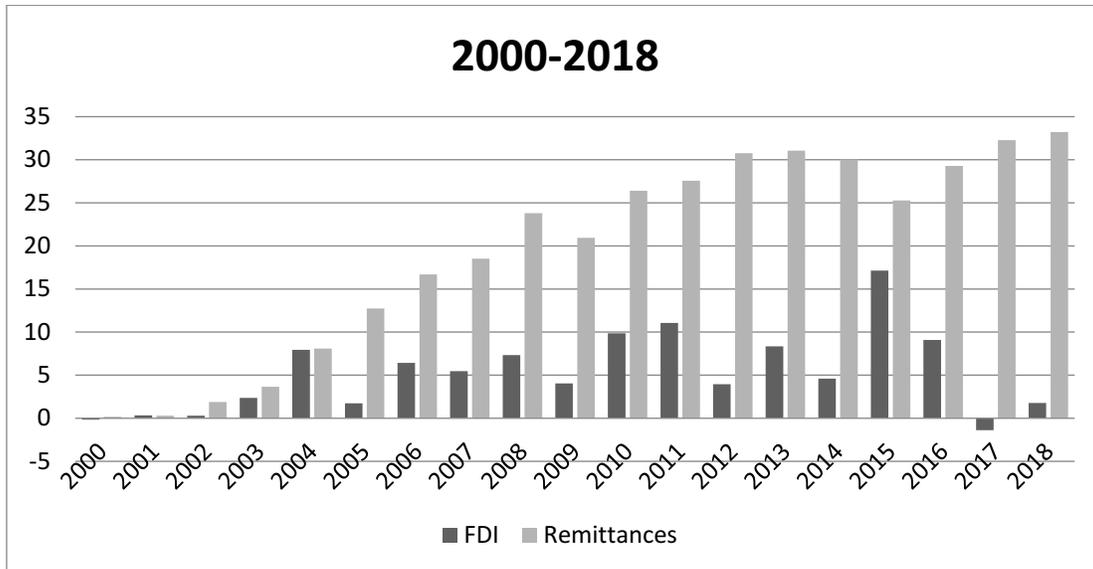
Figure 1. Dynamics of the Remittances in Kyrgyz Republic (in billions of US dollars)



Source of the data: World Bank Databank. World Development Indicators.

The role of the remittances becomes significant in the economy, with their increase. Although, the absolute value of the remittances is much less comparing to other developing countries, the share of them to Gross Domestic Products is significantly high. As we can see from Figure 2, in the last decade the share of remittances varies in 20-30 percentages. This number puts Kyrgyz Republic in top remittances depending countries. Specifically, Kyrgyz Republic is in second place after its neighbor state Tajikistan.

Figure 2. Share of Remittances and FDI to GDP (in percentages)



Source of the data: World Bank Databank. World Development Indicators.

Whereas if we look to dynamics of inflows of Foreign Direct Investment we can see that its amount is considerably lower than remittances. The highest share is 17 percent in 2015. According to the empirical study, remittances become an important source of foreign financial flows and facilitate economic growth (Meyer & Shera, 2017). It is especially important for the Kyrgyz Republic, because remittances are also a major source of foreign exchange earnings. As a small economy, the Kyrgyz Republic cannot influence international prices, and it practices a limited (managed) floating exchange rate regime. A managed floating exchange rate regime implies free floating of the exchange rate within a certain corridor, with central bank interventions in cases of deviations.

Therefore, large remittances help to sustain national currency. As it is found, remittances are important to the economy, because of high dollarization of the national currency, floating exchange rate regime and dependency on import products (Atabaev, Atabaeva & Baigonushova 2014).

2.2. Econometric analysis on the remittances and the Dutch Disease.

2.2.1 The methodological approach.

The main methodological approach is chosen based on other studies, which have similar purpose as the present study (Taguchi, & Shammi, 2018; Acosta, Larte & Mandelman, 2009; Ito, 2019; Rabbi, Chowdhury, & Hasan, 2013). The authors focused on identifying the Dutch Disease's symptoms in small economies as the Kyrgyz Republic. These studies employ Vector Autoregressive (VAR) model approach. The reason of this methodological approach is that authors aimed to analyze relationships of remittances, real exchange rate and manufacturing sector. The authors have taken three variables for the estimation, which are remittances as percentage of Gross Domestic Product, real effective exchange rate and manufacturing – service ratio. The logic of choosing first series is obvious, remittances is the main variable of interest. The selection of second series is meant to capture spending effect. If relationship of real effective exchange rate and remittances

would be found to be positive, it would indicate the presence of Dutch Disease. The last series is selected to test on resource allocation effect. In case, if increase of remittances would decrease the ratio of manufacturing to service, then it could signal the presence of the effect.

Vector Autoregressive model is considered to be effective, because it allows to analyze dynamics of multiple variables. Particularly, in VAR it is possible to estimate interrelations of each variable to other. It is very useful, since we would like to find the effect of remittances both to real exchange rate and manufacturing sector.

Vector Autoregressive model treats all variables as endogenous, in other words as dependent variable. In order to allow this, VAR model employs multi-equation system. For each variable there is individual equation, therefore number of equations depend on the number of variables of interest. Each variable is regressed on lags of own and other variables. Following we show very basic mathematical formulation of the VAR model.

If we consider the case with two variables and take only the lag of one period, the formulation is as following:

$$X_t = \alpha_1 X_{t-1} + \alpha_2 Z_{t-1} + \varepsilon_{xt}$$

$$z_t = \beta_1 x_{t-1} + \beta_2 z_{t-1} + \varepsilon_{zt}$$

x_t – first variable in the model,

z_t – second variable in the model,

α_n – Coefficients of variables in the right hand side of the first equation,

β_n – Coefficients of variables in the right hand side of the second equation.

If we formulate in matrix form we have the following:

$$\begin{array}{ccccccc} \begin{pmatrix} x_t \\ z_t \end{pmatrix} & = & \begin{pmatrix} \alpha_1 & \alpha_2 \\ \beta_1 & \beta_2 \end{pmatrix} & \begin{pmatrix} x_{t-1} \\ z_{t-1} \end{pmatrix} & + & \begin{pmatrix} \varepsilon_{xt} \\ \varepsilon_{zt} \end{pmatrix} \\ \Downarrow & & \Downarrow & \Downarrow & & \Downarrow \\ \mathbf{Y}_t & & \mathbf{C} & \mathbf{Y}_{t-1} & & \mathbf{e}_t \end{array}$$

For the simplicity of formulation we give corresponding name for each matrix as shown above (\mathbf{Y}_t , \mathbf{C} , \mathbf{Y}_{t-1} , \mathbf{e}_t). Then we can formulate the model in the following way:

$$\mathbf{Y}_t = \mathbf{C} \mathbf{Y}_{t-1} + \mathbf{e}_t$$

This is the basic formulation of VAR model. Specifically, this one is VAR (1) model, because of the one period lag. In the main equation, matrix **C** shows the magnitude of each effect, vector e_t is full of errors for each of variable.

2.2.2. The data.

As it is mentioned before, we follow approach of similar studies and, therefore, our variables of interest are as in that studies: remittances as percentage of Gross Domestic Product (roy), real effective exchange rate (reer) and manufacturing – service ratio (mts). The first series remittances to GDP is from Federal Reserve Economic Data (FRED) and dated as of May 2020. The series name on the original source FRED is the ‘Remittance Inflows to GDP for Kyrgyzstan’ (DDOI11KGA156NWDB). The Manufacturing – service ratio is constructed from two series from the World Bank Database, World Development Indicators (WDI) dates as of May 2020. Name of these series on the WDI are ‘Manufacturing, value added (constant 2010 US\$) [NV.IND.MANF.KD]’ and ‘Services, value added per worker (constant 2010 US\$) [NV.SRV.EMPL.KD]’. And the last series real effective exchange rate is taken from the Database of the National Bank of the Kyrgyz Republic (NBKR), dated similarly by May of 2020. The name of the series on the original source is the ‘Real and Nominal Effective Exchange Rate Indices’. The span

of observations, due to availability of the data, is from 2000 to 2017. Since we have three variables, our VAR model consists three equations. All variables are in the original measurement as in the source, except, manufacturing to service. This variable is converted to the logarithmic form in order to avoid unit measurement sensitivity. The descriptive statistics and the graphs of the series are given in the Appendix part.

2.2.3. Estimations and result discussion.

Before specification, however, we need also to select number of lags in the. For this we use Akaike (AIC), Schwarz Bayesian (BIC) and Hannan-Quinn information criteria. The best number lags is shown by the minimum value of respective criterion. In the case of our variables all three criteria show that two lags has minimum value (see Table 1). Therefore, our model is VAR (2), having as independent variables the two lags of all variables. Specification of the model is following:

$$\mathbf{Y}_t = \boldsymbol{\mu} + \mathbf{C}_1 \mathbf{Y}_{t-1} + \mathbf{C}_2 \mathbf{Y}_{t-2} + \mathbf{e}_t;$$

Where \mathbf{Y}_t is 3x1 matrix (vector) all three variables in consisting contemporary period ($roy_t, reer_t, mts_t$).

$\boldsymbol{\mu}$ - is a vector matrix consisting constant term

\mathbf{Y}_{t-1} – 3x1 column vector consisting one lag of each variable ($roy_{t-1}, reer_{t-1}, mts_{t-1}$)

C_1 – is a 3x3 size matrix consisting coefficients of for one lag of variables

Y_{t-2} - column vector consisting two lag of each variable (roy_{t-2} , $reer_{t-2}$, mts_{t-2})

C_2 – is a 3x3 size matrix consisting coefficients of for two lag of variables

e_t – vector for error terms

Table 2. Test on information criteria for the optimal number of lags

| <i>Lags</i> | <i>loglik</i> | <i>p(LR)</i> | <i>AIC</i> | <i>BIC</i> | <i>HQC</i> |
|-------------|---------------|--------------|------------|------------|------------|
| 1 | -77.80181 | | 11.973574 | 12.540014 | 11.967540 |
| 2 | -63.99080 | 0.00110 | 11.332107* | 12.323377* | 11.321548* |
| 3 | -58.39171 | 0.26237 | 11.785561 | 13.201662 | 11.770477 |

Following we present the outcome of the estimation (Table 2.). The estimation is also checked on diagnostic tests. First we check our model on autocorrelation. The test show no autocorrelation in the estimation. According to the results, we cannot reject Null Hypothesis of no autocorrelation in the model (Table 3.). As we can see, the p-value is greater than 0.01. This result implies that the model has consistent estimators.

Table 3. Test on autocorrelation.

| Test for autocorrelation of order up to 2 | | | |
|--|-------|--------------|---------|
| | Rao F | Approx dist. | p-value |
| lag 1 | 0.317 | F(9, 9) | 0.9487 |
| lag 2 | 1.070 | F(18, 3) | 0.5556 |

Next, we check on ARCH effect in the model. The result of the test indicates having no ARCH effect. As we the p-value is not significant (Table 4). We can consider that there is no ARCH effect in the estimation, which implies conditional homoskedasticity. Therefore, our inference can be accepted as valid.

Table 4. Test on the ARCH effect.

| Test for ARCH of order up to 2 | | | |
|---------------------------------------|--------|----|---------|
| | LM | df | p-value |
| lag 1 | 33.063 | 36 | 0.6090 |
| lag 2 | 75.184 | 72 | 0.3757 |

And the lastly we test our estimation on Normality. As we can see, the result of the test shows normality in the data distribution (Table 5.). The Doornik-Hansen test points on insignificant p-value, therefore, having normality we can make inference.

Table 5. Test on Normality.

| Residual correlation matrix, C (3 x 3) | | |
|---|-----------|-----------|
| 1.0000 | 0.68993 | -0.37428 |
| 0.68993 | 1.0000 | -0.024949 |
| -0.37428 | -0.024949 | 1.0000 |
| Eigenvalues of C | | |
| 0.225353 | | |
| 0.979092 | | |
| 1.79555 | | |
| Doornik-Hansen test | | |
| Chi-square(6) = 3.11759 [0.7939] | | |

The result of the VAR estimation shows no significant relationship of remittances and other two variables, when it is dependent variable (equation 1). This may be considered as expected outcome, since we do not assume direct impact of real exchange rate and manufacturing sector on remittances. In the second equation, where real effective exchange rate is dependent variable, we observe significant relationships (Table 6., see full output in Annexes 1). There are two significant relationships in 95 percent confident level, which are constant term and first lag of

dependent variable. However, we would like to focus on more relevant variables for out topic. According to the outcome, remittances have statistically significant effect on real effective exchange rate on 90 percent confident level. More precisely, the one lag of remittances (roy) is significant (p-value 0.07), and its coefficient has negative sign. Second significant variable is manufacturing variable (mts), for both one and two lags the p-value is less than 0.10. The two coefficients have negative sign. Regarding the last equation, where manufacturing to service ratio is being dependent variable, we observe no significant relationship except constant term.

Table 6. VAR estimation output

Dependent variable: _MtS

| | <i>Coefficient</i> | <i>Std. Error</i> | <i>t-ratio</i> | <i>p-value</i> | |
|---------|--------------------|-------------------|----------------|----------------|----|
| const | 17.8318 | 5.93528 | 3.004 | 0.0149 | ** |
| Roy_1 | -0.0139704 | 0.00991648 | -1.409 | 0.1925 | |
| Roy_2 | 0.00142889 | 0.0127036 | 0.1125 | 0.9129 | |
| Rer_1 | -0.009160 | 0.00510804 | -1.793 | 0.1065 | |
| Rer_2 | 0.00708920 | 0.00652434 | 1.087 | 0.3055 | |
| l_MtS_1 | -0.0358125 | 0.288603 | -0.1241 | 0.9040 | |
| l_MtS_2 | -0.326423 | 0.323884 | -1.008 | 0.3399 | |

Dependent variable: Rer

| | <i>Coefficient</i> | <i>Std. Error</i> | <i>t-ratio</i> | <i>p-value</i> | |
|-------|--------------------|-------------------|----------------|----------------|----|
| const | 874.760 | 312.248 | 2.801 | 0.0207 | ** |
| Roy_1 | 0.533008 | 0.521694 | 1.022 | 0.3336 | |
| Roy_2 | -1.36711 | 0.668323 | -2.046 | 0.0711 | * |
| Rer_1 | 0.676854 | 0.268728 | 2.519 | 0.0328 | ** |

| | | | | | |
|---------|----------|----------|--------|--------|---|
| Rer_2 | 0.118697 | 0.343237 | 0.3458 | 0.7374 | |
| l_MtS_1 | -31.9151 | 15.1830 | -2.102 | 0.0649 | * |
| l_MtS_2 | -33.9003 | 17.0391 | -1.990 | 0.0779 | * |

Dependent variable: l_MtS

| | <i>Coefficient</i> | <i>Std. Error</i> | <i>t-ratio</i> | <i>p-value</i> | |
|---------|--------------------|-------------------|----------------|----------------|----|
| const | 17.8318 | 5.93528 | 3.004 | 0.0149 | ** |
| Roy_1 | -0.0139704 | 0.00991648 | -1.409 | 0.1925 | |
| Roy_2 | 0.00142889 | 0.0127036 | 0.1125 | 0.9129 | |
| Rer_1 | -0.0091605 | 0.00510804 | -1.793 | 0.1065 | |
| | 2 | | | | |
| Rer_2 | 0.00708920 | 0.00652434 | 1.087 | 0.3055 | |
| l_MtS_1 | -0.0358125 | 0.288603 | -0.1241 | 0.9040 | |
| l_MtS_2 | -0.326423 | 0.323884 | -1.008 | 0.3399 | |

Although, this estimation is interesting for the topic, we focus more on the results of Cointegration test. The test would show the existence of the long-run relationship in the variables. For that purpose we perform Engle-Granger causality test. The first step in performing the test is to conduct unit-root test for each variable. For this purpose, we use Augmented Dickey-Fuller test (ADF). The ADF test shows that all three variables have unit root and are non-stationary at level (Table 7). The variables are stationary at their first differences. Since all series are stationary in the same order we can proceed to cointegration regression and unit-root test in both systems.

Table 7. Augmented Dickey-Fuller test

| <i>Variable</i> | <i>p-value</i> | <i>Stationarity at</i> | <i>p-value</i> | <i>Stationarity at</i> |
|-----------------|----------------|------------------------|----------------|------------------------|
|-----------------|----------------|------------------------|----------------|------------------------|

| | | <i>level</i> | | <i>level at first difference</i> |
|-----|--------|----------------|------------|----------------------------------|
| Roy | 0.4972 | Non stationary | 0.02226** | Stationary |
| Rer | 0.9719 | Non stationary | 0.0392** | stationary |
| Mts | 0.1962 | Non stationary | 0.009989** | stationary |

In the Granger Causality the null hypothesis is that variable 1 does not Granger Cause variable 2. We have included two lags in the test. The outcome of Granger causality test shows “weak” causality (at 90 % level significance) from remittances to GDP (Roy) to manufacturing-service ratio (Mts) and from real effective exchange rate (Rer) to manufacturing-service ratio (Mts). The nature of the causality or effect can be seen from output of VAR estimation (Table 6). The causality of remittances to manufacturing-service ratio is unclear, because the estimation of VAR model shows different sign in coefficients of first and second lag of remittances to GDP variable. And also it is statistically insignificant. The same situation is in case of the second causality between real effective exchange rate and manufacturing-service ratio. The most natural interpretation of these results could be that there are causality relationships in between variables. However, we could also look at impulse response function of those two relationships.

Table 8. Pairwise Granger Causality Tests

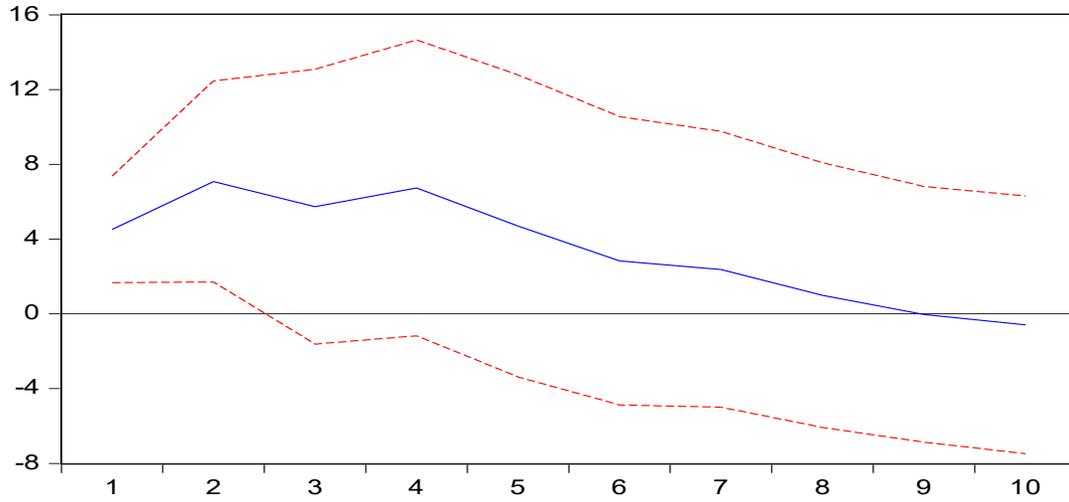
| Direction of causality | observations | p-value | Decision |
|-------------------------------|---------------------|----------------|------------------------|
| Roy→Mts | 16 | 0.0749* | Reject (at 10 % level) |
| Mts →Roy | | 0.9371 | Do not reject |
| Rer→Mts | 16 | 0.0626* | Reject (at 10 % level) |
| Mts → Rer | | 0.1666 | Do not reject |
| Rer→Roy | 16 | 0.8852 | Do not reject |
| Roy→ Rer | | 0.5778 | Do not reject |

The impulse response function shows that shock in remittances increase real effective exchange rate in first four periods and then decreases it. The positive effect of remittances to real effective exchange rate is interpreted as a spending effect by Taguchi and Shammi (2018). In our case, however, the positive effect is only in the initial periods and at last two periods it is negative. It can be assumed that there is no spending effect in the country. According to the findings of Atabaev, Atabaeva & Baigonushova (2014), the most of the remittances in the Kyrgyz Republic is spent on investment activities. Therefore, it can be hypothesized that remittances does not used largely on non-tradable goods. Consequently prices of those goods do not rise, keeping relative prices in stable overall.

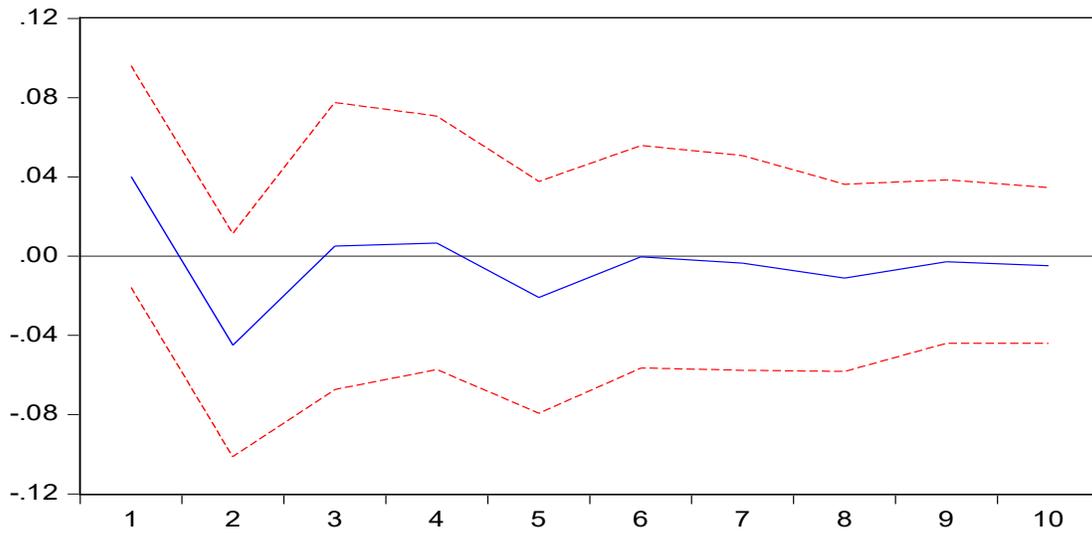
Taguchi and Shammi (2018) considered the negative effect in the impulse response function of manufacturing-service ratio to real effective exchange rate as resource movement effect. Accordingly, as in our estimates of impulse response function we have similar results; we can assume the resource movement effect in the country.

Figure 3. Impulse Response functions

Response of RER to Cholesky
One S.D. ROY Innovation



Response of L_MTS to Cholesky
One S.D. RER Innovation



CHAPTER III.

CONCLUDING REMARKS AND POLICY CONSIDERATIONS:

3.1. Concluding Remarks.

The Kyrgyz Republic is among top remittances receiving countries. The country is small and developing economy. These factors put attention on the idea that the country is experiencing the Dutch Disease. Where the inflows of large volumes of the remittances lead to decline of the manufacturing sector and by increased consumption cause real exchange appreciation. The outcome of the Dutch Disease is that it loses its international competitiveness. The paper aimed to examine the existence of the Dutch Disease in the country.

The outcome of the empirical estimations points that in the case of the Kyrgyz Republic there is no symptoms of the Dutch Disease. Although, there is “weak” evidence for the existence of the resource movement effect. However, considering overall statistical outcome, we could say that the remittances do not lead to the real exchange appreciation.

3.2. Policy Considerations.

Therefore, the policies targeting these two goals are very important for the economy of the Kyrgyz Republic.

Considering the fact that the remittances are one of important variable in the economy of the Kyrgyz Republic, it is crucial to have “right” policies related to this flows. The numbers of theoretical and empirical studies have found that the remittances spend on investment activities contribute to the economic development, while if it’s mainly directed to the consumption the outcome could be deteriorating as in case of the Dutch Disease. Therefore, policy authorities need to promote investment incentives. Among such policies, the authorities could introduce regulations improving banking sector. Specifically, easing access to credits, lowering interest rates, increasing competitiveness among commercial banks, educating about financial services in rural area.

Another important policy consideration is that the authorities need to promote export manufacturing sector in the country. Such policies include lowering income tax for firms with exporting potential. Additionally, policies which increase foreign investment attractiveness are also very crucial. The low capital capacity of the country could be boosted by foreign financial and capital investment.

The remittances spend on investment activities and growth of the manufacturing sector might largely reduce the risk of occurring of the Dutch Disease in the future.

APPENDIX

Descriptive statistics and Graphs of the series.

Summary Statistics, using the observations 2000 – 2017

| Variable | Mean | Median | Minimum | Maximum |
|----------|-----------|----------|----------|--------------|
| Roy | 17.326 | 18.514 | 0.16381 | 32.270 |
| Rer | 89.056 | 90.200 | 60.300 | 112.80 |
| l_MtS | 12.797 | 12.774 | 12.437 | 13.105 |
| Variable | Std. Dev. | C.V. | Skewness | Ex. kurtosis |
| Roy | 11.911 | 0.68748 | -0.27008 | -1.3861 |
| Rer | 18.522 | 0.20798 | -0.17399 | -1.3654 |
| l_MtS | 0.17109 | 0.013370 | 0.16711 | -0.20489 |

Figure 4. Dynamics of the remittances to GDP

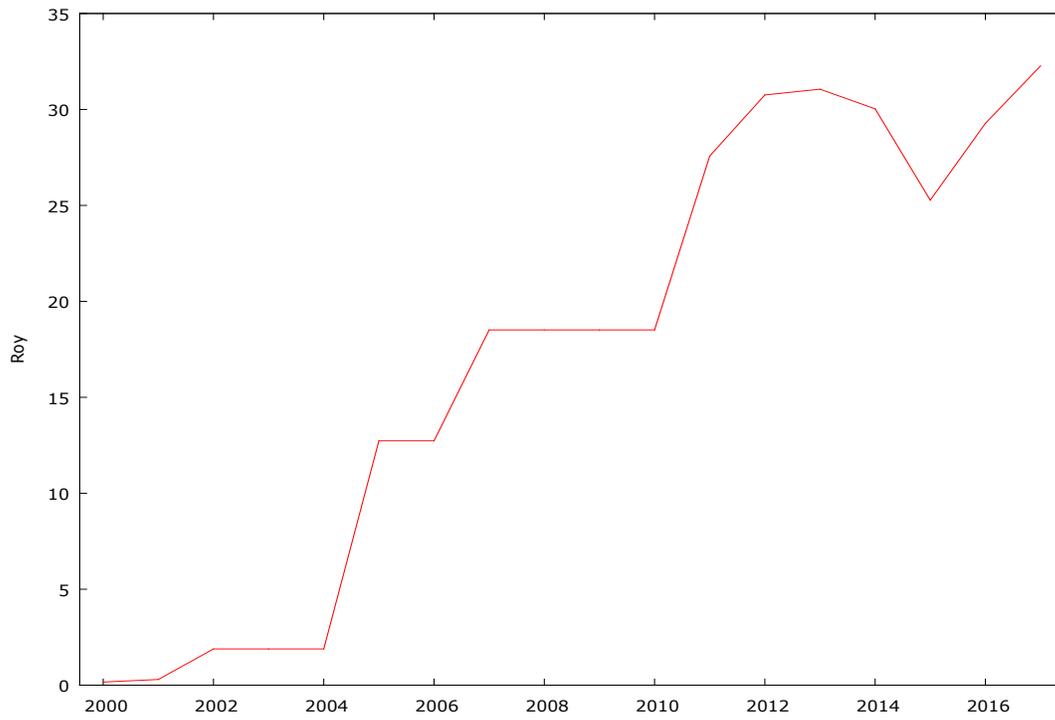


Figure 5. Dynamics of the real effective exchange rate

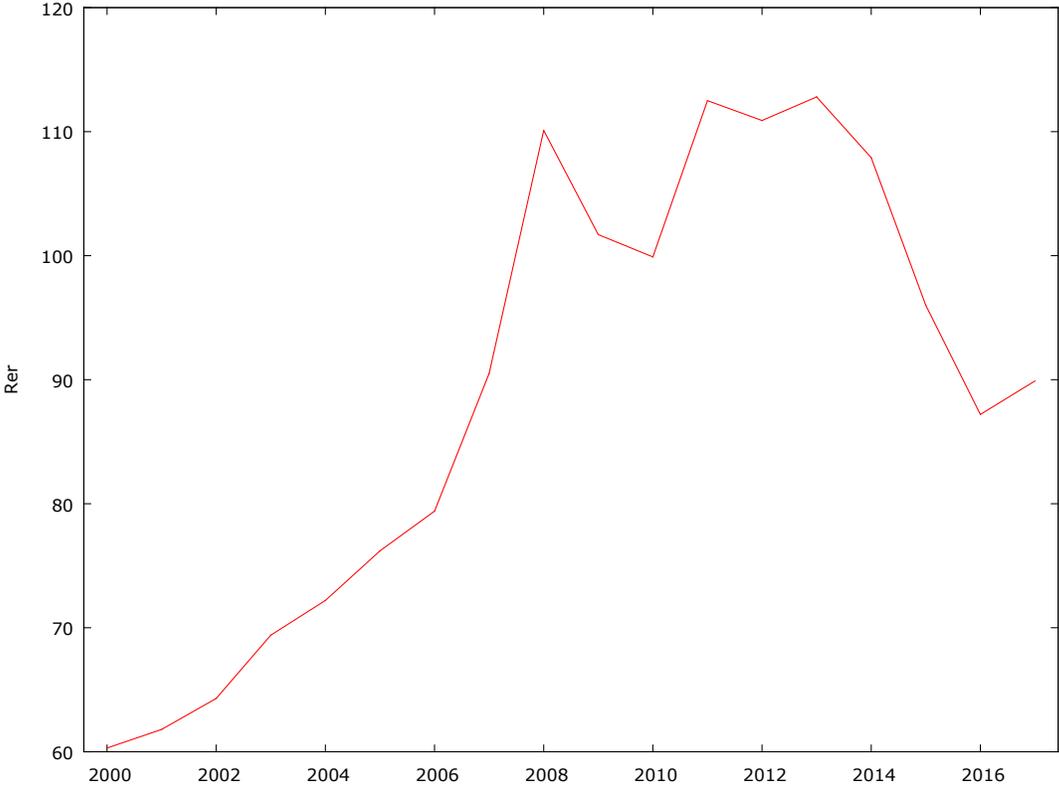


Figure 6. Dynamics manufacturing to service ratio



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