The Effect of Remittances on Economic Growth in Kyrgyzstan and Macedonia: Accounting for Financial Development

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ABSTRACT

Kyrgyzstan and Macedonia have experienced a reasonable increase in remittances over the last twenty-five years. Subsequently, the extent to which remittances can be instrumental for economic development of the two countries has gained serious attention in recent development dialogues. The aim of this study is to examine the impact of remittances versus financial development on the economic growth of the two counties, complementing the burgeoning interest and focus on remittances for policy. The short-run and the long-run effects and the causality dynamics of remittances and financial development, are explored. The results show a long-run positive impact of remittances on the economic growth of these countries. The impact of financial development is negative, significant only for Kyrgyzstan and not statistically significant for Macedonia. The causality results show that remittances support economic growth for Kyrgyzstan, whereas economic growth appears to propel remittances for Macedonia.

INTRODUCTION

Remittances are defined as personal transfers (cash and in-kind) and compensation of workers (income from border, seasonal and other short-term works) (World Bank, 2017). While remittances are an important source of income for emigrants' families, it is often exposed to exchange rate risk and transaction costs. As such, it is not surprising that the impact of remittances on growth can be ambiguous and depends on whether remittances are used for consumption or investment purposes. The net amount of this income largely depends directly on the associated transaction costs related to the money transfer. Also, the high costs incurred in sending or receiving remittances often encourage the use of informal money transfer services (IFTs) (Coxhead & Linh, 2010), e.g. postal services and friends or relatives travelling to the recipient countries, as means to send remittances. The flow of remittances is also influenced by the degree of competition among the transfer service providers, legal restrictions imposed by monetary authorities on the service providers, senders and recipients, and the availability of information to the senders and recipients. Additionally, the quality of infrastructure such as telecommunications, finance and local transport services are necessary to ensure smooth transfer of remittances to the recipients (Kock & Sun, 2011).

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In general, remittances can help to overcome poverty and the liquidity constraints of emigrants' families, where both effects reduce the likelihood of income and wealth inequality in the home country (Stark et al., 1986; Taylor & Wyatt, 1996; Ratha, 2007; Buch & Kuckulenz, 2010; Rao & Hassan, 2012). However, remittances, which can be similar to welfare benefits, change the economic incentive structure and therefore the economic behaviour of the receivers. Therefore, it is unclear if these changes will have a desirable impact on key economic variables, including economic growth. In the extreme, remittances can result in conspicuous consumption (Rempel & Loddell, 1978) which may frustrate non-migrants and discourage the labour supply of the receiving relatives in their home country. It is also conceivable that remittances can promote moral hazard on the side of the receiving relatives (Chami et al., 2005) or the government of the home country (Grabel, 2009). This phenomenon appears when migrants' relatives and/or the government of the home country reduce their efforts in improving the economic performance and instead rely on remittances as a source of income predominantly to furnish consumption. In this regard, both conspicuous consumption and moral hazard reduce the growth performance of a country. A second argument is that remittances are used as a kind of informal insurance against local risks and shocks (e.g. natural disasters) by saving the remittances first and in case of a realized risk to consuming the savings to maintain consumption level (Yang, 2011). Additionally, remittances can be used as a source of finance for human (Rapoport, 2002; Rapoport & Docquier, 2003) and physical (Stark, 1991) capital investment.

It is widely accepted that a well-developed and well-functioning financial sector is integral for economic growth and development (Bagehot, 1873; Schumpeter, 1912; Cameron, 1967; Goldsmith, 1969; McKinnon, 1973; Shaw, 1973). The underlying argument (Levine, 2005) is that a well-functioning financial sector and its institutions produce information about possible investments, allocate savings efficiently, monitor investments, exert corporate governance, facilitate trading and diversification, and manage risk. The financial sector is well placed to mobilize funds like remittances to productive investments and income/employment generating activities (Gregorio & Guidotti, 1995; Demetriades & Hussein, 1996; Calderón & Liu, 2003; Adenutsi, 2011; Valickova, Havranek, & Horvath, 2015; Durusu-Ciftci, Ispir, & Yetkiner, 2017). It should be noted, however, that improved resource allocation and lower risk imply opposing income and substitution effects which may result in lower savings rates and less capital accumulation (Levhari & Srinivasan, 1969). The consequence could be that better financial services may cause a growth-retarding effect.

The nexus between remittances, financial development and economic growth has been of interest to migration scholars for quite some time. Whenever it was noted that remittances have increased in or perceived to have an impact on a particular country or region, subsequent studies have followed in conjunction with financial development. The majority of these studies conclude that remittances have pro-growth effects in the presence of an efficient financial sector (Demirgüç-Kunt, Córdova, Peria, & Woodruff, 2011; Aggarwal, Demirgüç-Kunt, & Peria, 2011; Ramirez, 2013; Kumar, 2013; Menyah, Nazlioglu, & Wolde-Rufael, 2014; Chowdhury, 2016).

Recently, remittances have become a centre of discussion for the development of Kyrgyzstan and Macedonia (Karymshakov, Abdieva, Sulaimanova, & Sultakeev, 2015; Blagica, Tumanoski, Petreska & Dávalos, 2016; Petreski, Petreski, & Tumanoska, 2017). In 2015, remittances as a proportion of GDP for Kyrgyzstan was 25 per cent compared with 22.5 per cent the previous year. Macedonia, on the other hand, recorded remittances close to 3 per cent of its GDP (Figures 2 & 3). Although there is a significant difference in terms of remittance inflows as a share of GDP, both countries have acknowledged remittances to be a valuable source of income to propel socio-economic development. Additionally, Karymshakov et al. (2015) and Blagica et al. (2016) highlighted the need for financial institutions like banks and pension funds in improving the impact of remittances in Kyrgyzstan and Macedonia. However, there are no studies so far to ascertain the plausible impacts of remittances in conjunction with financial development on the growth of the two countries. Thus, by exploring the short-run and long-run effect of remittances viz. financial

development, this study provides a timely contribution to the development policy dialogues, and more specifically on the prospects of economic growth in the two countries.

The balance of the article is organized as follows. In the next section, a literature review of remittances and financial development is discussed. This is followed by a brief background and justification of choosing the two countries in section 3. In section 4, guiding theories, data and methodology are discussed, followed by the results from the analyses in section 5. Policy is discussed in section 6 and finally conclusion follows in section 7.

LITERATURE REVIEW

There are some evidences that remittances boost economic growth, alleviate poverty and stabilise consumption that can emerge from various shocks (Adams & Page, 2005; Adams, 2009; Combes & Ebeke, 2011; Driffield & Jones, 2013). However, it is noted that the effects of remittances on growth can be unique for each country given the differences in terms of income, population, infrastructure, among other things. Studies which examined remittance-led growth hypothesis have, for the most part, showed mixed outcomes: Acosta et al., (2008), Mundaca, (2009), Catrinescu et al., (2009) Chami et al., (2009), Jawaid and Raza, (2012), Ramirez, (2013), Datta and Sarkar, (2014), Ramirez, (2014), Imai, Gaiha, Ali and Kaicker, (2014), and Nwaogu and Ryan, (2015), among others.[1]

The role of financial sector development in shaping growth and development (Schumpeter, 1911; Mckinnon, 1973; Shaw, 1973; Greenwood and Jovanović, 1990; King and Levine, 1993; Beck et al, 2013; Valickova, et al., 2015; among others) is at least as important as remittances. The function of financial sector extends to pooling, allocating and mobilising funds into productive projects, promoting entrepreneurship, facilitating trade of goods and services, diversifying and managing risk, and supplying access to credit. The efficient transfer and use of remittances thus requires a close link with the services offered by the financial institutions. Subsequently, for richer analysis of remittances and growth, a number of studies have accounted for the role of financial development (Giuliano and Ruiz-Arranz, 2009; Nyamongo et al., 2012; Bettin and Zazzaro, 2012, among others).

Giuliano and Ruiz-Arranz (2009) examined the impact of remittances on growth in one hundred countries and concluded that countries with less developed financial system can use remittance as an alternative form of liquidity to boost investment and growth.[2] Similarly, Aggarwal et al. (2011) considered one hundred and nine countries over the periods 1975 to 2007 and examined the link between remittances and financial development. They found a positive and significant association between financial development and remittances viz. economic development. With municipal level data for Mexico and focussing on the depth and breadth of the banking sector, Demirguc-Kunt et al. (2011) also found a strong association between the two. Ramirez (2013) estimated the impact of remittances and financial variables on the economic growth of selected high- and low-income countries in Latin America and the Caribbean. The results showed that a positive effect of remittances in both income groups were stronger in the presence of credit, although credit and the degree of economic freedom were positive and significant only in the upper income countries. Nyamongo et al. (2012) investigated thirty-six African countries and concluded that the association between growth and remittances was positive, growth and volatility in remittances was negative, and remittances complemented financial development. Bettin and Zazzaro (2012) developed and used a bank inefficiency index in addition to the other measures of financial development such as the ratio of liquid liabilities of the financial system to GDP (M2), the ratio of domestic credit provided by the banking sector to GDP, the ratio of bank deposits to GDP and the ratio of claims on the private sector to GDP. Using a sample of sixty-six countries, the results from this study showed the impact of remittances on growth was negative (positive) in countries where bank efficiency was low (high). On the other hand, Chowdhury's (2016) study looked at a sample of thirty-three top remittance receiving

countries. The results showed that although remittances are effective in promoting growth, the association between financial development and growth was not statistically significant.

On country-specific studies, remittances and growth are examined together with the role of financial sector development. For instance, Kumar (2013a) noted that for the Philippines, remittances and their interaction with information and communication technology (ICT) have a positive association with income whereas remittances' interaction with financial development have a negative association with growth. Similarly, Kumar (2013b) noted a positive association between remittances and growth in Guyana but the association between financial development and growth was not statistically significant. Additionally, it is noted that growth causes financial development, whereas financial development and investment cause remittances in the country. In Tunisia, as noted by Jouini (2015), in the long-run, both financial development and remittances exerted a negative effect on the per capita income, although the latter was not statistically significant, and there was a negative correlation between remittances and financial development.

Notably, just a few studies have focused on remittances in Kyrgyzstan which conclude that remittances increase durable goods consumption. Anderson and Kroeger (2011) investigated the relationship between remittances and expenditures on child education and health. They found that remittances have not promoted investments in children education and health. Atamanov and van den Berg (2010) studied the determinants of remittances using a household budget survey. The study noted that altruism and insurance seemed to drive remittances from seasonal migrants while positive relations between income, assets and remittances from permanent migrants may be a result of loan repayment, bequest and exchange motives. In another study, Atamanov and van den Berg (2012a) examined the effect of remittances on crop income in Kyrgyzstan and found that the net effect of migration on crop production was different for farms with different land-size and across households with permanent and seasonal migrants. The negative impact of lost labour from permanent migrants outweighed the positive impact of remittances, while seasonal migration positively affected crop production. Additionally, Atamanov and van den Berg (2012b) used the household-budget survey to study the determinants of international labour migration and rural local income-generating activities. The studied stated that permanent migration and local non-farm wages employment substituted the agricultural activities and attracted the most educated rural individuals. Also, the study highlighted that the permanent migration option was unattainable to individuals with poor households and small land-holdings. As a consequence, these individuals engaged in local non-farm activities, while those who were educated and had resources to finance the cost of migration chose to leave the country for long periods of time.

Karymshakov et al. (2016) examined the impact of remittances from international migration on the occupational choices of youths left behind. The study found that the left-behind youths were employed in the household agricultural land to replace the migrant workers in the family; there was no significant evidence of remittance-dependent behaviour; and remittances did not impact wage employment. The findings also confirmed that remittances were mainly used for current consumption and did not represent financial resources for businesses or entrepreneurial activities at home.

With respect to Macedonia, studies conducted at household level show that remittances have a positive effect on consumption, poverty reduction, health (especially for females and rural dwellers), and owning businesses (Petreski & Jovanović, 2013a, 2013b, 2016; Petreski et al. 2014). Moreover, Bucevska (2011) examined the role of remittances in financial crisis using the vector error correction (VEC) model and found that real remittances have a destabilizing effect on the economic growth and do not cushion large fluctuations during economic downturn.
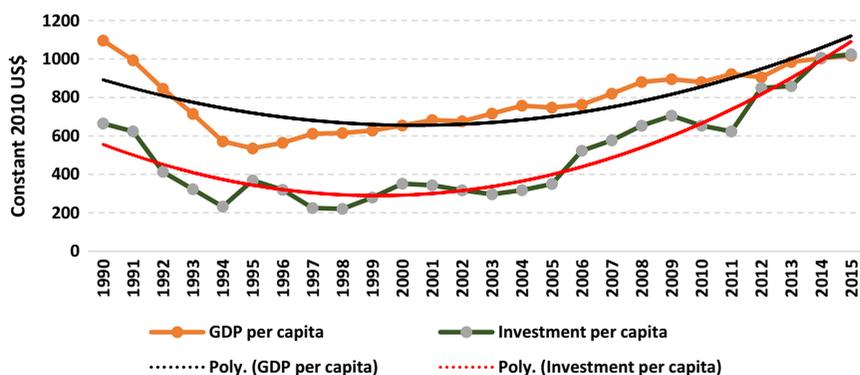
BACKGROUND

As noted in Figure 1, Kyrgyzstan (Kyrgyz Republic) is fifth among the top ten remittance receiving countries (as a per cent of GDP) after Nepal (31.2%), Liberia (28.8%), Tajikistan (27%) and Tonga (25.7%).[3]

FIGURE 1
TOP 10 REMITTANCES (% GDP) IN 2015
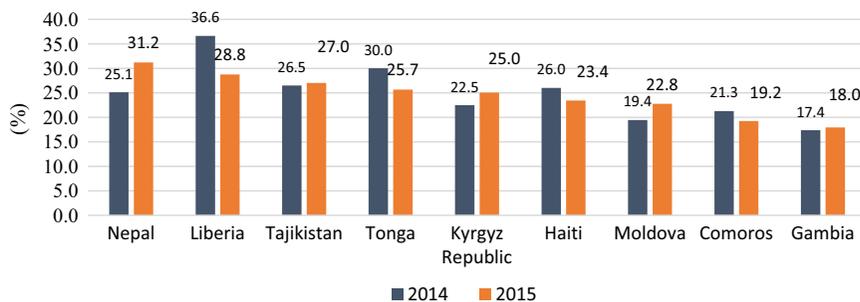
Source: World Bank (2017) and authors' own calculation.
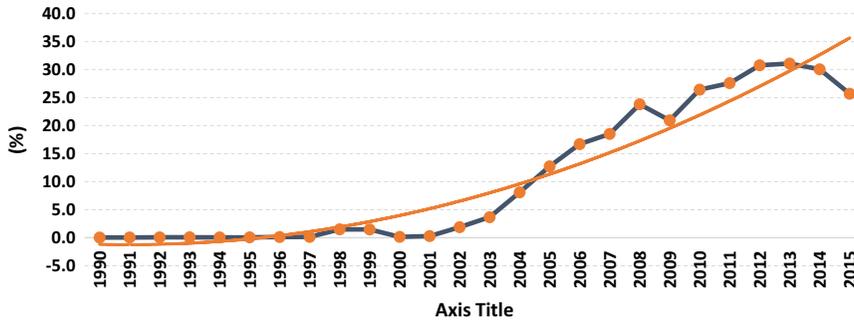
FIGURE 2
KRYZYGSTAN

Source: World Bank (2017) and authors' own calculation.

Kyrgyzstan, a former republic of the Soviet Union (SU) is one of the five poorest countries in Asia, with a GDP per capita of US$1,017 and investment per capita of US$1,025 (in 2015) (Figure 2). Like Macedonia, Kyrgyzstan is a multi-ethnic country with a population of around 5.7 million people. The main ethnic groups are Kyrgyzes (71%), Uzbeks (14%) and Russians (9%). In 2013, some 738,232 Kyrgz migrants lived and worked in Russia (77%), Germany (11%), Ukraine (3%) and elsewhere; and these countries are the main source of remittances.

Using a simple polynomial plot as a guide, we note that remittances of Kyrgyzstan exhibit an increasing trend, with significant growth noted from 2001 to 2012 (Figure 3) followed by a marginal decline from 2013 to 2015. Similarly, for Macedonia (Figure 4), we note an increase in remittances (although at a decreasing rate) over the same period and a downward trend from 2013 to 2015. Interestingly, the projections based on the trend function indicates a growth in remittances for Kyrgyzstan and convergence around 4 per cent of GDP for Macedonia.

Macedonia, comparatively, is a small multi-ethnic country with a population of just over 2.1 million people and one of the poorest countries in Europe (GDP per capita $5,094 and investment per capita of US $1,285 in 2015) (Figure 5).[4] The country, also known as the Former Yugoslav Republic of Macedonia (FYROM) because of a conflict about the name "Macedonia" with Greece, became independent of

FIGURE 3
REMITTANCES (% GDP) – KYRGYZSTAN

Source: World Bank (2017) and authors' own calculation.

FIGURE 4
REMITTANCES (% GDP) – MACEDONIA
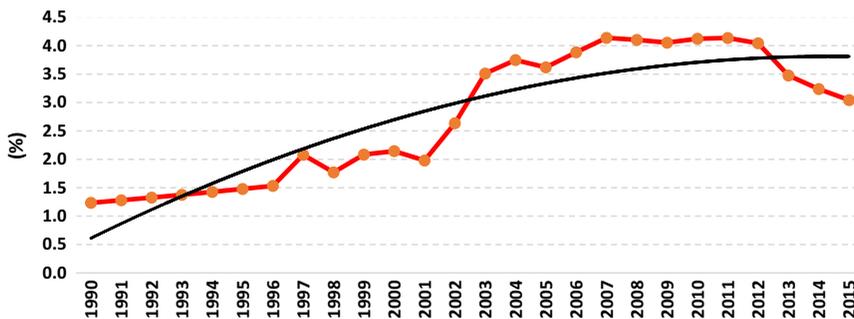
Source: World Bank (2017) and authors' own calculation.

Yugoslavia in 1991. In the same year, the insurgency ended with the Ohrid framework agreement, which provided ethnic Albanians with additional political rights. Since 2015, Macedonia has been struggling with a huge stream of refugees from Syria crossing Macedonia to reach Northern EU countries.

The largest share of remittances was transferred in 2015 by the 626,312 Macedonian migrants and was received from Germany (18%), USA (15%), Turkey (12%), Italy (11%), Switzerland (10%), Australia (8.7%), Serbia (6%) and Austria (3.5%). In total, the remittances amounted to just over US$300 million, which accounts for around 3 per cent of Macedonia's GDP (Figure 4). More-over, the study by Petreski et al. (2016) which considered 1,211 households in different geographi-cal regions and 3,089 individuals, highlights that about half of the remittances received were used for consumption and family events, and the other half's uses included property purchase, education and health, business, savings and debt repayment.

On the financial sector development[5] (Figure 6), we use the domestic credit to private sectors (per cent of GDP) as a proxy.[6] We note that for both countries, Kyrgyzstan and Macedonia, domestic credit (per cent of GDP) has increased since 2003. Interestingly, the domestic credit shows a positive trend for Macedonia and a quick recovery for Kyrgyzstan during the 2007-2008

FIGURE 5
MACEDONIA
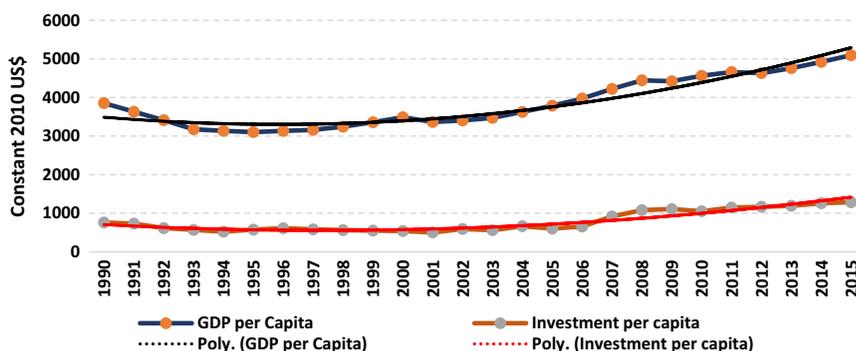
Source: World Bank (2017) and authors' own calculation.

FIGURE 6
DOMESTIC CREDIT TO PRIVATE SECTOR (% GDP)
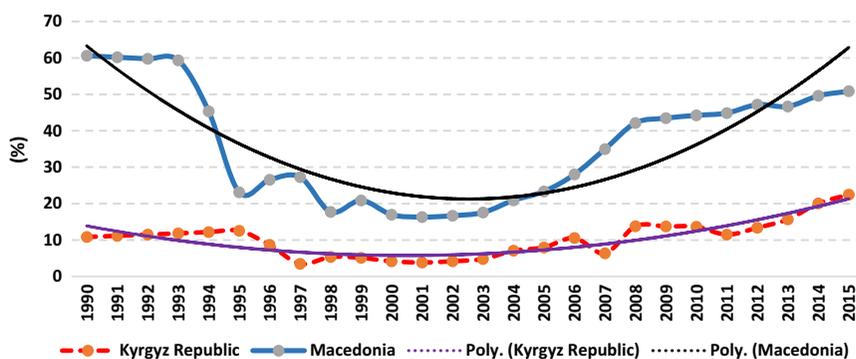
Source: World Bank (2017) and authors' own calculation.

global financial crisis. The resilience of domestic credit could be due to weak linkages with the international financial market, lack of financial innovation and access to credit, among other things.

The two countries have some features which differentiates them from each other. Macedonia's GDP per capita is about five times more (in purchasing power terms) than Kyrgyzstan, and the two countries differ in terms of geography, religion, and culture However, despite these differences, both countries exhibit many similarities. First, the counties are relatively poor and have a similar number of expats. It must be noted that the number of expats from Kyrgyzstan exceeds the number of expats from Macedonia by only 18 per cent, although the population of Kyrgyzstan is nearly three times the population of Macedonia. However, the average remittance per Kyrgyz expat was US$2286 in 2015, while the average remittance per Macedonian expat was only US$504 in the same year. This is especially remarkable considering that majority of Macedonian expats work in countries with higher incomes compared to the Kyrgyz expats.

Second, both countries were part of the so called Socialist federations – Macedonia a republic of Yugoslavia and Kyrgyzstan a republic of the Soviet Union (SU) – and both gained independence

in 1991. The countries belong to the poorest republics in Yugoslavia and in the SU, respectively and to date are among the poorest countries in their respective region. Also, both countries are undergoing transition from a planned economy and non-democratic political system to a democratic market economy, where the transition was temporally accompanied by violent conflicts.[7] Not surprisingly, both countries are suffering from corruption, which is widespread in politics, the jurisdictional system and public administration.[8] The industrial structure of both countries is to date relatively similar. In both countries, the agricultural sector plays an important role. In 2015, the agricultural sector contributed 11.2 per cent and 15.9 per cent to the Macedonian and the Kyrgyz GDP, respectively. In terms of the labour force participation in the agricultural sector, Macedonia has 17.9 per cent and Kyrgyzstan has 29.3 per cent. On the other hand, 51.6 per cent and 49.8 per cent of the labour force is hired in the service sector in Macedonia and Kyrgyzstan, respectively. Both economies had slow growth between 1991 and 2015 at almost the same rate of (1.40 per cent for Kyrgyzstan and 1.36 per cent for Macedonia).

Given these similarities, the development of remittances as share of GDP of both countries is of specific interest for our purposes. In the 1990s, remittances of Macedonia were in between 1.5 to 2 per cent, and increased since 2003 to about 4 per cent (Figure 3); and the remittances of Kyrgyzstan was less than 1 per cent until 1997 and began to rise to a high of 31 per cent in 2013 (Figure 4). However, in the last few years, the remittances inflow to Kyrgyzstan and Macedonia has decreased as a result of the sluggish economic situation in Russia and Ukraine and the increased migration barriers in the European Union (EU), respectively. These situation is expected to improve in the near future provided the sanctions of the EU against Russia and the civil war in Ukraine ends, and the accession negotiations between Macedonia and the EU progress.

Although the financial sector in both countries is improving, they are still relatively underdeveloped and inefficient (c.f. Giustinani & Ross, 2008, and Naumovska & Cvetkoska, 2016 for Macedonia and Vorobey, 2015 and Gicquel et al. 2016 for Kyrgysztan). For example, the ratio of non-performing loans of both countries exceeded the levels of comparable countries since the middle of the 1990s. This is also reflected by some key indicators of the financial inclusion.[9] In 2014, out of the 40 per cent of the Macedonians who saved money, only 13.7 per cent made use of a financial institution. Similarly, in Kyrgyzstan, out of the 36.2 per cent of the households who saved money, only 5 per cent used a financial institution. A similar situation is noted for borrowings. Out of 37.4 per cent of the Kyrgyzs who borrowed money, only 13.5 per cent were from a financial institution. For Macedonia, out of the 40 per cent who borrowed money, only 13.2 per cent were from financial institutions. It is noted that in both countries, the majority (21%) borrow from their families. From these comparisons, we can derive that both countries are confronted with very similar problems with the most important ones being corruption and political instability. Although, the economic situation in Macedonia is much better than in Kyrgyzstan in absolute terms, in relation to their geographical region and neighbouring countries, there are many similarities between them.

The forgoing analysis of Kyrgyzstan and Macedonia indicated a unique opportunity to study the impact of remittances and financial development on economic growth, which is our primary motivation.

GUIDING THEORIES, MODEL, ESTIMATION METHOD AND DATA

Guiding theories

The theories of development (Rosenstein-Rodan, 1943; Prebisch, 1950; Singer, 1950; Nurske, 1953; Lewis, 1954; Myrdal, 1957; Hirschman, 1958 and Rostow, 1960) and economic growth (Nordhaus and Tobin, 1972; Hueting, 1974; Daly and Cobb, 1989) remains at the heart of the discussion for many countries' economic planners, scholars, politicians and practitioners. According to

Hicks (1965), to understand development and growth from a practical perspective requires appealing to many branches of theory, including sociology and anthropology, however controversial, contentious, or complex they may seem, .

The growth theories also require an appreciation of interlinked features such as the diminishing marginal returns, capital accumulation (physical and human), the association between output per capita and population growth, the specialisation of labour, and technological innovations (Smith, 1776; Malthus, 1798; Ricardo, 1817; Ramsey, 1928; Young, 1928; Schumpeter, 1934; Knight, 1944).

The theory and insights on economic growth echoes the work of Keynes (1936) which was developed a few years later by Harrod (1939) and Domar (1946), and a decade later, by Solow (1956), Swan (1956) and Meade (1961) as a neoclassical growth model to rectify the weakness of instability of equilibrium by incorporating the intertemporal optimization approach of Ramsey (1928). The next wave of studies were by Romer (1986, 1987 and 1990) on the endogenous growth, with focus on external economies of scale – the idea was drawn from the works of Arrow (1962) and Sheshinski (1967). Uzawa's (1965) model was developed further by Lucas (1988), and came to be known as the New Growth Theory (NGT). The theory differed from earlier ones in that the positive externalities were the result of human capital accumulation. The NGT was later extended to incorporate the role of research and development, imperfect competition and diffusion of technology (Grossman and Helpman, 1991; Aghion and Howitt, 1992; Jones, 1999; Aghion et al., 2001; Acemoglu et al., 2001; Glaeser and Shleifer, 2002; Aghion et al., 2002; Acemoglu, 2003; Barro and Sala-i-Martin, 2004; Klette and Kortum, 2004; Lentz and Mortensen, 2008; Acemoglu and Robinson, 2012; Acemoglu et al., 2013).

Many studies contend that the contemporary notion of development is progressive and should include economic growth as a critical force among other things. This notion came about after the authors of the studies witnessed the success of countries in the East Asia and particularly Korea. Hence, economic development in this sense appeals to the need to explore generic and country-specific drivers of growth (Greenwald and Stiglitz, 2006;; Lin, 2012; Stiglitz and Greenwald, 2014) with focus on strengthening market forces and government interventions. Lin (2011 and 2012: 21) expands this notion by arguing that a country's endowments such as capital, labour and land, human capital, hard infrastructure like roads, electricity grids, telecommunication technologies, soft infrastructure like institutions, rules and regulations, and social capital plays an important role in shaping the economic structure of a country. Accordingly, the New Structural Economics (NSE) provides an alternative, if not a complementary theory of economic development. Given the complex nature of development and growth, however, it must be appreciated that to identify or arrive at specific policy levers is a challenging task and the efforts are influenced or guided by the methodologies used.

Against the aforementioned backgrounds and insights on growth and development, our study comes close to the application of the NSE theory, within the augmented Solow (1956) type framework. Additionally, underscoring the recent development dialogues centred on remittances for development in Kyrgyzstan and Macedonia, and the argument that financial sector development is pivotal for growth, the study examines the plausible impact of these two sources on the economic growth of the two countries.

Model

We test the association between remittances, financial sector development and economic growth in Macedonia and Kyrgyzstan. As indicated in the introduction, the effect of remittances on growth depends strongly on whether remittances are used for consumption or investment. From early literature on the growth effects of remittances, this question was the focus of discussion. While Böhning (1975) or Rempel and Lobdell (1978), expressed a pessimistic view, because they explained that remittances were mainly used for consumption and housing services, Griffin (1976) and Stark

(1978) advocated the more optimistic view that remittances were used for investments. A more detailed approach was worked out by Mesnard (2001) who assumed that remittances can be a means to overcome a liquidity constraint to set up a firm. Hence, the argument relies on the possibility that a loan can be taken from a financial institution to finance a start-up if a sufficient collateral exists. A similar argument was developed by Perotti (1993), but in his model the liquidity constraint prevented parents from investing enough in the education of their children to overcome the threshold of a low development trap. If parents are able to migrate, they can pay back via remittances the formal or informal loans taken to finance education of their children and on aggregate, the home economy will begin to grow because of the increased human capital.

A robust and efficient financial system promotes growth by channeling resources to their most productive uses and fostering a more efficient allocation of resources (Levine 2005; Estrada et al. 2010). With respect to the aforesaid, a better financial system can increase the output not only by boosting the aggregate savings rate, but also by strengthening competition through start-up and stimulating innovative activities because of better educated citizens. However, as noted in the introduction, a positive relationship between development of the financial sector and economic growth is not guaranteed, because of the opposite direction of substitution and income effects (Levhari & Srinivasan, 1969). Remittances and the financial sector can be complements because, like remittances, the financial sector can decrease the transaction costs for remitting money and the transaction costs of investing the money. On the other hand, both can be substitutes because a more efficient financial sector, ceteris paribus, requires fewer remittances to generate the same desired effect. This feature of the relationship between the financial sector and remittances can be formally represented with the help of a Cobb-Douglas function.[10]

To model our ideas, we follow the approach of Sturm (1998) and Rao (2010) which is related to Solow's (1956) methodology (c.f. Jawaid & Raza, 2016). The general Cobb-Douglas equation is specified as:

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} \tag{1}$$

where A represents the stock of technology, K and L are the capital and labour stock, respectively; α and β are capital and labour shares respectively. Assuming constant returns to scale ($\beta = 1 - \alpha$), and dividing (1) by L, we get:

$$y_t = A_t k_t^{\alpha}, \alpha > 0 \tag{2}$$

The model assumes that the evolution of technology is given by:

$$\Phi_t = A_0 e^{gt} \tag{3}$$

where A_0 is the initial stock of knowledge and t is time. We introduce remittance (per cent of GDP) and financial development as shift variables (Rao, 2010). The financial development is measured by the domestic credit to private sectors (per cent of GDP) (Bettin & Zazzaro, 2012; Beck et al., 2013). Following Kumar and Stauvermann (2014a,b), we describe the relationship between remittances and financial sector with a Cobb-Douglas function:

$$\psi_t = f(REM, CRD) = REM_t^{\theta} CRD_t \tag{4}$$

where $\theta > 0$ represents the elasticity of remittances, respectively. Hence:

$$A_t = \Phi_t \psi_t = A_0 e^{gt} REM_t^{\theta} CRD_t \tag{5}$$

Finally, including this information in (2), we get:

$$y_t = (A_0 e^{gt} REM_t^{\theta} CRD_t) k_t^{\alpha} \tag{6}$$

Taking the log of (6), we derive the basic model for estimation as:

$$ln\, y_t = \pi + \delta Trend + \vartheta SDUM + \alpha lnk_t + \theta \ln REM_t + \ln CRD_t + \varepsilon_t \tag{7}$$

where π is the constant, δ and ϑ are the coefficient of time trend (*Trend*) and structural break dummy (*SDUM*), respectively; and the lag estimate equation is expressed as:

$$In\, y_t = \phi_1 + \phi_2 Trend + \phi_3 SDUM + \sum_{i=1}^{p_1} \gamma_{2i} In\, y_{t-i} + \sum_{i=0}^{p_2} \zeta_{2i} In\, k_{t-i} +$$
$$\sum_{i=0}^{p_3} \omega_{2i} In\, REM_{t-i} + \sum_{i=0}^{p_4} \tau_{2i} In\, CRD_{t-i} + u_t \tag{8}$$

Estimation techniques

ARDL bounds procedure

The autoregressive distributed lag (ARDL) bounds procedure (Pesaran, Shin & Smith, 2001) is widely used and has some useful advantages. The procedure can be applied regardless of the variables order of integration as long as the highest order of integration is one. Hence, the variables order of integration can be a combination between zero and one for the procedure to be invoked. Moreover, the ARDL procedure is less sensitive to sample size and hence is suitable for small samples. Also, the procedure minimizes the problems of endogeneity and provides unbiased estimates of the long-run model with valid t-statistics (Odhiambo, 2009).

The ARDL equation is specified as follows:

$$\Delta \ln y_t = \beta_{10} + \beta_{11} \ln y_{t-1} + \beta_{12} \ln k_{t-1} + \beta_{13} \ln REM_{t-1} + \beta_{14} \ln CRD_{t-1} +$$
$$\phi_{10} SDUM + \varphi_{10} Trend + \sum_{i=1}^{p} \alpha_{11i} \Delta \ln y_{t-i} + \sum_{i=0}^{p} \alpha_{12i} \Delta \ln k_{t-i} +$$
$$\sum_{i=0}^{p} \alpha_{13i} \Delta \ln REM_{t-i} + \sum_{i=0}^{p} \alpha_{14i} \Delta \ln CRD_{t-i} + \varepsilon_{1t} \tag{9}$$

The dummy variable (*SDUM*) in the ARDL equation (9) represents the period of structural changes (breaks) in the economy. The breaks can be due to a number of reasons (shocks) and in most part can be due to socio-economic, policy, geo-politics among other events. Examining the breaks in the dependent variable and capturing the structural periods as part of the explanatory variable can provide important insights on the behaviour of the dependent variable (Ahmad & Aworinde, 2015). Also, it is possible that the structural break periods noted can be a result of cumulative events of the past which have transcending effects, and hence does not relate to the actual event date. In this case, associating the break periods to actual events can be challenging. However, the breaks in a series, based on the statistical significance, can affect the output per capita in a given period and hence need to be accounted for. Accounting for breaks can isolate the effect of the key drivers on the economic growth. Additionally, including the break periods can influence the cointegration results and where the break periods are significant, the outcomes supporting cointegration can be stronger.

Next, the co-integration is identified in two steps. First, equation (9) is estimated using the ordinary least squares technique. The second step requires testing the null hypothesis of no co-integration (H_{NULL}: $\beta_{11} = \beta_{12} = \beta_{13} = \beta_{14} = 0$) against the alternative hypothesis of the existence of a long run relationship (H_{ALT}: $\beta_{11} \neq 0$; $\beta_{12} \neq 0$; $\beta_{13} \neq 0$; $\beta_{14} \neq 0$). The existence of a long run co-integration relationship is examined by reviewing the corresponding F- statistics, against its upper and lower bounds. We reject the null hypothesis of no co-integration when the F-statistics is above the upper bound $\{F - stat > I(1)_{critical}\}$. If the F-statistics is below the lower bound $\{F - stat < I(0)_{critical}\}$, cointegration is rejected, and if the F-statistics is within the upper and lower bounds, $\{I(0)_{critical} < F - stat < I(1)_{critical}\}$, the outcome is inconclusive. After confirming the cointegration, the next step is to estimate the long-run and short-run results. The resulting CUSUM and CUSUMQ plots are examined to ensure that the parameters of the model are stable.

Causality analysis

Additionally, we examine the causality relationship between the variables to gain further insights. For this, we use the granger non-causality test of Toda and Yamamoto (1995). The procedure has advantages as well. The procedure can be applied with variables that are co-integrated of any arbitrary order; and the method is well suited with the ARDL procedure since part of the information such as the lag-length and order of integration can be used to carry out this analysis. Moreover, because the procedure does not impose stationarity restrictions and the need for first order differencing, information contained in the series are intact. However, the only restriction is to ensure that the properties of the inverse roots of the AR (auto-regressive) characteristics polynomial, I_R, are within the positive and negative unity i.e. $-1 \leq I_R \leq 1$ to ensure dynamic stability of the VAR model. This can be achieved if necessary, by including/excluding appropriate lags, a trend variable or structural break dummies as exogenous variables.

To examine the directions of causality, the following vector autocorrelation regression (VAR) equations are specified:

$$\ln y_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \ln y_{t-i} + \sum_{j=k+1}^{d\max} \alpha_{2j} \ln y_{t-j} + \sum_{i=1}^{k} \eta_{1i} \ln k_{t-i} + \sum_{j=k+1}^{d\max} \eta_{2j} \ln k_{t-j} + \sum_{i=1}^{k} \phi_{1i} \ln REM_{t-i} +$$

$$\sum_{j=k+1}^{d\max} \phi_{2j} \ln REM_{t-j} + \sum_{i=1}^{k} \rho_{1j} \ln CRD_{t-i} + \sum_{j=k+1}^{d\max} \rho_{2j} \ln CRD_{t-j} + \lambda_{1t} \qquad (10)$$

$$\ln k_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \ln k_{t-i} + \sum_{j=k+1}^{d\max} \alpha_{2j} \ln k_{t-j} + \sum_{i=1}^{k} \eta_{1i} \ln y_{t-i} + \sum_{j=k+1}^{d\max} \eta_{2j} \ln y_{t-j} + \sum_{i=1}^{k} \phi_{1i} \ln REM_{t-i} +$$

$$\sum_{j=k+1}^{d\max} \phi_{2j} \ln REM_{t-j} + \sum_{i=1}^{k} \rho_{1j} \ln CRD_{t-i} + \sum_{j=k+1}^{d\max} \rho_{2j} \ln CRD_{t-j} + \lambda_{2t} \qquad (11)$$

$$\ln REM_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \ln REM_{t-i} + \sum_{j=k+1}^{d\max} \alpha_{2j} \ln REM_{t-j} + \sum_{i=1}^{k} \eta_{1i} \ln y_{t-i} + \sum_{j=k+1}^{d\max} \eta_{2j} \ln y_{t-j} +$$

$$\sum_{i=1}^{k} \varphi_{1i} \ln k_{t-i} + \sum_{j=k+1}^{d\max} \varphi_{2j} \ln k_{t-j} + \sum_{i=1}^{k} \rho_{1j} \ln CRD_{t-i} + \sum_{j=k+1}^{d\max} \rho_{2j} \ln CRD_{t-j} + \lambda_{3t} \qquad (12)$$

$$\ln CRD_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \ln CRD_{t-i} + \sum_{j=k+1}^{d\max} \alpha_{2j} \ln CRD_{t-j} + \sum_{i=1}^{k} \eta_{1i} \ln y_{t-i} + \sum_{j=k+1}^{d\max} \eta_{2j} \ln y_{t-j} +$$

$$\sum_{i=1}^{k} \varphi_{1i} \ln k_{t-i} + \sum_{j=k+1}^{d\max} \varphi_{2j} \ln k_{t-j} + \sum_{i=1}^{k} \rho_{3j} \ln REM_{t-i} + \sum_{j=k+1}^{d\max} \rho_{3j} \ln REM_{t-j} + \lambda_{4t}$$

$$(13)$$

Hence in (10), *ln k*, *ln REM* and *ln CRD* Granger causes *ln y* if $\eta_{1i} \neq 0 \forall i$, $\phi_{1i} \neq 0 \forall i$ and $\rho_{1i} \neq 0 \forall i$, respectively. Similarly, in (11) *ln y*, *ln REM* and *ln CRD* Granger causes *ln k* if $\eta_{1i} \neq 0 \forall i$, $\phi_{1i} \neq 0 \forall i$ and $\rho_{1i} \neq 0 \forall i$, and $\rho_{1i} \neq 0 \forall i$, respectively; in (12) *ln y*, *ln k* and *ln CRD* Granger causes *ln REM* if $\eta_{1i} \neq 0 \forall i$, $\varphi_{1i} \neq 0 \forall i$ and $\rho_{1i} \neq 0 \forall i$, respectively; and finally, in (13) *ln y*, *ln k* and *ln REM* Granger causes *ln CRD* if $\eta_{1i} \neq 0 \forall i$, $\varphi_{1i} \neq 0 \forall i$ and $\rho_{1i} \neq 0 \forall i$, respectively.[11] The lags are calculated as the sum of the maximum order of integration and the lags from the ARDL estimation which are based on a set of criteria for lag-length testing.

Data

Consistent data available for analysis was from the period of 1990 to 2015. The GDP per capita (constant 2010 US$), gross fixed capital formation (constant 2010 US$) (proxy for investment) and personal remittances (per cent of GDP) were sourced from *World Development Indicators and Global Development Finance* database (World Bank, 2017). The capital stock data is constructed using the perpetual inventory method: $K_t = (1 - \delta)K_{t-1} + I_t$ We set the depreciation rate (δ) to 0.15 and the initial capital stock (K_0) to 1.2 times the real GDP (gross domestic product) of 1990 in 2010 USD prices. Although arbitrarily, the depreciation rate and the factor used for initial capital stock are chosen to ensure that the capital per worker exhibits concavity and hence diminishing returns to scale (Kumar & Stauvermann, 2014a, b). Total population is used to proxy for the labour stock, L_t given that labour increases at the growth rate of population.[12] The descriptive statistics and correlation matrix of all variables in its original form over the sample periods 1990–2015 are represented in Table 1.

According to Table 1, the average real per capita income is US$788 and US$3847 for Kyrgyzstan and Macedonia, respectively. Notably, remittances as a share of GDP are 10.8 per cent for Kyrgyzstan and 2.7 per cent of GDP for Macedonia; and the domestic credit (per cent of GDP) is 10.2 per cent for Kyrgyzstan and 36.3 per cent for Macedonia. Also, for Kyrgyzstan and Macedonia, a positive and statistically significant (within 1 to 10%) correlation between remittance and GDP per capita, domestic credit and GDP per capita, remittance and capital stock per capita, and domestic credit and capital stock per capita are noted. Although correlation does not necessarily imply cointegration or causality, the strength of the correlation, measured by the correlation coefficient and the level of significance, can influence the statistical significance of the association. For the purpose of regression analysis, all the variables are transformed into natural logarithmic form.

RESULTS

Unit root results

Table 2 presents the conventional unit root tests based on the Augmented Dickey-Fuller (ADF) (1979), the Phillips and Perron (P-P) (1988) and the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) (1992) tests. The tests are used in order to ensure conclusive results on unit roots. We note that the variables are stationary in their first differences which means that the maximum order of integration is one.

TABLE 1

DESCRIPTIVE STATISTICS AND CORRELATION

	GDP/Capita (constant US$) = y	Capital Stock/capita (constant US$) = k	Remittances (% GDP) = REM	Domestic credit (% GDP) = CRD
Panel a: *Kyrgyzstan*				
Mean	787.6379	2471.143	10.84380	10.21883
Median	759.9473	1985.442	2.775732	10.99815
Maximum	1095.933	4767.811	31.05644	22.46879
Minimum	535.0440	1315.119	0.040584	3.474550
Std. Dev.	160.1755	909.5531	12.24334	4.942874
Skewness	0.169272	1.204364	0.526563	0.545390
Kurtosis	1.893001	3.299948	1.565047	2.943630
Jarque-Bera	1.451730	6.382931	3.432178	1.292394
Probability	0.483906	0.041112	0.179768	0.524035
Observations	26	26	26	26
Correlation				
y	1.0000			
k	0.5746[A] (0.002)	1.0000		
REM	0.6323[A] (0.001)	0.8939[A] (< 0.001)	1.0000	
CRD	0.6407[A] (< 0.001)	0.7731[A] (< 0.001)	0.6540[A] (< 0.001)	1.0000
Panel b: *Macedonia*				
Mean	3847.073	4683.697	2.748874	36.32095
Median	3627.152	4336.743	2.839455	38.54419
Maximum	5093.836	6894.967	4.138561	60.59843
Minimum	3103.493	3803.596	1.234224	16.30433
Std. Dev.	640.5186	917.8521	1.121982	15.59580
Skewness	0.507083	1.131914	−0.044743	0.140982
Kurtosis	1.823533	3.091309	1.345254	1.590465
Jarque-Bera	2.613658	5.561027	2.975042	2.238484
Probability	0.270677	0.062007	0.225932	0.326527
Observations	26	26	26	26
Correlation *Matrix*				
y	1.0000			
k	0.8395[A] (< 0.001)	1.0000		
REM	0.7214[A] (< 0.001)	0.3272 (0.103)	1.0000	
CRD	0.4418[B] (0.024)	0.6330[A] (0.001)	−0.0829 (0.687)	1.0000

A and B denote the level of statistical significance of the correlation at 1% and 5%, respectively.
Source: Authors' estimation for sample from 1990–2015.

Structural break unit root tests

To examine the break in the output series, the Bai and Perron (2003) multiple break points test is applied. The results are reported in Table 3.

The results (Table 3) show breaks in the output series periods for Kyrgyzstan were in 1993, 1995, 1996, 1999, 2004 2009, and 2013, and for Macedonia, the breaks were in 1994 and 1999. To account for this, a dummy variable (*SDUM*) is set to one for these periods. Upon including the

TABLE 2

UNIT ROOT TEST RESULTS

Variables	ADF		P-P		KPSS	
	Level	1st Diff.	Level	1st Diff.	Level	1st Diff.
Panel a: Kyrgyzstan *Constant*						
ln y	−2.0300[1]	−2.4954[0]	−1.3547[3]	−2.5329[1]	0.1677[4][A]	0.2193[3][A]
ln k	2.6053[1]	−4.8872[0][A]	0.0370[2]	−4.4610[2][A]	0.6726[3][C]	0.1983[2][A]
ln REM	−1.1504[0]	−5.2941[1][A]	−1.1204 [2]	−4.3704[2][A]	0.9115[2]	0.1170[2][A]
lnCRD	−1.0358[0]	−5.54660[A]	−0.9564[1]	−5.5466[0][A]	0.2753[3][A]	0.2694[1][A]
Constant & trend						
ln y	−2.0534[1]	−2.6766[0]	−1.2392[2]	−2.6792[3]	0.1582[4][C]	0.0706[2][A]
ln k	−1.0533[2]	−3.5195[1][C]	−1.0419[2]	−6.8839[2][A]	0.1733[3][C]	0.1469[2][C]
ln REM	−2.1404[0]	−5.2849[1][A]	−2.1838[2]	−4.5163[4][A]	0.1227[2][B]	0.0786[2][A]
ln CRD	−1.4922[0]	−5.9347[0][A]	−1.3793[1]	−6.1998[3][A]	0.1758[3][C]	0.0837[4][A]
Panel b: Macedonia *Constant*						
ln y	1.0441[0]	−2.601[0][C]	0.2106 [3]	−2.4949[4]	0.6176[3][C]	0.4528[3][B]
ln k	−1.1883[1]	−1.0869[0]	0.6939[3]	−1.0869[0]	0.4028[3][C]	0.5398[3][C]
ln REM	−1.5870[0]	−4.5457[0][A]	−1.5870[0]	−4.5457[0][A]	0.6553[3][C]	0.3689 [0][B]
ln CRD	−1.4294[1]	−2.7392[1][C]	−1.3897[2]	−4.1311[0][A]	0.1861[3][A]	0.4629[1][B]
Constant & trend						
ln y	−4.7463[0][A]	−2.800[0]	−4.7463[0][A]	−2.6852[2]	0.1730[3][C]	0.1575[2][C]
ln k	−1.9335[1]	−2.4567[0]	−0.2030[2]	−2.4567 [0]	0.1952[3][C]	0.1124[2][A]
ln REM	−0.2488[0]	−5.0269[0][A]	−0.1615[1]	−5.0293[1][A]	0.1554[3][C]	0.1493[2][C]
ln CRD	−1.6520[1]	−3.6012[1][C]	−1.3613[2]	−4.8032[2][A]	0.1799[3][C]	0.1128[2][A]

Notes: A, B and C denote the series is stationarity at the 1%, 5% and 10% levels of significance, respectively.
Source: Authors' estimation for sample from 1990-2015

TABLE 3

UNIT ROOT WITH STRUCTURAL BREAK IN ln y

	Panel a: Kyrgyzstan				*Panel b: Macedonia*			
	Level		1st Diff.		Level		1st Diff.	
Break	F_{stat}|Critical Value	*SDUM*	F_{stat}|Critical Value	*SDUM*	F_{stat}|Critical Value	*SDUM*	F_{stat}|Critical Value	*SDUM*
Constant	8.321|11.83	1993, 2004, 2013	3.741|10.13	1996	1.976|8.58	None	5.513|10.13	1994
Trend	3.636|10.13	1999	1.960|11.14	1995, 2009	1.355|10.13	1999	3.617|10.13	1994

Notes: Critical values are obtained from Bai and Perron (2003).
Source: Authors' estimation

breaks, we check the stability of the estimated model using the CUSUM and CUSUM of squares tests and examine the long run and short run results.

Lag length and ARDL specification selection criterion

To determine the lag-lengths to be used for the estimation of the results, a number of criteria were used. As noted in Table 4, for Kyrgyzstan, all the criteria (LR, FPE, AIC, SC and HQ) indicate the maximum lag-length of 2; and for Macedonia, four criteria (FPE, AIC, SC and HQ) indicate the maximum lag-length of 2, and one ((LR) indicates the lag-length of one. Thus, following Clarke and Mirza (2006), we use the maximum lag-length of 2 as indicated by majority of the criteria.

Bounds Test for co-integration

The ARDL bounds procedure is applied further to examine the co-integration. The break periods dummy (*SDUM*) was significant for Kyrgyzstan only. In case of Macedonia, the break periods dummy was not statistically significant, and neither improved or changed the conclusion of the long-run results. Therefore, we exclude the *SDUM* for Macedonia from the estimation. Hence, the cointegration result based on the ARDL procedure was at optimal with ARDL (1, 2, 1, 2) and ARDL (1, 0, 2, 0) for Kyrgyzstan and Macedonia, respectively. (Table 5, Panels a and b). The cointegration result based on the ARDL procedure is optimal with ARDL (1, 2, 1, 2) and ARDL (1, 0, 2, 0) for Kyrgyzstan and Macedonia, respectively. The confirmation of co-integration provided sufficient reasons to examine the long run and short-run results.

Dynamic stability of the model

The break adjusted CUSUM and CUSUMSQ plot is presented in Figure 7a-b and 8a-b for Kyrgyzstan and Macedonia, respectively, and indicates the models estimated for the two countries are stable. Furthermore, we reviewed the diagnostic tests from the ARDL lag estimates and stability of parameters in the model based on CUSUM and CUSUMQ plots. The four diagnostic tests of interest are: the Lagrange multiplier test of residual serial correlation (χ^2_{sc}); the Ramsey's RESET test based on the square of the fitted values for correct functional form (χ^2_{ff}); the normality test based on the test of skewness and kurtosis of residuals (χ^2_n); and the heteroscedasticity test based on the regression of squared residuals on squared fitted values (χ^2_{hc}). As noted from the results reported in Table 6, Panel (iv), the estimations provide robust outcomes as the disturbance term is normally distributed and serially uncorrelated with homoscedasticity of residuals.

The long-run and short-run estimates

Long-run

The long-run results show the capital share is 0.43 for both Kyrgyzstan (In k_t = 0.434) and Macedonia (In k_t = 0.434) (Table 6, Panel a(i) and b(i)). As noted, the capital share is slightly higher than the stylised value of one-third (Table 6, Panel a and b, (ii)). As highlighted in Kumar and Stauvermann (2014a, b) with insights from related studies (Gollin, 2002; Ertur & Koch, 2007; Rao, 2007 and 2010; Bosworth & Collins, 2008; Breuss, 2010; Guerriero, 2012), a relatively high capital share is expected for some developing countries due to a number of reasons. These are: (i) the capital and labour inputs tend to grow at relatively similar rates; (ii) an economy has a large number of self-employed persons who earn income from both capital and their own labour (Gollin, 2002) thus making it difficult to obtain meaningful measures of income shares; (iii) the quality of

TABLE 4

LAG SELECTION CRITERION:

Lag	LL	LR	FPE	AIC	SC	HQ
Panel a: Kyrgyzstan						
0	14.515	–	0.02830	−0.732	−0.490	−0.662
1	38.063	36.228	0.00501	−2.466	−2.176	−2.383
2	41.683	5.291[A]	0.00412[A]	−2.668[A]	−2.329[A]	−2.570[A]
3	41.834	0.209	0.00443	−2.603	−2.216	−2.491
Panel b: Macedonia						
0	45.568	–	0.00158	−3.615	−3.417	−3.565
1	56.628	17.311[A]	0.00066	−4.489	−4.243	−4.427
2	58.643	2.9781	0.00061[A]	−4.578[A]	−4.281[A]	−4.503[A]
3	59.369	1.010	0.00063	−4.554	−4.208	−4.467

Notes: A indicates the maximum lag-length to be selected based on the different criteria, at the 5% level of statistical significance. LL = log likelihood, LR = sequential modified LR test statistic, FPE = Final prediction error, AIC = Akaike information criterion, SC = Schwarz information criterion, and HQ = Hannan-Quinn information criterion. A indicates lag order selected by the various selection criteria
Source: Authors' estimation.

TABLE 5

RESULTS OF BOUNDS TEST

| Country		F-statistic
Kyrgyzstan - ARDL(1, 2, 1, 2), ln y | ln k, ln REM, ln CRD, SDUM , Constant		29.507
Macedonia - ARDL(1, 0, 2, 0), ln y | ln k, ln REM, ln CRD, Constant		8.711
Critical Bounds	I-0 Bound	I-1 Bound
1%	4.290	5.610
5%	3.230	4.350
10%	2.720	3.770

Notes: Critical Bounds and the respective F-statistics are from (Pesaran and Pesaran, 2001).
Source: Authors' estimation

the data and the sample size which makes it difficult to compute capital stock (Bosworth & Collins, 2008) that can ideally exhibit decreasing returns to scale which conforms to a desirable steady-state convergence; and (iv) a large share of black market (underground) activities in the economy.

Interestingly, it is noted that the long-run coefficient of remittances, which is the elasticity of output with respect to remittances, is positive and statistically significant for both countries (Kyrgyzstan: In *REM* = 0.056 and Macedonia: In *REM* = 0.343). This implies that a one per cent increase in remittances is likely to increase the output per worker by 0.06 per cent and 0.34 per cent for Kyrgyzstan and Macedonia, respectively. While we note a negative association between financial development and output per worker for both countries (Kyrgyzstan: (In *CRD* = −0.219; Macedonia: In *CRD* = −0.047), the coefficient is only statistically significant for Kyrgyzstan. The negative association implies that financial development has a strong (weak) growth retarding impact for Kyrgyzstan (Macedonia). A possible explanation for this outcome can be derived from the high ratio of non-performing loans in the banking sector in the period from 1998 to 2006 in which the ratio reached double digit values with peaks of 31 per cent (in 1999 and 2000 for Kyrgyzstan) and 41

FIGURE 7
CUSUM AND CUSUMQ PLOTS
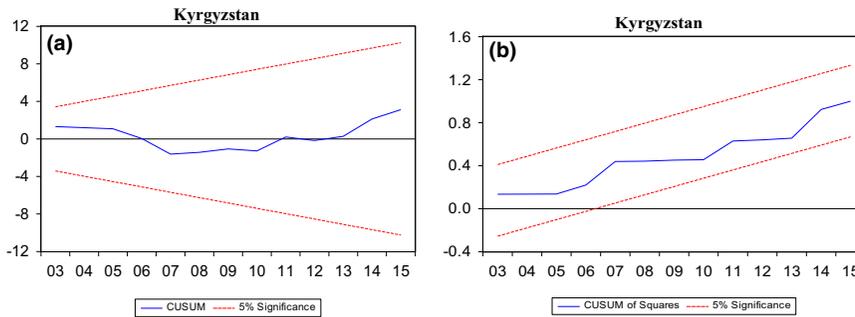
per cent (in 1999 for Macedonia) and remains relatively high. The high ratio signals internal insta-bility in the banking sector and therefore, as a precautionary measure, banks curtail lending in their effort to recover bad loans. On the other hand, these restrictions on loans reduce entrepreneurial activities and investment projects necessary for long-run growth. The structural break dummy has a positive ($SDUM^{LR}$ = 0.076) association with the long-run growth for Kyrgyzstan. This implies that the cumulative effect of the structural breaks as a result of geo-political, socio-economic and other shocks has a permanent positive effect on economic growth of the country.

Short-run

For Kyrgyzstan, in the short-run (Table 6, Panel a(ii)), we note that capital per worker has a lagged positive association ($\Delta \ln k_{t-1}$ = 0.732) at one per cent level of statistical significance (Table 6, Panel a(i)). Remittance, although positive ($\Delta \ln REM_t$ = 0.005) is not statistically significant within the conventional levels. Moreover, financial development, measured by the domestic credit to the private sector (per cent of GDP) has a negative ($\Delta \ln CRD_t$ = −0.069) and statistically significant (at 1% level) association, implying that financial development is not conducive to short-run growth of the economy. Notably, the break periods ($SDUM^{SR}$ = 0.039) are positive and statistically signifi-cant at one per cent level, thus indicating that structural breaks in the periods 1993, 1995, 1996, 1999, 2004, 2009, and 2013 had a cumulative plausible positive impact on the economic growth of Kyrgyzstan. The coefficient of the lagged error correction term (ECT_{t-1} = −0.512) measures the speed of adjustment to the long-run equilibrium. The coefficient is appropriately negative, statisti-cally significant, and implies that about fifty-one per cent of the shocks are corrected in the current period for convergence to the long-run equilibrium.

For Macedonia (Table 6, Panel bii), we note that capital per worker ($\Delta \ln k_t$ = 0.196) and remit-tances ($\Delta \ln REM_t$ = 0.035) although positive, are not statistically significant within the conventional levels. Similar to Kyrgyzstan, we note that for Macedonia, the coefficient of financial development is negative (−0.007), however not statistically significant within the 1-10 per cent level, thus implying a weak negative association with growth. From the short-run results, it can be stated that capital invest-ment and remittances (financial development) have a weak positive (negative) association with eco-nomic growth. The lagged error correction term (ECT_{t-1} = −0.350) indicates that roughly thirty-five per cent of previous period's shocks are corrected in the adjustment to the long-run equilibrium. It is clear that for both countries, the short-run impact of remittance is positive but not statistically signifi-cant, and financial development is marginally negative. On the other hand, we note a clear positive impact of remittances in the long run for both countries, thus underscoring remittances as a potential driver of long-run growth. Unfortunately, we note that financial sector development is having a

negative impact on growth for both countries, albeit a relatively significant one, for Kyrgyzstan. This outcome is in accordance with the usual considerations regarding the income and substitution effects initiated by higher returns and lower risk on the savings rate in combination with the sceptical attitude of the citizens of both countries with respect to the respective domestic financial sector.

Causality Analysis

For the purpose of causality, we apply the Toda-Yamamoto (1995) approach. We derive the optimal maximum lag and the maximum order of integration from the ARDL estimate ($k = 2$) and the unit root test results ($\delta_{max} = 1$), respectively. Hence, we use the maximum lag 3 ($l = k + \delta_{max} \leq 3$). The dynamic stability of the VAR model is shown in Figure 9 (a-b), which confirms the results are robust.

In terms of causality, for Kyrgyzstan, we note a unidirectional causality from capital stock (ln $k \rightarrow$ In y), remittances (ln $REM \rightarrow$ In y), and financial development (ln $CRD \rightarrow$ ln y) to output; and from remittances to capital stock (ln $REM \rightarrow$ ln k) (Table 7, Panel a). The results support the remittance-led growth for Kyrgyzstan, in addition to remittance-led investment and financial development-led growth hypotheses. On the other hand, for Macedonia we note a unidirectional causality from output (ln $y \rightarrow$ ln REM), capital stock (In $k \rightarrow$ ln REM) and financial development (ln $CRD \rightarrow$ ln REM) to remittances; and from financial development to capital stock (ln $CRD \rightarrow$ ln k) (Table 7, Panel b). In this regard, the results for Macedonia indicate that the flow of remittances is supported by economic growth, investment and financial development; and financial development also supports investment. To rationalize the behaviour of the migrants, we suppose that the outcome for Macedonia regarding remittances is related to the respective degree of political instability in Macedonia which is undoubtedly correlated with the respective economic situation. Unlike Kyrgyz migrants who are working mostly in Russia or Ukraine, Macedonian migrants are working in economically stable Western countries and have accounts as legal employees. Thus, the Macedonian migrant workers can store easily and safely their earnings abroad and probably are only willing to transfer their remittances through formal channels if they are assured of not losing it due to political unrest.

POLICY RECOMMENDATIONS

Before going into policy discussions, at a general level, we argue that both countries have to improve political stability and eradicate corruption, as the highest priority, in order for all other well-intentioned economic reforms to be pertinent.
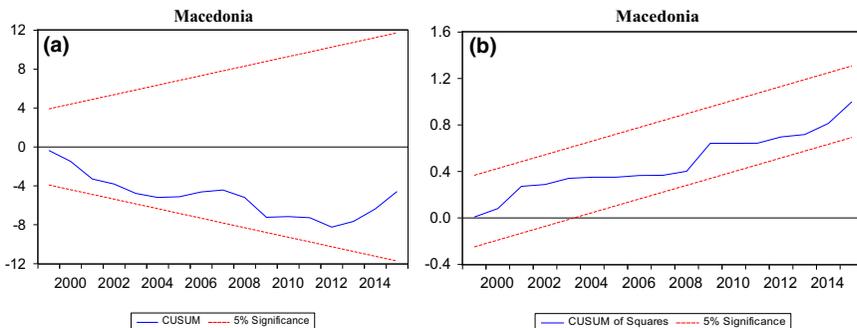
FIGURE 8
CUSUM AND CUSUMQ PLOTS

TABLE 6

LONG-RUN AND SHORT-RUN RESULTS

Variable	Panel a: Kyrgyzstan		Panel b: Macedonia	
	Coefficient	t-stat.	Coefficient	t-stat.
(i) Long-run				
ln k	0.430[A]	3.9467	0.434[A]	3.2921
ln *REM*	0.056[A]	3.9204	0.343[A]	5.0960
ln *CRD*	−0.219[A]	−3.2284	−0.047	−0.7965
SDUM^{LR}	0.076[C]	1.8045	–	–
(ii) Short-run dynamics				
Δ ln k_t	0.189	0.9740	0.196	1.3532
Δ ln k_{t-1}	0.732[A]	4.5457	–	–
Δ ln REM_t	0.005	0.6357	0.035	0.8431
Δ ln REM_{t-1}	–	–	−0.050	−1.1356
Δ ln CRD_t	−0.069[A]	−3.5296	−0.007	−0.2649
Δ ln CRD_{t-1}	−0.032	−1.6378	–	–
Constant	1.854[A]	11.937	1.555[A]	5.0886
SDUM^{SR}	0.039[A]	4.4691	–	–
ECM_{t-1}	−0.512[A]	−12.053	−0.350[A]	-5.0735
(iii) Model Fit				
R-Squared	0.9327		0.6908	
R-Bar-Squared	0.8810		0.5817	
S.E. of Regression	0.0278		0.0221	
Mean Dependent Variable	0.0010		0.0141	
Residual Sum of Squares	0.0101		0.0083	
Akaike Info. Criterion	48.256		54.616	
F-statistic	25.753		7.5963	
S.D. of Dependent Variable	0.0807		0.0341	
Equation Log-likelihood	59.256		61.616	
Schwarz Bayesian Criterion	41.777		50.492	
DW-statistic	2.0100		1.7282	
(iv) Diagnostic Test				
χ^2_{sc}	$\chi^2(1) = 0.0351[0.851]^\dagger$		$\chi^2(1) = 0.1719[0.678]^\dagger$	
χ^2_{ff}	$\chi^2(1) = 0.8594[0.354]^\dagger$		$\chi^2(1) = 1.8133[0.178]^\dagger$	
χ^2_n	$\chi^2(2) = 2.0020[0.367]^\dagger$		$\chi^2(1) = 0.2530[0.881]^\dagger$	
χ^2_{hc}	$\chi^2(1) = 0.2095[0.647]^\dagger$		$\chi^2(1) = 2.5700[0.109]^\dagger$	
CUSUM	Stable		Stable	
CUSUMQ	Stable		Stable	

Notes: A and C denote statistical significance at 1% and 10% levels, respectively; †denotes rejection of statistical bias at 1% levels.
Source: Authors' estimation

Taking a closer look at Kyrgyzstan, although remittances play a major role in reducing poverty (80% of the population has less than $5 a day available) they are rarely invested (Gicquel et al., 2016, Akmoldoev & Budaichieva, 2012). This outcome is partly caused by the fact that especially the rural population invest in immovable assets such as stock, cattle and other farming goods which are not reflected in the national accounts. Additionally, investments of remittances are restricted due to the burdensome regulations which discourage business entrants and investments. Furthermore, the banking system of Kyrgyzstan is only relatively well developed in its three bigger cities (Bishek, Osh and Jalal-Abad), whereas in the remote areas that most migrants come from, the access to banking services are limited because of weak competition in the banking sector, high operating costs of bank branches caused by low population density, poor financial infrastructure and limited financial literacy of small and middle-sized enterprises (Gicquel et al., 2016).

FIGURE 9
(A) INVERSE ROOTS OF AR CHARACTERISTIC POLYNOMIAL: KYRGYZSTAN (B) INVERSE ROOTS
OF AR CHARACTERISTIC POLYNOMIAL: MACEDONIA
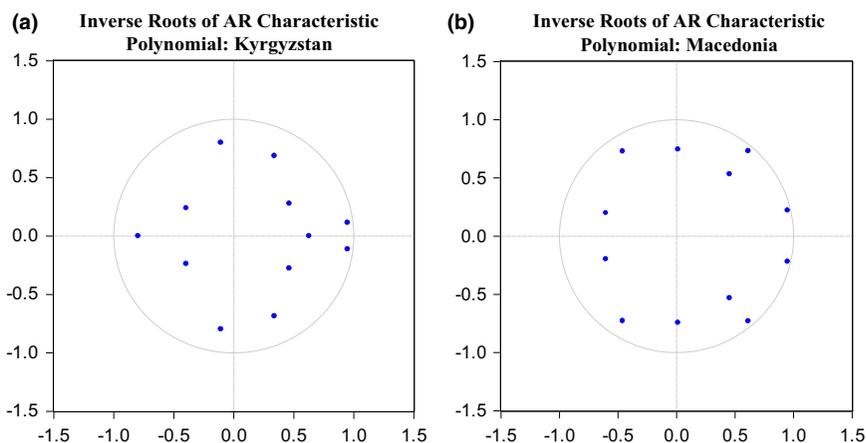
Additionally, it should be noted that many citizens lost everything they kept in banks after the collapse of the SU, and the bankruptcy of the largest bank (Asia Universal Bank) in 2010, and this further increased the distrust in the financial sector.

According to the World Competitiveness Report (2015), political instability, corruption, inefficient bureaucracy, an inadequately educated workforce and difficulties to access financing are among the worst obstacles hampering business activities in Kyrgyzstan. Although the share of citizens older than 15 years who have a bank account increased from 11.3 per cent in 2009 to 55 per cent in 2014 (Gicquel et al., 2016), the share is still relatively low. Again, based on past bad experiences and the difficulty in having access to a bank branch, the rural population prefers to keep cash instead of a bank account. Another indication for the mistrust in the public institution and banks is provided by the fact that 58 per cent of the bank deposits are denominated in US currency (Vorobey, 2015). Against these facts and the results, the following policy recommendations are proposed:

- The overall business climate needs to be improved as it is reflected by the "distance to frontier" indicator (DTF) of the World Bank (2016).
- Good governance practices need to be applied to improve financial sector development and the positive effect of remittances.
- Use of mobile phones and extension of mobile banking can be a cost efficient strategy to increase the access to financial services. Banks and microfinance institutions can lead the way, and ultimately reduce the share of cash in the broad money which currently stands at 40 per cent (Gicquel et al., 2016) due to demands of the informal sector (Abdih & Melina, 2013).
- It is imperative that the trust of Kyrgyz citizens in the political and financial system is improved to ensure a broad-based economic development.

For Macedonia, remittances are important to cover the trade deficits which accounted, on average, 20 per cent of its GDP in the past years. The worker's remittance represents only a small share of private transfers from abroad because it is difficult to account for cash transfers in Macedonia

TABLE 7

GRANGER NON-CAUSALITY TEST BASED ON χ^2

		Dependent Variable (*Y*)							
		Panel a: Kyrgyzstan				*Panel b: Macedonia*			
$X \xrightarrow{\text{causes}} Y$	**X**	*lny*	*lnk*	*lnREM*	*lnCRD*	*lny*	*lnk*	*lnREM*	*lnCRD*
	ln y	–	1.3336	1.3368	5.3607	–	3.1616	**7.7795**[C]	4.7231
			(0.721)	(0.720)	(0.147)		(0.367)	**(0.051)**	(0.193)
	ln k	**14.075**[A]	–	1.4021	2.0937	0.2930	–	**11.974**[A]	1.0529
		(0.003)		(0.705)	(0.553)	(0.961)		**(0.008)**	(0.788)
	ln REM	**13.527**[A]	**6.8271**[C]	–	0.6219	0.7699	2.9889	–	2.9584
		(0.004)	**(0.078)**		(0.891)	(0.857)	(0.393)		(0.398)
	ln CRD	**7.0206**[C]	0.0190	3.1224	–	1.1695	**11.1884**[B]	**7.6876**[C]	–
		(0.071)	(0.999)	(0.373)		(0.760)	**(0.011)**	**(0.053)**	
	Combined	**45.346**[A]	14.391	8.6935	**17.648**[B]	7.0795	**16.773**[C]	**42.178**[A]	10.2727
		(<0.001)	(0.109)	(0.466)	**(0.040)**	(0.629)	**(0.052)**	**(<0.001)**	(0.329)

Notes: A, B and C indicate the presence of causality at 1%, 5% and 10% level of significance, respectively; maximum VAR lag-length of 3 is used.
Source: Authors' estimation

(Gerard et al., 2014). Additionally, according to the World Bank data, a bank transfer of money costs between 1.5 per cent and 2 per cent of the total amount from the Russian Federation to Kyrgyzstan, but 9 per cent and 10 per cent from Italy or Germany to Macedonia. Also, according to household surveys (Petreski & Jovanovic, 2016; Mughal et al., 2008; Roberts et al. 2008), only a small share of the Macedonia's remittances (6 per cent to 12 per cent) are invested. These outcomes coincide with our results and the following policy recommendations are in proposed:

- Maintain a proper account of remittances inflow to Macedonia. The National Bank of the Republic of Macedonia can play an important role in ensuring the statistics on remittances and migration are properly captured.
- Remittances need to be mobilized for investment. One way this can be done is by introducing Diaspora bonds to pool relatively small amounts of expats' savings into a large fund of capital. This can be a cheap way to finance infrastructure with a high social return of investment. Also, Diaspora bonds can an effective and attractive vehicle for the country to secure a stable and cheap source of external finance and funding source during times of balance-of-payments difficulties, as shown to be case in Israel and India (Ketkar & Ratha, 2010).

CONCLUSION

Despite the fact that the two countries are experiencing a reasonable increase in remittances, there has been no study done to analyse the magnitude effect and the causality dynamics viz. financial development and economic growth. Hence, this article set out to explore the short-run and long-run impact of remittances and financial development on the economic growth of Kyrgyzstan and Macedonia. We use the augmented Solow (1956) framework and the ARDL bounds procedure whilst accounting for structural break in series. The sample period is from 1990 to 2015. The results show a weak positive impact of remittances in the short-run for the two countries, and a (weak) negative impact of financial development for Kyrgyzstan (Macedonia). On the other hand, we note a long-run positive impact of remittances on the economic growth of both countries, with the dominant impact noted for Macedonia. Only for Kyrgyzstan, financial development has a permanent negative impact whereas the structural break periods have a positive impact on its growth. The causality results support the remittance-led growth hypothesis for Kyrgyzstan and growth-led remittance hypothesis for Macedonia, the latter indicatomg that remittance inflow is driven by economic progress. Some important policy considerations are highlighted.

ACKNOWLEDGEMENTS

NOTES

1. For other studies focusing on remittances and growth in different countries, please refer to Siddique et al. (2012), Kumar and Vu (2014), Jayaraman et al. (2011a, b), and Rahman (2014), Kumar (2013b), Jayaraman et al. (2012), Kumar et al. (2011), Kumar (2011), Lartey (2013), Kumar (2014), Kumar and Stauvermann (2014a,b), Jouini (2015), Lim and Simmons (2015); Rao and Takirua (2010).

2. However, we argue that this is possible in countries with less developed financial sector provided there is a substantial demand for funds for productive investments and high efficiency (c.f. Bettin & Zazzaro, 2012).

3. Macedonia, however, is ranked 70th in terms of remittances as a per cent of GDP.

4. Data is from http://www.worldbank.org/en/topic/migrationremittancesdiasporaissues/brief/migration-remittances-data and http://data.worldbank.org.

5. The World Bank (2016a) defines financial sector as "the set of institutions, instruments, markets [and] the legal and regulatory framework that permit transactions to be made by extending credit….[and] financial sector development is about overcoming "costs" incurred in the financial system."

6. Note that other indicators such as domestic credit to private sector by banks only and domestic credit provided by financial sector showed similar trends.

7. In 2002 and 2010 ethnic tensions between Kyrgyzes and Uzbeks resulted in violent conflicts with hundreds of people dead. In 2001, the Albanian minority, who representing about 25 per cent of the population, begun a violent insurgency in Macedonia with the intention of separating from the country and becoming independent. Although this conflict is no longer violent, it still creates political instability.

8. In the ranking of Transparency International (Corruption perceptions Index) Macedonia ranks 90 with a score of 37 out of 100, while Kyrgyzstan ranks 137 with a score of 28 out of 100. For details regarding the latter country see Hellman et al. (2000), Anderson and Gray (2006), World Bank (2011) or Engvall (2011). Regarding corruption in Macedonia see for example UNODC (2011) or Hajrullai (2015).

9. See: http://datatopics.worldbank.org/financialinclusion/

10. The elasticity of substitution is positive and constant (one if) and the cross derivatives are positive.

11. Also, it must be noted that confirmation of (11)-(13) imply the plausible endogeneity, and hence can be further investigated using systems approach (c.f. Driffield & Jones, 2013).

12. Please note that the population is used as a divisor to derive the per capita variables, and hence the population is fully considered.

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