Economic Growth, FDI and Migrant Remittance: Identifying Transmission Channel

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Abstract

This study investigates the impact of FDI and migrant remittances on economic growth both directly and indirectly through transmission channel. In this respect, we use panel of 52 developing countries over the period of 1990-2017. We apply generalized methods of moments (GMM) for our empirical analysis. Our findings suggest that there is direct link between FDI and economic growth. But, no such a link exists in case of migrant remittances. Furthermore, to check the combined impact of FDI and migrant remittances, we introduce interaction of FDI and migrant remittances. We do not find any significant relation between economic growth and interaction of FDI and migrant remittances. Additionally, we use total factor productivity (TFP) as transmission channel. We find that TFP and FDI are negatively linked whereas the coefficient of interaction of FDI and remittances is not only positive but also statistically significant. The results show strong complementarity between FDI and remittances in terms of promoting productivity growth in the recipient economies.

Key Words: Economic growth, FDI, Remittances, TFP, GMM

1 Introduction

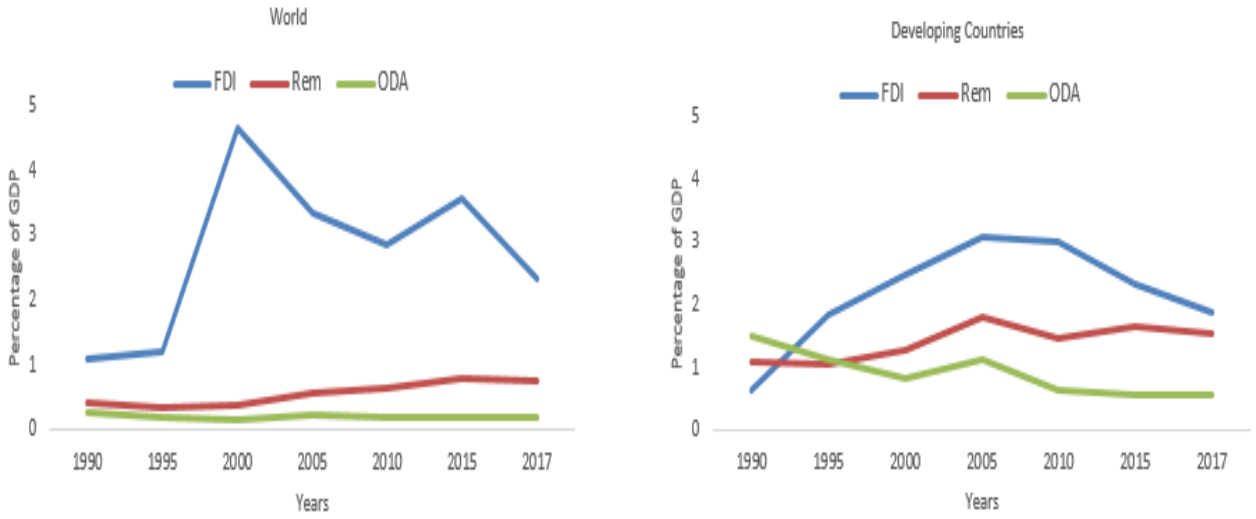
Capital accumulation, technological advancement & innovation and improvement in capital are some of the pre-requisites for economic development (Aghion and Howitt, 1992; Romer, 1990; Solow, 1956). Denault (2011) argues that capital either local or external is crucial for economic growth and development. At the same time, shortages in financial capital and technical expertise are some of the primary reasons for many developing countries lagging behind in the race of economic development. As a result, they are not able to fully exploit the domestically available resources. So, in order to sustain economic growth, the economic agendas of these capital scarce economies are primarily linked to the policies which attract foreign assistance, loans, foreign direct investment (FDI), portfolio flows and other external financial flows (Iamsiraroj and Ulubaşoğlu, 2015). Additionally, these external financial inflows also help in enhancing both savings and imports capacities through elimination of constraints associated with them (Comes et al., 2018).

Despite several economic owes associated with developing countries, there are still huge potential for economic expansion and better avenues for investment mainly due to abundance and unexploited natural resources, availability of large and cheap labour force etc. Based on these potentials, investors are always keen in investing in developing countries and huge inflows of FDI are diverted toward them. On the other hand, industries and firms in advanced economies are looking for cheap labor force for smooth running of economic activities. Due to large population, developing countries provide cheap labor to the countries with scarce labor force. In this way, developing countries receive huge inflows of external capital in the form FDI and migrant remittances .

The recent international financial integration due to significant rise in the cross-border financial inflows has created new debates among policymakers and researchers (Woo, 2009). These financial inflows are considered important factors in economic development across the globe. At the same time, these inflows has also generated policy questions regarding the determinants of growth in the economy. Previously, savings, human resource stock, financial and political institutions were considered key factors in determining economic growth (Mankiw et al., 1992; Romer, 1986; Solow, 1956). Now, along with domestic factors, external financial inflows such as FDI, remittances, ODA and other financial inflows are also key in determining economic growth (Alfaro et al., 2004; Borensztein et al., 1998; Gapen et al., 2009; Jahjah et al., 2003). The substantial increase in external inflows such as FDI and migrant remittances have many considerable positive impacts on economic development. Furthermore, they also promote investment and consumption, ameliorate standards of living, stimulate economic growth and potentially increase welfare in developing countries. Most importantly, these inflows are considerably helpful in alleviation of poverty and other economic miseries across the globe.

A significant restructuring in the international capital flows has been observed across the globe in the last three decades. These changes are more prominent in developing countries. In this regard, a rising trend in the inflow of FDI and migrant remittances has been observed. Whereas, a decreasing trend in foreign aid and other inflows has been witnessed in recent years. Figures 1.1(a) and 1.1(b) provide information regarding different financial inflows

to the world and to the developing countries respectively. These graphs show that FDI and migrant remittances are still major inflows across the globe and to developing countries. In the past, foreign aid or official development assistance (ODA) was considered one of the most important sources of foreign exchange for developing countries (Joshi, 2016). But, with the rising importance of FDI and migrant remittances as sources of developing finance, accordingly, the focus has been shifted towards these reliable and more stable sources of foreign exchange. These financial inflows are contributing to the economic well-being of developing countries in many ways. Additionally, along with financial support, they also contribute in modernization of the host economy through delivery of modern technology and transfer of technical know-how. Furthermore, they also play a fundamental role in the economic growth through provision of capital and creation of employment opportunities in the host economies (Shahid et al., 2013). Similarly, they also increase the productivity and efficiency of domestic firms by adopting foreign technology and innovation.



(a) External inflow in the world

(b) External inflow in the Developing countries

Figure 1.1: Inflows of FDI, Remittances and ODA to the world and developing countries

1.1 Objectives of the study

In view of the growing importance and potential surge in the inflow of FDI and migrant remittances to the developing countries, it is imperative to study the possible impact of these capital inflows on economic development in general and economic growth in particular. This study focuses primarily on the role of FDI and migrant remittances with economic growth in the sample of developing countries. Furthermore, to identify transmission channels through which these external inflows determine the direction of economic growth. It is pertinent to mention here that a handful of research is available in the literature wherein they study the individual impacts of FDI and migrant remittances on economic growth. For instance in case of FDI, (Curwin and Mahutga, 2014; Hansen and Rand, 2006; Lim, 2001; Makki and Somwaru, 2004) and in case of migrant remittances (Gapen et al., 2009; Giuliano and Ruiz-Arranz, 2009; Jahjah et al., 2003). However, knowing the importance of FDI and migrant remittances and their subsequent impact on economic growth, economists have never tried properly the joint impact of these international financial flows on economic growth. Keeping this research gap in mind, this study is an effort to explore empirically the combined impact of these inflows on economic growth. Additionally, identifying transmission channels through which they impact economic growth. Surely, this study will be an addition to the body of available literature.

Rest of the paper is organized as: section 2 highlights some important stylized facts about remittances and FDI. Section 3 provides detail description of the available literature on the subject matter and section 4 demonstrates theoretical standings and economic channels through which remittances and FDI impact economic growth. Section 5 explains empirical strategy and discussion about the data. Section 6 discusses empirical findings and section 7 concludes.

2 FDI and Migrant Remittances; some stylized facts

Migrant remittances and FDI are always on the agenda of political and economic managers in the developing countries mainly due to their potential role in the process of economic development. In recent times, special attention has been given to migrant remittances and FDI owing to their potential rise towards developing countries. According to World Bank (2019), a significant growth has been seen in the inflow of remittances and FDI across

the globe. This is evident from the fact that in 1990 only 239 billion USD of FDI inflows were recorded across the world whereas, this amount has increased to 1968 billion USD in 2017. This clearly indicates multiple folds rise of FDI. Similarly, if we glance at the inflow of FDI to developing countries, we can easily find visible growth in this inflow from 21 billion UDS to 549 billion USD from 1990 to 2017 respectively. In similar manner, a potential rise in the inflow of migrant remittances has been witnessed in the last three decades. In this context, total amount of remittances in the world was 68 billion USD in 1990 which has increased to 594 billion USD in 2017. Similarly, huge inflows of remittances are also diverted towards developing countries. In this respect, in 1990, the amount of remittances received by developing countries was 29 billion USD only which has increased to 455 billion USD in 2017. This is evident from the fact that out of 594 billion USD, 455 billion USD of remittances are received by developing countries. Table 2.1 provides details regarding the inflow of FDI and migrant remittances to the world and developing countries.

It is also very important to survey and compare the inflows of migrant remittances and FDI across regions and income groups. In some regions, remittances are more prevalent than that of FDI. According to Dzeha et al. (2018), remittances are certainly a lifeline in many African countries and over the past decades, remittances remain an issue for policymakers and researchers. In this respect, we highlight the inflows of migrant remittances and FDI to different regions and income groups. Figure 2.1(a) and 2.1(b) provide insights regarding the inflow of remittances and FDI to the different regions across the globe, respectively. In similar vein, figure 2.2(a) and 2.2(b) provide information in respect of inflows of remittances and FDI to different income groups, respectively.

Policymakers and researchers are keen in identifying potential benefits associated with these inflows in the promotion of economic development processes. If we glance at the individual impacts of these two external inflows, there are several widespread economic and social significance associated with them both for host as well as for recipient countries. In this regard, several theoretical and empirical studies have been carried out in the last three decades. Now, let's, first look at economic impacts of foreign remittances. Foreign remittances play an important role in increasing foreign exchange reserves in developing countries. Migrant remittances are more stable in nature in comparison with other capital inflows (Gopalan and Rajan, 2009; Ratha, 2003), reduce poverty (Adams Jr and Page, 2005; Imai et al., 2014), ensure consumption against negative shocks (Combes and Ebeke, 2011; Pozo, 2006), reduce macroeconomic volatility ((Fullenkamp et al., 2008; Jawaid and Raza, 2016). Similarly, remittances are also countercyclical in nature (Schiantarelli, 2005; Vargas-Silva et al., 2009) and increase savings (Richard, 2002; Ziesemer, 2012). In a similar fashion, remittances also enhance investment in physical (Connell and Brown, 1995) as well as in human capital (Barguellil et al., 2013), improve welfare of households and alleviate credit constraints (Fullenkamp et al., 2008) and increase income of recipient families (Taylor, 1999).

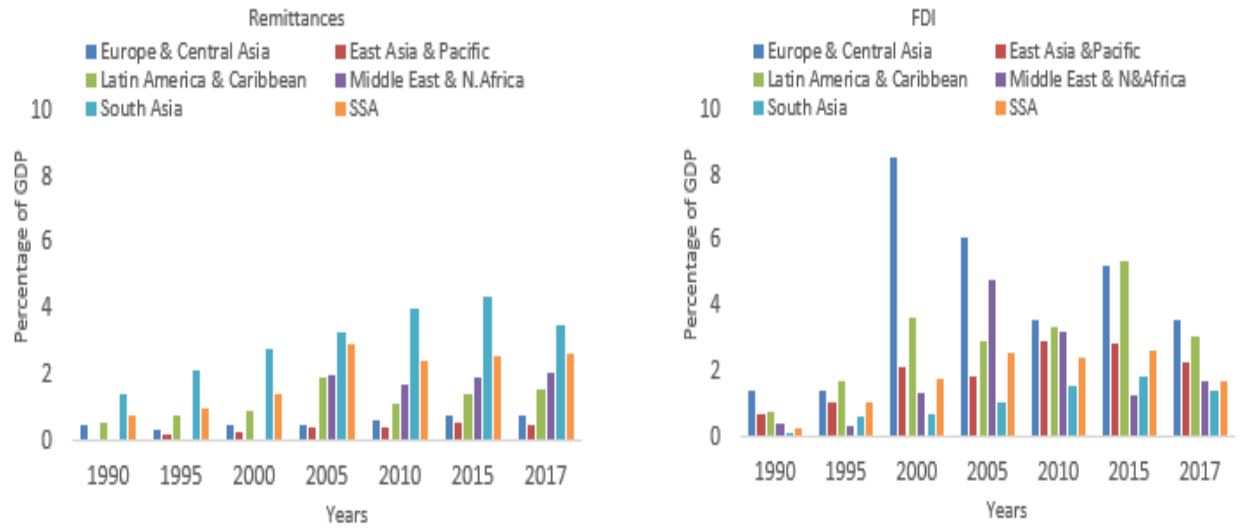
Table 2.1: The inflow of FDI and migrant remittances to the world and to the developing countries

	World		Developing Countries	
Years	**FDI**	**Remittances**	**FDI**	**Remittances**
1990	239	68	21	29
1995	362	95	91	50
2000	1569	122	146	74
2005	1563	253	300	172
2010	1917	419	616	302
2015	2680	566	619	434
2017	1968	594	549	455

Source: Data are taken from WDI, World Bank. Authors' own construction.

Along with several benefits, there are also some disadvantages associated with inflows of migrant remittances as well, such as, brain drain, where highly educated and skilled labour leave their country of origin with motive to find high paid jobs in other countries. This brain drain has twofold disadvantages. On the one hand, highly qualified and skilled labour are scarce resource in developing countries. On the other hand, the government has also invested huge amount of money and time in their trainings and education. When these people leave their countries, they not only deprive countries of their services but also require huge time and investment for the government to produce their replacements (Pradhan et al., 2008). Remittances cause inflation (Narayan et al., 2011) and also lead to appreciation of foreign exchange rate (Pozo, 2006). This may hamper international competiveness and generate adverse influences on manufacturing and tradable goods (Acosta et al., 2009) in (Tahir et al., 2019). There are also possibility of moral hazard and Dutch disease like problems which might slowdown economic activities in the remittance recipients' economies (Jahjah et al., 2003). As it is evident from the literature that remittances are primarily used for consumption purposes, so large amount of remittances may lead to surge in the consumption of imported goods and services (Lipton, 1980; Russell, 1986). This might reduce demand for domestically produced goods and services.

In recent years, an unprecedented surge in the inflow of FDI has been witnessed (Escaleras and Register, 2011). It is still one of the largest and stable sources of external finance and exceeding by far the sum of commercial bank

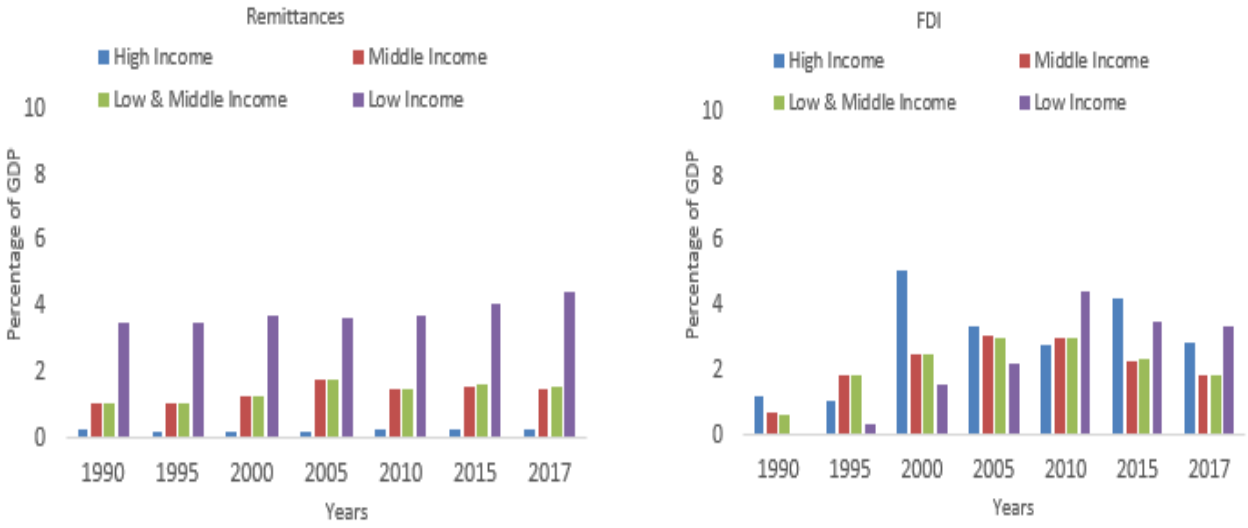


(a) Inflows of remittances to different regions

(b) Inflows of FDI to different regions

Figure 2.1: Inflows of FDI and Remittances to the different regions

loans and official inflows (Kosack and Tobin, 2006). In addition to this, numerous direct and indirect advantages are associated with inflow of FDI in advancing economic development across the globe. Firstly, FDI is viewed as an important agent for technological change and brings modern technology to the host country. Secondly, it is also an important source of investment. Thirdly, it also brings new knowledge and skills to local firms (Iamsiraroj and Ulubaşoğlu, 2015). It also promotes economic growth in the host countries (Alfaro et al., 2004; Borensztein et al., 1998). In comparison with other external sources of capital, FDI is considered potentially more beneficial to developing countries due to numerous advantages. FDI helps in boosting productive capacity, supplement employment and trade. Furthermore, it brings knowledge through the acquisition of skills and training of labour. Additionally, FDI introduces new production processes and creates backward and forward linkages. Lastly, it provides domestic firms access to foreign markets (Iamsiraroj and Ulubaşoğlu, 2015). FDI helps in stimulating capital accumulation in the economy through well-developed financial system (Wang and Wong, 2009).



(a) Inflows of remittances to different income groups

(b) Inflows of FDI to different income groups

Figure 2.2: Inflows of FDI and Remittances to the different income groups

Along with several advantages of FDI to host countries, some adverse impacts of FDI are also highlighted in the recent literature. According to (Blomström et al., 2003; Globerman and Shapiro, 1999; Mencinger, 2003) several social repercussions are associated with inflow of FDI to host countries. Haddad and Harrison (1993) are not even certain about the existence of spillover effects from FDI. In addition to these, there are several types of FDI which have different effects on accumulation of capital and economic growth. In this respect, some may have no impact on the accumulation of capital such as mergers and acquisitions (Agosin and Machado, 2005). According to Driffield and Jones (2013), impact of FDI through spillover effect may have no outcome on domestic productivity rather just transfer of resources from domestic to foreign residents.

3 Review of literature

The potential rise in the inflow of external financial inflows in recent times has originated new discussion among policymakers and academic scholars. They are more interested in pros and cons associated with these inflows to host and source countries. Among all, FDI and migrant remittances get special attention in the eyes of policymakers and researchers in recent times. In this regard, rigorous efforts have been made by international organizations (World Bank, IMF, and OECD), individual countries and academic institutions (Universities/ Research Institutions) to explore the real potentials associated with these inflows in last three decades. As result of these efforts, a huge body of literature has been available both for FDI and migrant remittances and their subsequent relationship with economic growth. Although, there is no clear agreement among researchers on the link of FDI and migrant remittances with economic growth and still exists ambiguity. It is, therefore, we split the available literature into three parts. In the first part, we discuss FDI and its link with economic growth. In the second part, we shed light on migrant remittances and their association with economic growth. Lastly, we check the available literature on the combined effect of FDI and migrant remittance on economic growth, if any.

3.1 FDI and Economic Growth

The literature related to FDI-growth relationship is prolific. According to Comes et al. (2018), the available literature can be classified into three main strands. The first strand shows positive association between economic growth and FDI, the second strand ascertains negative link between FDI and economic growth, whereas the third strand shows no link between economic growth and FDI. In theoretical underpinning, FDI is generally viewed as an important agent of economic growth (Aitken and Harrison, 1999; Azman-Saini et al., 2010; Grossman and Helpman, 1991; Makiela and Ouattara, 2018). However, in empirical literature, this association is not that straightforward as described in the theoretical framework despite the fact that FDI helps in the accumulation of capital (Neuhaus, 2006), promotion of technology and transfer of knowledge (De Mello, 1999). According to Almfraji and Almsafir (2014), sample selection, time period, model selection/ econometric methodologies etc. are some of the factors mainly responsible for variation in the empirical results in FDI-growth literature.

There are several empirical studies which identify positive relationship between FDI and economic growth. For instance, Balasubramanyam et al. (1996); Makki and Somwaru (2004); Hansen and Rand (2006); Vadlamannati and Tamazian (2009);Tiwari and Mutascu (2011) and Pegkas (2015). In this respect, Balasubramanyam et al. (1996) examine the effectiveness of FDI on economic growth and show that FDI is more effective in countries with export-oriented policies. In the same way, De Mello (1999) succinctly explores the link between economic growth and FDI in OECD and non-OECD countries during 1970-1990. They show that there is direct effect of FDI on economic growth in the OECD countries whereas, there is no such link to non-OECD countries. He also argues that spillovers and knowledge transfer from host country primarily determine long-term growth in the recipient countries. Furthermore, the author posit that the extent of effectiveness is determined by the complementarity (substitution) between FDI and domestic investment. While, analyzing the role of FDI and trade in boosting economic growth in a set of 66 selected developing countries over the period of 1970-2000, Makki and Somwaru (2004) show that FDI and trade are some of the most important determinants of economic growth. They further show that there is strong positive interaction between FDI and trade in determining economic growth. In addition to this, they also argue that well developed human capital, sound macroeconomic policies and institutional stability are some of the pre-requisites for FDI-led growth.

Additionally, Hansen and Rand (2006) empirically show bidirectional causality between GDP and FDI in a set of 31 countries during time period of 1970-2000. Moreover, Vadlamannati and Tamazian (2009) using panel of 80 countries over a period of 1980-2006, show that FDI, political reforms and institutional reforms promote economic growth. According to Tiwari and Mutascu (2011), FDI and exports boost economic growth. Nonetheless, FDI oriented policies are less effective than that of export-oriented development policies in this respect. Pegkas (2015) finds positive association between FDI and economic growth in Eurozone countries by employing fully modified OLS (FMOLS) and Dynamic OLS (DOLS).

On the contrary, Carkovic and Levine (2005); Alvarado et al. (2017); Curwin and Mahutga (2014); Durham (2004); Feeny et al. (2014a) find negative or no association between FDI and economic growth. According to Carkovic and Levine (2005), there is no direct robust link between FDI and economic growth. Another research done by Alvarado et al. (2017) where they examine the link between economic growth and FDI in 19 Latin American countries over the period of 1980-2014. They find no association between economic growth and FDI. However, by splitting the sample into high, middle and low income countries, they argue that FDI cause growth in high income countries only. Furthermore, Curwin and Mahutga (2014) while studying the role of FDI on economic growth in a sample of post-socialist transition countries show that domestic investment performs better than FDI in causing growth in the recipient country. According to them, more FDI penetration leads to economic contraction in the economy. Moreover, Durham (2004) finds no positive link between economic growth and FDI. Likewise, Feeny et al. (2014a) empirically show that impact of FDI is lower in recipient countries than that of host countries while utilizing OLS and GMM methodologies in a sample of Pacific Island countries during 1971-2010.

Together with the above, several transmission channels such as human capital, financial depth, institutional

quality, economic openness etc. through which FDI causes economic growth are investigated by scholars. In this regard, Borensztein et al. (1998); Xu (2000); (Li and Liu, 2005) and Kottaridi and Stengos (2010) link the effectiveness of FDI with certain minimum threshold of human capital stock availability in the economies. According to Borensztein et al. (1998), FDI is an important determinant of economic growth and plays positive role in transfer of technology but the extent of this relationship is linked to the availability of minimum threshold of human stock, which is necessary to absorb the positive benefits associated with FDI. Similarly, Xu (2000) also links the effectiveness of FDI in realizing economic growth with certain minimum level of human capital stock. Furthermore, Li and Liu (2005) empirically show that FDI positively affects economic growth directly and indirectly through interaction of human capital. In addition to this, (Kottaridi and Stengos, 2010) show that there is strong positive link between FDI and economic growth in the presence of nonlinear human development.

Another key channel through which FDI impact economic growth is financial development. Financial development and financial depth are some of the key factors which help in determining sustainable economic growth in an economy. Keeping this in mind, Alfaro et al. (2004) and Samargandi et al. (2015) examine the relationship between FDI and economic growth through channel of financial development. In this respect, Alfaro et al. (2004) study the role of FDI and economic growth while considering local financial markets in the cross country regression model. According to them, FDI significantly improves economic growth subject to the well-functioning and developed financial markets. In a similar manner, Samargandi et al. (2015) examine the link between FDI and economic growth in 52 countries over the period of 1980-2008. They employ PCA and ARDL models and show that FDI contributes positively to economic growth in the presence of well-functioning financial system.

Total factor productivity (TFP) is another important aspect of economic growth theories. It is widely recognized in the literature that FDI boost economic growth through improvement in the TFP. In this regard, Bitzer and Görg (2009); Woo (2009); Wang and Wong (2009); Azman-Saini et al. (2010); Makiela and Ouattara (2018); Malikane and Chitambara (2017); Li and Tanna (2019) and Ng (2006) study the link between FDI and TFP. In this regard, Bitzer and Görg (2009) examine the link between FDI and TFP at industry level. They utilize 10 manufacturing sectors for 17 OECD countries over the period of 1973-2001. According to the authors, inward FDI positively impact domestic productivity whereas outward FDI has negative impact on domestic productivity.

In a similar way, Woo (2009) and Wang and Wong (2009) explore positive association between FDI and TFP. However,Wang and Wong (2009) caution that this positive link is conditioned to two factors such as human capital and financial development. Likewise, Li and Tanna (2019), examine the link between FDI and TFP in the cross country analysis of 51 low and lower middle income countries over the period of 1984-2010. They show weak but direct effect of FDI on TFP. However, this impact is enhanced through introduction of interaction terms in the model. They also argue that strong institutions are prerequisite in attaining the fruits of FDI-TFP led growth. In contrast to above, Ng (2006) study the link between FDI and TFP in a sample of eight Asian countries and shows weak evidence of FDI causing technical changing in the sample countries.

Whereas, Azman-Saini et al. (2010) link the impact of FDI on economic growth with economic freedom. According to them, FDI has no direct effect on economic growth rather the effect of FDI depends on the host country level of economic freedom. According to the authors, open economies enjoy the benefits of external financial inflows. Whereas, Makiela and Ouattara (2018) consider the role of FDI on economic growth through identification of different transmission channels in a sample of selected developing countries from 1970-2007. They show that FDI impacts economic growth through input accumulation rather than TFP. While, Malikane and Chitambara (2017) investigate the impact of FDI on productivity growth by utilizing a panel of 45 African countries over the period of 1980-2012. They apply two measures of backwardness such as the distance from technological frontier and income gap. To obtain results, they apply fixed effect and system GMM methodologies. They show weak but positive effect of FDI on productivity growth in African countries.

To proceed further, some scholars also try to explain the impact of FDI on economic growth in different regions and individual countries. At regional level, Rothgeb Jr (1988) study this relationship in Latin American and African countries whereas Sadik and Bolbol (2001) in Arab countries. Likewise, Bevan et al. (2004) study the impact of FDI in transition economies and Adams (2009) in SSA countries. In this respect, Rothgeb Jr (1988) finds positive association between FDI and economic growth during time period of 1967-1978 in Latin American and African countries by utilizing multiple regression analysis. Furthermore, he also shows that FDI significantly affect economic growth in transport, telecommunication and construction sectors whereas negative/no impact in case of mining sector.

Additionally, Sadik and Bolbol (2001) show positive link between FDI and economic growth in six Arab countries. While, Adams (2009) study the link among FDI, private investment and economic growth. He utilizes data from 42 Sub-Saharan African countries (SSA) for the time period of 1990-2003 and empirically shows the link between FDI and domestic investment. Furthermore, he shows that FDI inflows erode domestic investment. In the same manner, there are several papers which link the relationship between FDI and economic growth at individual country level. These include Aitken and Harrison (1999) for Venezuela; Liu and Wang (2003) for china; Kathuria (2001) for India and all these papers conclude that FDI helps in increasing productivity in the countries under study.

3.2 Remittances and economic growth

The effects of remittances on growth have been discussed extensively in the remittance-growth literature. Like FDI, migrant remittances are not only important for migrant households but also key financial inflows to developing countries. After all, the primary difference between remittances and FDI is that remittances are small individual transactions from migrants to their families. Thus, utilization of remittances is solely based on the decision of remittance-recipient households. Therefore, remittances are primarily used for consumption, accumulation of assets and productive investment at household level. But, we cannot deny the role of remittances at macro level. Remittances are also an important source of foreign exchange for developing countries. In this respect, several attempts have been made to ascertain the link between remittances and economic growth. Strikingly, a clear division exists in the extant literature regarding the association between remittances and economic growth. Like FDI, this relationship is either positive, negative or no relationship exists at all. According to Gapen et al. (2009), factors such as discrepancy in data on remittances, different time periods, use of different control variables (most probably a case of omitting variables) and choice of variables as instruments are mainly responsible for the ambiguous relationship between remittances and economic in the available literature.

As discussed previously, the relationship between remittances and economic growth is not clear in the literature. In this regard, one branch of literature try to find positive effects of remittances on economic growth. Accordingly, Pradhan et al. (2008) examine the link between remittances and economic growth in 39 developing countries over the period of 1980-2004. They apply fixed and random effect models and show positive association between remittances and economic growth. Along similar lines, Ziesemer (2012) observes the link between remittances and economic growth in a panel of 52 countries whose per capita income is not more than $1200 USD. By employing GMM estimation methodology, he finds positive association between remittances and economic growth directly and indirectly through interaction of saving and expenditure on education. In addition to this, Chowdhury (2016) investigates the effect of remittances on economic growth through financial development by utilizing system GMM model in 33 top remittance receiving countries over the period of 1979-2011. He shows positive association between remittances and economic growth in the selected countries.

In opposite to what has been mentioned above, many scholars show that remittances exert negative impact on economic growth (Bettin and Zazzaro, 2012; Feeny et al., 2014b; Gapen et al., 2009; Jahjah et al., 2003; Rao and Hassan, 2011). In this respect, Jahjah et al. (2003)in their seminal paper show negative/ no link between remittances and economic growth. According to them, this is linked to the fact that remittances discourage efforts by labor in the remittance recipients' countries and they referred this phenomenon as moral hazard problem. Ultimately, undermines economic activities in the economy.

In like manner, Gapen et al. (2009) by using fixed effect and instrumental variable estimation techniques in a sample of 84 recipient countries over the period of 1970-2004 show that remittances have no significant positive and robust impact on long term economic growth rather exert negative effects. To further elaborate this point of view, Rao and Hassan (2011) examine the role of remittances on economic growth by using panel data for 40 countries where remittance to GDP ratio is one percent or more. They apply system GMM introduced by Arellano and Bover (1995) and Blundell and Bond (1998). According to them, there is no direct link between remittances and economic growth. Likewise, Bettin and Zazzaro (2012) and Feeny et al. (2014b) show no clear bond between remittances and economic growth.

Keeping in mind this ambiguous link between remittances and economic growth in the literature, Giuliano and Ruiz-Arranz (2009) reexamine the relationship between remittances and economic growth through introduction of financial development as transmission channel. They use panel data of 73 countries over the period of 1975-2002 and employ OLS and SGMM (control for endogeneity) methods. Their results clearly indicate that remittances perform well in countries with weak financial system and provide incentives to finance their investment. In addition to this, they also argue that remittances work as an alternative for ineffective credit markets and help in reducing credit constraints in poor countries. Similarly, Kratou and Gazdar (2018) explore the link between remittances and economic growth in 24 African countries by utilizing SGMM in their analysis over the period of 1998-2011. According to them, remittances enhance economic growth in countries with well-developed financial system.

In same vein, Barguellil et al. (2013) investigate the impact of remittances on economic growth through education in panel data analysis for the period of 1990-2006. They split their data into two samples. First sample includes ten economies with largest amount of remittances in terms of GDP, whereas second sample includes 18 countries with highest amount of remittances in absolute terms. According to the authors, remittances show positive impact on economic growth in the first sample through channel of education whereas, no effect in case of second sample. Nsiah and Fayissa (2013) show positive and statistically significant link between remittances and economic growth in 64 developing countries. It is generally believed that remittances help in increasing migrants' household income which in turn help in reducing poverty among households. In this regard, Imai et al. (2014) show positive link between remittances and economic growth in the panel of 24 Asian countries. They further argue that remittances help in eradication of poverty by supplementing households' consumption. Likewise, Inoue (2018) empirically analyzes the effects of financial development and remittances on poverty situation in developing countries. He applies GMM for the panel data of 102 countries over the period of 1980-2013. His results show positive and significant connection between financial development and remittance in reduction of poverty in developing

countries.

La Porta et al. (1997); Acemoglu et al. (2001) and Rodrik et al. (2004) greatly emphasis the role of institutions in promotion of economic development. In this regard, researchers try to establish connection between remittances and economic growth through inclusion of institutional variables in their analysis. To this end, Catrinescu et al. (2009) and Le (2009) show positive link between remittances and economic growth by including policy and institutional variables in their empirical analysis. Whereas, on the other hand, Abdih et al. (2012) show that abundance of remittances are not beneficial for institutional development in developing countries. They argue that with abundance of remittances, public institutions are more inclined to corrupt practices as citizens do not make them accountable for delivery of public services because remittances act as buffer between public institutions and citizens. In the same order, Adams and Klobodu (2016) examine the relation among economic growth, remittances and regime durability in 33 Sub Saharan African countries over the time period of 1970-2012. They use SGMM and show that there is no positive link between remittances and economic growth in the selected set of countries.

In remittance-growth literature, very little focus has been given to the role of TFP in establishing relationship between remittances and economic growth. In this regard, Gapen et al. (2009) conceptually analyze the channel of TFP through which remittances may cause economic growth. On empirical grounds, Kumar et al. (2018) examine the link between remittances and TFP in Bangladesh and India. They show that there is inverted 'U' shaped link in case of India whereas 'U' shaped link in case of Bangladesh. Similarly, Hassan et al. (2016) examine the link between long term economic growth and remittances using TFP as dependent variable in their empirical model for Bangladesh. They show that link between remittances and long-term economic growth is 'U' shaped.They argue that this 'U' shaped relationship is due to the fact that substantial amount of time is required for remittances to offset the cost associated with remittances.

Along similar lines, Dzeha et al. (2018) examine the link between human development, remittances and TFP in the sample of 21 SSA countries over the period of 2010-2014. To obtain empirical results, they use fixed effect, random effect and SGGM models (to cater for endogeneity). Their empirical results show that there is positive link between remittances and human development whereas negative link between TFP and human resource development. Additionally, they also introduce interaction of remittances and TFP into their empirical analysis and show positive association with human development in high remittance receiving countries. They further claim that countries with higher remittances can change the negative association of TFP into positive.

3.3 Combined Effects of Remittances and FDI

In previous two sections, we discuss the available literature wherein the effect of FDI and remittances on economic growth are separately studied. Whereas, in this section, we are going to shed light on the available literature which discusses the combined effect of remittances, FDI and economic growth. In this connection, Benmamoun and Lehnert (2013) examine the link between remittances, FDI and ODA in panel of developing countries over the period 1990-2006. They use SGMM and show that there is positive link of remittances, FDI and ODA with economic growth in the sample of developing countries. They further argue that this impact has increased with migrant remittances and clearly speaks of the importance of migrant remittances in contribution to economic growth. Likewise, Driffield and Jones (2013) study the effects of migrant remittances, FDI and ODA on economic growth in the sample of developing countries over the period of 1984-2007. In their empirical analysis, they use 3SLS and introduce several institutional interaction terms. They show positive effects of remittances and FDI on economic growth and negative in case of ODA. In same vein, Golitsis et al. (2018) analyze the impact of migrant remittances and FDI on economic growth over the period 1996-2004 for Albania. They show that there is positive link between remittances and economic growth both in short and long-run whereas no link with FDI.

By the same token, Javorcik et al. (2011) examine the connection between migrant networks and FDI using data on migrants present in USA. According to them, migrant networks play pivotal role in attracting FDI to the migrants' country of origin. Likewise, Makun (2018) notes positive relationship of migrant remittances and FDI on economic growth but imports do not cause growth. According to Tahir et al. (2015), there is positive link among remittances, FDI and economic growth whereas imports has negative association with economic growth. Coon and Neumann (2018), study the effect of FDI flows on migrant remittances in a sample of 118 countries over the period of 1980-2010. To obtain empirical results, they employ Random effect and show positive and significant effect of FDI on migrant remittances. In addition to this, to cater for endogeneity in the model, they employ two stage instrumental variables approach. Their findings suggest complementary link between FDI and migrant remittances. Furthermore, by splitting the sample into four income group, they show that this relationship is pronounced for low income countries, which clearly indicates the importance of migrant remittances to these countries.

Comes et al. (2018) also study the effect of FDI and migrant remittances on economic growth using OLS and Fixed effect models by utilizing panel data from seven central and Eastern Europe. According to them, FDI and migrant remittances are positively associated with economic growth. Although, the influence of FDI is stronger than migrant remittances. To check the impact of overseas capital inflows, Ferdaous (2016) investigates the relationship between remittances, FDI, and economic growth in 33 developing countries using panel data over the period of 2003-2013. He applies both static and dynamic panel estimation methodologies. He finds statistically significant

positive link between FDI and economic growth whereas negative link between remittances and economic growth. According to Mustafa and Anwar (2017), FDI and remittances are positively associated with economic growth. Whereas, Shahid et al. (2013) show positive relation between economic growth and remittances and negative link between FDI and economic growth.

4 Theoretical and Conceptual Framework

Persistent increase in investment and savings, improvement in human capital, adapting new technologies and rise in output are some of the pre-requisites for sustainable economic growth. In this regard, different theories have been presented over the period of time for understanding economic growth processes and identifying factors that are contributing to the mechanism through which these factors affect economic growth. The early models in this regard are Harrod-Domar growth model and Lewis two-sector model. These models explain growth mechanism through investment (Todaro and Smith, 2012). In a similar way, Solow (1956) presented his growth model, which is also considered as beginning of modern literature on economic growth and also called Neo-classical growth model. In Solow's growth model (1956), much of the growth in the economy is explained by changes in the amount of labor with emphasizing the role of investment. In mid-1980s, endogenous growth models have been developed in which technical progress and technological change (Lucas Jr, 1988; Romer, 1986) have been included in the growth models. In addition to the above, Barro (1991); Grossman and Helpman (1991) and Mankiw et al. (1992) have considered human capital and research development as some of the important determinants of growth. Despite these breakthroughs, it is still very difficult to fix problem regarding determinants of economic growth because several factors are responsible in determining economic growth. The question regarding determinants of economic growth is yet to be answered (Tahir et al., 2015). It is rightly observed by Lucas Jr (1988) in his famous lectures regarding the determinants of economic growth, "Economic growth, is a summary measure of all the activities of an entire society, necessarily depends, in some way, on everything that goes on in a society. Societies differ in many easily observed ways, and it is easy to identify various economic and cultural peculiarities and imagine they are key growth performers". Hence, along with savings, investment and human capital; external factors like foreign remittances, FDI and ODA are also pivotal in determining economic growth in countries/ regions (Gapen et al., 2009; Lueth and Ruiz-Arranz, 2006).

According to two gap model, most of the developing countries are constraints with low savings to compensate for their domestic investment or facing foreign exchange constraints to finance their import bills. The magnitude of saving and foreign exchange gaps might be different across countries (Todaro and Smith, 2012). Lack of financial resources is one of the major obstacles for under development of developing countries despite rich in natural resources and availability of large labor force. In this regard, external financial inflows such as FDI, remittances, and ODA play significant role in overcoming these problems and give impetus to economic growth. Among other financial inflows, FDI and migrant remittances are key in bringing financial capital to countries with low saving rates and foreign exchange shortages. Below, we try to explain the mechanism through which FDI and migrant remittances impact economic growth directly and indirectly through different channels.

In this respect, FDI is commonly regarded as a catalyst for economic growth (Li and Tanna, 2019). In view of exogenous growth theories. FDI through capital accumulation, brings new technologies and diversification in the production of goods to boost the host country's economy. While, endogenous growth theorist view FDI an important agent in transfer of skills through acquiring knowledge, which in turn help in enhancing the stock of human capital (Elboiashi, 2011). Additionally, FDI is also a potential source of financial investment and transfer of new technology. According to Azman-Saini et al. (2010) countries with FDIs are more likely to get access to new technologies and innovations. This might increase productive efficiency and ameliorate overall economic activities in the economies. Likewise, Sodu (2002) explicitly explains mechanism through which FDI impact economic growth. According to Sodu (2002) " Beyond the initial macroeconomic stimulus from the actual investment, FDI influences growth by raising total factor productivity and more generally, the efficiency of resource use in the recipient economy. This works through three channels: the linkages between FDI and foreign trade flows, the spillovers and other externalities vis-à-vis the host country business sector, and the direct impact on structural factors in the host economy".

In view of Woo (2009), several positive effects are associated with FDI such as transfer of technology, introducing new production processes, and improvement in managerial skills. In addition to these, FDI also helps in increasing labor productivity (Azman-Saini et al., 2010). Technological diffusion is another channel through which FDI impact economic growth (Eaton and Kortum, 2001; Woo, 2009). It is also shown in the available literature that FDI through vertical linkages improve domestic productivity (Smarzynska Javorcik, 2004). Hence, there are several mechanisms through which FDI might affect economic growth and brings economic benefits in the form of capital accumulation, technological transfer and better administrative procedures.

Likewise, there are several ways through that remittances influence economic growth in recipient countries. In this regard, remittances are primarily used to supplement consumption expenditures of migrant households (Glytsos, 1993; Jahjah et al., 2003; Pozo, 2006) which lead to increase in demand for goods and services in the economy. Similarly, migrant remittances are also used for productive investment which boost economic develop-

ment in developing countries. Remittances also help in bringing and adapting cutting-edge technologies which in turn bring innovation to the industries in the recipient economies (Dzeha et al., 2018). Thus, remittances not only enhance aggregate consumption but also bring productive investment through raising saving capacity of the remittance receiving households (Chowdhury, 2016; Etowa et al., 2014). Resultantly, all these factors lead to cause economic growth.

According to Giuliano and Ruiz-Arranz (2009), remittances not only stimulate investment but also help in reducing credit constraints in the absence of formal credit markets in low income countries. In a similar manner, there are several other potential channels through which remittances may directly or indirectly impact economic growth (Chowdhury, 2016). For example, remittances can be used as investment to enhance capital accumulation in an economy. Remittances sent through formal banking system is another channel which helps in increasing aggregate amount of deposit that might affect credits in the economy and ultimately lead to capital accumulation (Dzeha et al., 2018).

According to Le and Bodman (2011), remittances bring technological diffusion which in turn entails positive externalities necessary for growth. The amount sent by migrants are also used to attain education, acquiring required skills and trainings to enhance chances to get employment (Kunz, 2008; Lutz, 2010; Pozo, 2006). In this respect, many scholars show positive impacts of remittances on child education (Córdova, 2006; Edwards and Ureta, 2003). In the empirical literature, there are several studies (Burnside and Dollar, 2000; Catrinescu et al., 2009; Driffield and Jones, 2013; Gapen et al., 2009) where migrant remittances along with other financial inflows have been used as a component of investment. According to Driffield and Jones (2013), investment primarily consist of public and private investment, wherein public investment is partly financed by ODA and private investment is financed by FDI and migrant remittances.

TFP is another determinant of economic growth. Solow (1956) in his classical growth model emphasizes the importance of TFP in determining growth in an economy which he called unexplained part in economic growth equation. According to Prescott (1998), TFP is considered an important factor in determining the productivity of labor directly and indirectly through productivity of capital per worker. Within the growth literature, several studies, like Klenow and Rodriguez-Clare (1997) and Hall and Jones (1999), reveal that differences in TFP are key in understanding cross-country income differences. A stark distinction in the variation of economic growth in countries is mainly related to differences in their TFP (Acemoglu and Robinson, 2010; Caselli, 2005; Easterly and Levine, 2002). According to Easterly and Levine (2001), 60 % variation in growth is explained by TFP. So along with direct effects of FDI and remittances on economic growth, we will also try to identify indirect link through channel of TFP.

5 Empirical strategy, Data and variables description

In this section, we will try to explain model specification, data and description of variables used in the analysis.

5.1 Model specification

According to neoclassical Solow growth model (1956), the process of production in an economy depends upon labor, capital and technology. But, this model fails to describe the differences in international income across countries due to its restrictive framework (Mankiw et al., 1992). However, the recent empirical work on economic growth suggests that along with labor, capital and technology, there are several other factors which are also important in determining economic growth, such as stock of human capital, well-functioning financial system, institutional development, FDI, migrant remittances and foreign aid across countries (Hansen and Tarp, 2001; Mankiw et al., 1992; Pradhan et al., 2008).

To examine the impact of remittances, FDI on economic growth, we split the sample into 9 non-overlapping 3 years period averages except for last period which we average for 4 years. For our empirical strategy, we follow the seminal work of Mankiw et al. (1992), Giuliano and Ruiz-Arranz (2009) and Driffield and Jones (2013). Our empirical equations as follow,

$$GDPG_{i,t} = \beta_0 + \beta_1 GDPG_{i,t-1} + \beta_2 FDIg_{i,t} + \beta_3 Rem_{i,t} + \beta_4 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (1)$$

$$GDPG_{i,t} = \beta_0 + \beta_1 GDPG_{i,t-1} + \beta_2 FDIg_{i,t} + \beta_3 Rem_{i,t} + \beta_4 Rem * FDI_{i,t} + \beta_4 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (2)$$

Where GDPG is per capita GDP growth, $GDPG_{i,t-1}$ is lagged per capita GDP, FDIg is gross FDI as percentage of GDP, and Rem is inflow of migrant remittances as percentage of GDP, $X_{i,t}$ is matrix of control variables, μ_t is time specific effect,η_i is unobserved country fixed effect and $\varepsilon_{i,t}$ is the error term. We use lagged per capita GDP growth to control for initial economic conditions. According to convergence theory, growth rate per capita will eventually equalize. The coefficient of the lagged per capita GDP growth variable will be negative, if convergence theory holds (Feeny et al., 2014a). As a preliminary exercise, we first estimate the impact of remittances and FDI on economic growth with pooled OLS and Fixed effect models and then introduce SGMM in our analysis.

In the equation (2), we introduce interaction of remittances and FDI. We believe that interaction of remittances and FDI might have some complementary or substitution effect in determining economic growth. In this respect,

we interact remittances with FDI to check for the complementary/substitution between them. A positive coefficient would indicate that increase in one inflow will complement the rise in the inflow of other as well. While, negative sign for interaction term would indicate substitution of one inflow for the other.

As next step, we will try to identify transmission channel through which remittances and FDI might indirectly impact economic growth. For this purpose, we use TFP as transmission channel to check the impact of FDI and migrant remittances on economic growth. We use TFP as dependent variable and include same variables from the growth equation. If the sign of the coefficient is positive, it would be considered that remittances and FDI help in acceleration of economic growth through TFP and if the sign for the coefficient is negative, it would be indicated that impact of FDI and remittances on economic growth through FDI is depressing.

$$TFP_{i,t} = \beta_0 + \beta_1 TFP_{i,t-1} + \beta_2 FDIg_{i,t} + \beta_3 Rem_{i,t} + \beta_4 Remit * FDI_{i,t} + \beta_5 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (3)$$

Apart from above, we also introduce regional and income dummies into our analysis to check for regional and income heterogeneities. In this respect, we use four regional dummies such as dummy for Asia, dummy for Europe & central Asia, dummy for Latin Caribbean and dummy for Africa & Middle East. In a similar vein, three income dummies are also included; dummy for low income, lower middle income and upper middle income countries.

5.2 Problem of Endogeneity

According to Temple (1999), the problem that is frequently faced in cross-country study is the endogeneity among variables considered for analysis. Although, the endogeneity problem can be avoided by applying instrumental variables (Borensztein et al., 1998). The instruments should be exogenous (H Greene, 2002) i.e. it should be correlated with explanatory variables but not with the error term. In the available literature, lags of dependent and independent variables are mostly used as internal instruments (Alfaro et al., 2010; Borensztein et al., 1998). Bearing this in mind, this study utilizes Generalized Method of Moments (GMM) approach proposed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998) to investigate the empirical link between FDI, migrant remittances and economic growth.

In the empirical literature, GMM approach is considered more efficient than other econometric methodologies for dynamic panel data analysis. It is pertinent to mention here that, using GMM has some advantages which are as under. First, to take care of problem of endogeneity, GMM includes lagged values of dependent variable among other independent variables. Second, GMM estimators also help in removing potential bias caused by omitted heterogeneity. (Wooldridge, 2010). Third, Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998) GMM estimators perform well where time period (T) is shorter than number of countries (N) in a panel setting (Roodman, 2009) .

Apart from the lags of dependent and independent variables as instruments, we also use three unique external instruments. Firstly, to cater for the endogeneity of migrant remittances in the growth equation, we use weighted GDP per capita of migrants' host countries[1]. In similar fashion, we construct instrument for FDI using different geographical and demographical factors that might impact FDI inflows to take into account for endogeneity of FDI. Using the method of Davies and Voy (2009), we construct an instrument for FDI to cater for endogeneity of FDI in our model. For this purpose, we use latitude of country, total population, share of population living in rural areas, total area in square kilometers and political index from freedom house. In addition to the above, two other variables are also included into the model to measure the attractiveness of country towards FDI. The first is proximity, which is the sum of real GDP for all countries weighted by the distance in kilometers between country j and i. The second is the colonial link, which is sum of GDP for all countries with those country j has a colonial link. After regressing FDI on the above stated factors, we take the fitted values of FDI as instrument. The information regarding colonial link, distance, area and latitude are taken from CEPII website. Thirdly, we use the unemployment rate in the host countries as an instrument.

After applying instruments, it is very important to check for their validity and consistency. In this respect, several tests are available in the econometric literature mainly used for the purpose of consistency of GMM estimator which consequently depend upon the validity of the instruments. In this respect, two specification tests proposed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998) are used in the literature. The Sargan and Hansen tests of over-identification to check overall validity of instruments and Arellano-Bond test to check for serial correlation in the model (Carkovic and Levine, 2005). Additionally, we also include orthogonal transformation as it produces efficient results in case of missing values in the panel (Hayakawa et al., 2009).

[1]This idea is borrowed from Combes and Ebeke (2011) where they use this variable as instrument to avoid endogeneity.

Table 5.1: List of Selected Developing Countries

Africa and Middle East		Asia and pacific	Europe And Central Asia	Latin America and Caribbean
Algeria	Malawi	Bangladesh	Albania	Bolivia
Angola	Mali	China	Armenia	Brazil
Burkina Faso	Morocco	India	Belarus	Colombia
Cameroon	Niger	Indonesia	Bulgaria	Costa Rica
Congo, Dem. Rep.	Nigeria	Malaysia	Kazakhstan	Dominican Republic
Cote d'Ivoire	Senegal	Pakistan	Romania	Ecuador
Egypt, Arab Rep.	South Africa	Philippines	Russian Federation	Guatemala
Ghana	Tanzania	Sri Lanka	Turkey	Jamaica
Iran, Islamic Rep.	Tunisia	Thailand	Ukraine	Mexico
Jordan	Uganda			Peru
Kenya	Zimbabwe			Venezuela, RB
Madagascar				

5.3 Data

We use unbalanced panel data consist of 52 low and middle income countries over the period of 1990-2017. The list of countries are given in table the 5.1. The rationale behind using low and middle income countries is due to the fact that most of the remittances are received by these countries. Likewise, to pursue their development agendas and to overcome financial constraints, developing countries are also in dire need for FDI. It is pertinent to mention here that selection of these developing countries is solely based on the availability of data. The selected time period is also relevant to our study owing to the potential surge in the inflow of FDI and migrant remittance during this time period towards developing countries. A significant rise in the inflow of FDI and migrant remittances has been observed since 1990. We use non-overlapping three year averages to avoid business cycle fluctuations. Short-run or cyclical fluctuations in annual data may not properly help in identifying the long-run impact of economic growth (Harrison, 1996). Most of the data for our sample come from World Development indicators (WDI), World Bank. The data for gross FDI and institutional variables are from UNCTAD database and ICRG database, respectively. We use Chinn-Ito database to get data on financial development whereas data for TFP come from conference board database.

5.4 Description of variables

Macroeconomic variables: In our analysis, the following macroeconomic variables are included in the model. Such as, size of the government (proxied by government consumption as a share of GDP). This variable takes into account the capacity of government in provision of public goods. However, it might also give insights into the distortionary effects of public spending and taxation (Samargandi et al., 2015). In this regard, it is rightly pointed by Barro (1997), that "big government is bad for growth". Trade which is measured by the sum of imports and exports (as share of GDP). Sachs et al. (1995) show that open economies grow faster than that of closed ones. Financial development is also an important determinant of economic growth and great emphasis has been put in the recent literature. According to King and Levine (1993), financial development is of vital importance in achieving long-term productivity. We use KAOPEN Index from Chinn and Ito (2006) for financial openness. Similarly, TFP is another important factor in promotion of economic growth. (Aghion et al., 2005; Alfaro et al., 2010) have put great emphasis on the importance of TFP. Likewise, macroeconomic and policy stability are also vital for long-term economic growth. Inflation is used as proxy to cater for macroeconomic and policy stability. Inflation may have positive or negative impact on economic growth (Gossel, 2018). Lower inflation rate is favorable for investment, trade and ultimately for overall economic growth (Fisher and Modigliani, 1978). Alternatively, as pointed by Gossel (2018), increasing inflation may necessitate upward push in the interest rate, which certainly bring equity based FDI due to possibility of higher profits.

Factor supply variables: Human and physical capital are mainly included in this category. In this analysis, physical capital (investment) is proxied by gross fixed capital formation. In the process of economic development, capital accumulation is key for economic growth. In addition to physical capital, human capital refers to "the ability and skill level of a country's workforce, and is usually measured by using education enrollment rates" (Barro, 2001). It has been empirically shown that human capital affects economic growth positively as it helps in technological development and diffusion (Lucas Jr, 1988; Nelson and Phelps, 1966; Romer, 1990). In this regard, secondary school enrollment, is better proxy for human capital. (Barro, 1991; Curwin and Mahutga, 2014; Ferdaous, 2016; Mankiw et al., 1992). We also include age-dependence ratio in list of our control variables.

Institutional variables: Several studies have highlighted the importance of institutions in the process of development and their subsequent impact on aggregate productivity growth such as, Acemoglu et al. (2001). The purpose of including these variables is to gauge the quality of institutions and their subsequent impact on the overall economic development in the developing countries. There are several valid arguments put forward by eminent economists such as La Porta et al. (1997) and Acemoglu et al. (2001) to highlight the role of institutions

in the process of development. We construct an index of institutional variables using principal component analysis (PCA). PCA is a statistical technique which is used to identify principal components. In this regard, we use the following variables from ICRG database for construction of our institutional index such as Government Stability (govsta), Investment Profile (invpro), Law and Order (Law & order), Democratic Accountability (demacc) and Bureaucratic Stability (burqua). So our institutional index as follows;

$$INS = f(govsta, invpro, Laworder, demacc, burqua) \tag{4}$$

Table 5.2: List of Variables

Variables	**Name used in Tables**	**Description**	**Sources**
GDPPC Growth	GDPG	Gross Domestic Product per capita growth (Annual)	Data extracted from World Development Indicators(WDI)
Remittances	REM	Inflow of migrant remittances as percentage of GDP	
General Government Final Consumption	GFC	General Government final consumption expenditure as a percentage of GDP used as a proxy for government policy	
Gross Fixed Capital Formation	GCF	Gross Fixed capital formation (% of GDP), used as proxy for capital.	
Inflation	INF	Inflation, consumer prices (annual %) for economic stability	
Trade	TRA	Trade (% of GDP) to gauge the extent of openness of an economy.	
Migrant Stock	MST	International migrant stock (% of population)	
Population Growth	POP	Population growth (annual %)	
Secondary School Enrollment	SCH	School enrollment, secondary (% gross) use as proxy for human capital.	
Total Natural Resources Rent	NRR	Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents as percentage of GDP	
Age Dependency Ratio	AGE	Age dependency ratio (% of working-age population)	
Total Factor Productivity	TFP	Total factor productivity growth	Data extracted from Conference Board data base.
Index for Institutional Quality	INS	We use five variables from ICRG database to create an index of Institutional quality.	Data extracted from ICRG database.
KOPEAN	KOP	The Chinn-Ito index (2006) is measure of financial openness.	Data are taken Chinn-Ito database.
Gross FDI	FDIg	Gross Foreign direct Investment as percentage of GDP	Data taken from UNCTAD database

Demographic variables: Along with economic variables, recent literature also emphasizes the importance of demographic characteristics in econometric modellings in order to best fit the empirical models. In this domain, we include following demographic variables such as population growth to cater for demographic characteristics. Population growth, which is exogenous in the standard growth theory, is a key factor in determining long-run growth in an economy (Barro, 1997). There is no disagreement in the available economic growth literature regarding the role of population growth in the economic growth process. It is, therefore, population growth is considered a key variable in economic growth models. In addition to the above demographic variables, International migrant stocks as percentage of population is also included. On one side, these migrants in host counties send remittances to their respective countries. On the other side, these migrant stock might also influence the inflow of FDI by creating social networking in source the countries. In addition to the above stated variables, we also include regional and income dummies to cater for heterogeneity in the sample. Moreover, the coefficient of regional dummies take into account any residual variation that are not already explained by the variables specified in the model (Carkovic and Levine, 2005). Likewise, we also use time dummies as rightly pointed by Roodman (2009) for GMM specifications, "The autocorrelation test and the robust estimates of the coefficient standard errors assume no correlation across individuals in the idiosyncratic disturbances. Time dummies make this assumption more likely to hold".

6 Results and discussion

Table 6.1 presents descriptive statistics and table 6.2 reports information regarding pairwise correlation matrix. The correlation between per capita GDP growth rate and FDI is positive and statistically significant whereas no significant correlation with migrant remittances. We also perform panel unit root test in order to check for the stationarity properties of our variables (See table A1 at appendix). After presenting descriptive statistics and correlation matrix, in model 1 and model 2 of table 6.3, we provide results regarding our analysis with pooled OLS and Fixed effect as preliminary exercise. Whereas, model 3 and model 4 report results regarding SGMM and inclusion of interaction FDI and remittances in the analysis. In first two specifications, we do not include lagged

value of dependent variable due to the Nickell bias[2]. According to convergence theory, per capita growth rate will eventually equalize. The coefficient of the lagged GDP per capita variable will be negative, if convergence theory holds (Feeny et al., 2014a). In our case, the sign for the coefficient for lagged per capita GDP growth is negative but not significant.

Table 6.1: Summary Statistics

Variables	N	Mean	St.Dev	min	max
GDPPC Growth	468	1.98	3.92	-25.81	14.47
Gross FDI	436	3.04	3.07	-1.62	30.04
Remittances	439	3.57	4.49	0.00	23.28
Gross Capital Formation	466	23.49	7.55	0.00	48.88
Secondary Edu(Enr)	405	63.09	28.01	5.33	123.16
General Government Expenditures	464	13.41	4.30	1.07	25.15
Trade	464	64.82	30.16	16.22	213.78
Population Growth	468	1.69	1.22	-2.26	5.27
KOPEAN	454	-0.29	1.15	-2.00	2.00
Institutional Index	458	0.00	0.91	-2.57	1.90
TFP	468	0.04	3.49	-30.28	16.31
Age Dependence	468	69.43	19.76	35.74	111.68
Inflation	450	73.91	485.79	-4.35	8767.32
Natural Resource Rents	468	7.55	8.10	0.04	45.44
Migrant stocks	468	3.90	6.67	0.03	43.60

Source: Authors' Construction

Similarly, the coefficient on FDI in the growth equations is statistically significant and positively associated with economic growth. The coefficient of FDI ranges from 0.12(0.13) in FE (Pooled OLS) to 0.22(0.41) in SGMM(Rem*FDI) specifications. More specifically, in model 3, 1 percentage point rise in FDI improves economic growth by 0.22 percentage points, ceteris paribus. Whereas, this impact increases to 0.41 percentage points by introducing interaction of remittances and FDI in the anaysis. This is indicative of the fact that FDI promotes economic growth. Our results are also in line with the empirical literature on FDI (Alfaro et al., 2004; Makki and Somwaru, 2004; Malikane and Chitambara, 2017). In fact, FDI through transfer of advanced technology and knowledge improves economic growth in developing countries (Makki and Somwaru, 2004). De Mello (1999) argues that spillovers and knowledge transfer from host country primarily determine long-term growth in the recipient countries. Furthermore, the author posits that the extent of effectiveness of FDI is determined by the complementarity (substitution) between FDI and domestic investment.

Table 6.2: Pairwise Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
GDPPC growth	1														
Gross FDI	0.20*	1													
Remittances	0.06	0.18*	1												
Gross Fixed Capital	0.29*	0.15*	0.01	1											
Secondary Edu(Enr)	0.06	0.15*	0.14*	0.23*	1										
General Gov Expenditure	-0.14*	0.07	0.04	0.01	0.18*	1									
Trade	0.05	0.37*	0.19*	0.15*	0.30*	0.26*	1								
population Growth	-0.15*	-0.09	-0.11*	-0.23*	-0.69*	-0.14*	-0.20*	1							
KOPEAN	0.11*	0.21*	0.32*	-0.04	0.29*	-0.05	0.12*	-0.13*	1						
Institutional Index	0.32*	0.23*	0.02	0.18*	0.05	0.08	0.19*	-0.07	0.03	1					
TFP	0.78*	0.12*	0.11*	0.03	0.01	-0.09	0.08	-0.11*	0.04	0.21*	1				
Age Dependence	-0.22*	-0.10*	-0.05	-0.38*	-0.85*	-0.13*	-0.26*	0.80*	-0.18*	-0.10*	-0.10*	1			
Inflation	-0.31*	-0.04	-0.08	-0.13*	-0.05	-0.06	-0.03	0.02	-0.09	-0.21*	-0.23*	0.06	1		
Natural Resource Rents	-0.04	0.15*	-0.30*	0.09	-0.21*	-0.07	0.00	0.32*	-0.21*	0.05	0.05	0.28*	0.13*	1	
Migrant stocks	-0.07	0.21*	0.31*	0.03	0.25*	0.31*	0.41*	-0.04	0.14*	0.12*	0.05	-0.10*	0.02	-0.08	1

Note: * indicates significance level at 5 % level.

Whereas, the co-efficient for migrant remittances is not statistically significant in all specifications. So, our empirical findings in respect of migrant remittances are somehow in line with Jahjah et al. (2003) and Gapen et al. (2009), wherein they show that impact of migrant remittances is either negative or no relationship exists at all with economic growth. Jahjah et al. (2003) argue that despite the fact that remittances are compensatory in nature but at the same time remittances are also give rise to moral hazard problems. This moral hazard problem can be severed enough to reduce economic activity in an economy. This fact is further justified by Rao and Hassan (2011) that remittances do not have any direct long-run instead may have indirect short run effect on economic growth. Likewise, Gapen et al. (2009) conclude that there is no robust evidence that remittances support economic growth due to the fact that remittances are not intended primarily for investment.

[2]One immediate problem in applying OLS to this empirical problem is that Yt-1 is correlated with fixed effects in the error terms, which give rise to " dynamic panel bias",(Nickell, 1981) taken from (Roodman, 2009)

Table 6.3: FDI, Remittances, Per Capita GDP growth and inclusion of interaction term of Rem*FDI

Variables	Model 1 OLS	Model 2 FE	Model 3 SGMM	Model 4 Rem*FDI
Lagged GDPPC Growth			0.00	-0.06
			(-0.24)	(-0.12)
Gross FDI	0.13**	0.12**	0.23*	0.41**
	(-0.05)	(-0.05)	(-0.12)	(-0.19)
Remittances	-0.03	-0.09	-0.04	0.02
	(-0.04)	(-0.07)	(-0.12)	(-0.16)
Gross Fixed Capital	0.09***	0.08**	0.00	0.00
	(-0.02)	(-0.04)	(-0.10)	(-0.07)
Secondary Edu(Enr)	-0.02**	-0.02	0.02	0.00
	(-0.01)	(-0.02)	(-0.04)	(-0.04)
General Gov Expenditures	-0.10***	-0.11	-0.04	-0.04
	(-0.03)	(-0.11)	(-0.15)	(-0.13)
Trade	0.00	0.00	-0.03	-0.03
	(0.00)	(-0.01)	(-0.02)	(-0.03)
Population Growth	-1.04***	-2.13***	-0.64	-1.25
	(-0.28)	(-0.46)	(-0.94)	(-1.06)
KOPEAN	-0.10	-0.26	-0.75*	-0.65**
	(-0.13)	(-0.16)	(-0.44)	(-0.31)
Institutional Index	0.53**	0.60***	1.42***	1.29***
	(-0.22)	(-0.19)	(-0.42)	(-0.40)
Age Dependence	-0.01	0.04	0.01	0.00
	(-0.02)	(-0.03)	(-0.05)	(-0.05)
Inflation	-0.00***	-0.00***	-0.01	-0.02
	(0.00)	(0.00)	(-0.01)	(-0.02)
Natural Resource Rents	-0.02	0.13**	-0.05	-0.05
	(-0.02)	(-0.05)	(-0.05)	(-0.05)
Migrant stock	0.05*	0.04	0.07	0.15
	(-0.03)	(-0.22)	(-0.15)	(-0.13)
Rem*FDI				-0.03
				(-0.03)
Observations	344	344	318	317
Countries		52	52	52
R2	0.39	0.35		
AR(1) test			0.08	0.01
AR(2) test			0.46	0.34
P-value for Hansen test			0.60	0.26

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Dependent variable is per capita GDP growth. All regressions include time dummies.
Source: Authors' construction.

Recognizing the role of other factors in influencing economic growth, we include some very important control variables in the analysis. We use gross fixed capital formation as proxy for capital that has positive sign but statistically significant in the first two specifications. More specifically, 1 percentage point rise in investment improves economic growth by 0.09 percentage points in model 1 and 0.08 percentage points in the model 2, holding all else constant. In fact, capital plays an important role in impacting economic growth and our findings are in line with both economic theory and empirical literature (Barro et al., 2004; Catrinescu et al., 2009).

Apart from the above, we construct an index of institutional quality using PCA. Our results are statistically significant with positive sign in all four models. As it is clear from theoretical and empirical literature that institutions play an important role in improving economic growth and economic development. In this vein, well established institutions not only bring stability but also help in the proper utilization of economic resources (Acemoglu and Robinson, 2010; Yildirim and Gokalp, 2016). Acemoglu and Robinson (2010) emphasis the importance of institutional development and linked the economic wellbeing with institutional quality.

We also include natural resource rents to ascertain the role of natural resource endowment on economic growth. The sign for coefficient of this variable is positive and statistically significant in one out of four specifications indicates that natural resource endowment may partly improve economic growth. In this respect, several empirical studies are available in the literature wherein they show positive association between economic growth and natural resource endowment. It is in fact true that natural resource is an important factor which helps in improving economic development and brings economic prosperity. There are also some other variables which have significant coefficients. In this regard, Financial inclusion proxied by KOPEAN have negative but significant coefficient in two out of four specifications.

Table 6.4: FDI, Remittances and Per Capita GDP Growth with Interaction term and Regional Dummies

	Model 1 DA&ME	**Model 2 DASIA**	**Mpdel 3 DECA**	**Model 4 DLCC**
Lagged GDPPC Growth	-0.14	-0.10	-0.01	-0.05
	(-0.13)	(-0.19)	(-0.16)	(-0.13)
Gross FDI	0.34	0.33*	0.41**	0.41**
	(-0.22)	(-0.17)	(-0.16)	(-0.18)
Remittances	-0.01	0.02	-0.03	0.07
	(-0.17)	(-0.17)	(-0.14)	(-0.16)
Gross Fixed Capital	0.03	-0.02	0.01	-0.01
	(-0.08)	(-0.07)	(-0.07)	(-0.07)
Secondary Edu(Enr)	-0.01	0.05	-0.02	0.01
	(-0.05)	(-0.04)	(-0.04)	(-0.05)
General Gov Expenditures	0.04	0.1	0.01	-0.04
	(-0.16)	(-0.19)	(-0.12)	(-0.14)
Trade	-0.03	-0.03***	-0.04	-0.03
	(-0.02)	(-0.01)	(-0.03)	(-0.02)
Population	-0.98	-1.38	-2.51*	-1.02
	(-1.06)	(-0.92)	(-1.28)	(-1.18)
KOPEAN	-0.74**	-0.56	-0.48	-0.58*
	(-0.36)	(-0.38)	(-0.36)	(-0.33)
Institutional Index	1.25***	1.19***	1.39***	1.31***
	(-0.40)	(-0.38)	(-0.41)	(-0.39)
Age Dependence	0.01	0.08*	0.04	0.00
	(-0.05)	(-0.04)	(-0.05)	(-0.05)
Inflation	-0.02	-0.02	0.00	-0.02
	(-0.02)	(-0.03)	(-0.03)	(-0.02)
Natural Resource Rents	0.00	0.03	-0.05	-0.04
	(-0.05)	(-0.04)	(-0.04)	(-0.05)
Migrant Stock	0.12	0.09	0.20	0.13
	(-0.13)	(-0.16)	(-0.13)	(-0.15)
Rem*FDI	-0.02	-0.01	-0.03	-0.03
	(-0.04)	(-0.03)	(-0.02)	(-0.03)
Regional Dummies	Yes	Yes	Yes	Yes
Observations	317	317	317	317
Countries	52	52	52	52
AR(1) test	0.05	0.08	0.03	0.01
AR(2) test	0.2	0.44	0.39	0.34
P- values Hansen test	0.28	0.38	0.28	0.31

Standard errors in parentheses,* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Dependent variable is per capita GDP growth. All regressions include time dummies. DA& ME, DASIA, DECA and DLCC stand for Africa and Middle East dummy, Asian dummy, Europe & Central Asian dummy and Latin America & Caribbean countries dummy, respectively. Source: Authors' construction.

After looking into our primary findings, now in model 4 of table 6.3, we introduce interaction of remittances and FDI to check how their combined effect influences economic growth. In this regard, the coefficient of interaction term for remittances and FDI is negative but not statistically significant. This indicates that, in the absence or reduction in the FDI, remittances may work as substitute and contribute to enhance financial capital of developing countries. Our results are in contrast to Coon and Neumann (2018)[3], where they study the impact of FDI on remittances and show that remittances and FDI are complementary for each other.

In order to check the impact of FDI and remittances on economic growth in different regions and income groups, we introduce regional and income dummies. We use four regional and three income dummies. The regional dummies include dummy for Africa &Middle East (DA&ME), dummy for Asia (DASIA), dummy for Europe and Central Asia (DECA) and dummy for Latin and Caribbean countries (DLCC). In this respect, table 6.4 reports results regarding different regional dummies. There is no stark differences in the magnitude and sign of coefficients of the explanatory variables but with some minor changes. These findings indicate that the impact of remittances and FDI on economic growth is similar across all regions.

[3]In their study, they use FDI as independent and remittances as dependent variable by finding the link between them.

Table 6.5: FDI, Remittances, Per Capita GDP Growth with Interaction Term and Income Dummies

	Model 1 DLI	**Model 2 DMI**	**Model 3 DUMI**
Lagged GDPPC Growth	-0.07	-0.03	-0.01
	(-0.11)	(-0.11)	(-0.12)
Gross FDI	0.39*	0.36*	0.41**
	(-0.22)	(-0.19)	(-0.16)
Remittances	0.05	0.02	0.08
	(-0.20)	(-0.15)	(-0.13)
Gross Fixed Capital	0.03	0.04	0.04
	(-0.06)	(-0.06)	(-0.06)
Secondary Edu(Enr)	0.00	0.01	0.03
	(-0.04)	(-0.04)	(-0.03)
General Gov Expenditure	-0.02	0.02	-0.01
	(-0.18)	(-0.16)	(-0.16)
Trade	-0.03	-0.03	-0.03
	(-0.02)	(-0.02)	(-0.02)
Population Growth	-0.91	-1.23	-0.90
	(-1.05)	(-0.940	(-0.67)
KOPEAN	-0.66**	-0.61*	-0.53*
	(-0.30)	(-0.30)	(-0.31)
Institutional Index	1.21***	1.32***	1.32***
	(-0.43)	(-0.37)	(-0.35)
Age Dependence	-0.01	0.02	-0.01
	(-0.08)	(-0.05)	(-0.05)
Inflation	-0.01	0.00	0.00
	(-0.02)	(-0.02)	(-0.02)
Natural Resource Rents	-0.05	-0.05	-0.04
	(-0.04)	(-0.04)	(-0.04)
Migrant Stocks	0.14	0.13	0.12
	(-0.12)	(-0.12)	(-0.12)
Rem*FDI	-0.04	-0.03	-0.04
	(-0.04)	(-0.03)	(-0.02)
Income Dummies	Yes	Yes	Yes
Observations	317	317	317
Countries	52	52	52
AR(1) test	0.01	0.01	0.01
AR(2) test	0.24	0.38	0.33
P-values Hansen test	0.33	0.47	0.52

Standard errors in parentheses,* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Dependent variable is per capita GDP growth. All regressions include time dummies. DLI, DMI and DUMI stand for Low income dummy, Lower Middle income and Upper Middle income dummy, respectively. Source: Authors' construction.

Similarly, we also include three income dummies namely dummy for low income countries (DLI), dummy for lower middle income countries (DMI) and dummy for upper middle income countries (DUMI) in order to look for income heterogeneities. In this respect, table 6.5 shows results after including different income dummies in the analysis. We do not find any stark difference in results with our previous findings and all coefficients retain same signs. We can easily infer from these empirical findings that FDI is still main driving force in promotion of economic growth in developing countries. However, behavior of remittances in causing economic growth is still not clear.

After performing empirical analysis regarding the role of FDI and remittances on economic growth, now as next step, we want to identify transmission channel to check whether remittances and FDI have any impact on economic growth. In this regard, recognizing the role of TFP on economic growth, we use TFP as channel through that remittances and FDI may impact economic growth. We use TFP as dependent variables to identify transmission channel with the same set of explanatory variables what we have used in per capita GDP growth equations. In this respect, model 1, table 6.6 shows findings regarding the role of TFP as transmission channel. We do find that TFP is an important channel through which FDI and migrant remittances influence economic growth. The coefficient for FDI is negative and significant. The coefficient implies that a 10 percentage points increase in FDI leads to 0.25 percentage points decrease in the total productivity growth, holding all else constant. Generally, it is viewed that FDI inflows could lead to increase in TFP via knowledge spillovers, technology transfers and fostering linkages with domestic firms depending on the local conditions (Alfaro et al., 2010). In this respect, in the literature, there are several research papers, which show negative link between FDI and TFP (Herzer and Donaubauer, 2018; Li and Tanna, 2019). Our results are line with Herzer and Donaubauer (2018) wherein they show that on average the impact of FDI on TFP is negative in developing countries and reasoning behind such negative association is linked to the fact that higher productivity and higher wages are linked to discourage FDI inflow in developing

countries. In addition to the above, in the empirical findings of Wang and Wong (2009), they show negative link between FDI and TFP. However, the link become positive with minimum threshold of human capital and financial development.

Table 6.6: TFP, FDI, Remittances, interaction term and inclusion of regional dummies.

	Model 1 Rem*FDI	Model 2 DA&ME	Model 3 DASIA	Model 4 DECA	Model 5 DLCC
Lagged TFP	-0.09	-0.15	-0.08	-0.16	-0.10
	(-0.14)	(-0.14)	-0.14	(-0.16)	(-0.15)
Gross FDI	-0.25*	-0.37**	-0.31**	-0.39**	-0.30
	(-0.15)	(-0.15)	9-0.15)	(-0.18)	(-0.19)
Remittances	-0.13	-0.17	-0.13	-0.15	-0.14
	(-0.13)	(-0.13)	(-0.11)	(-0.12)	(-0.15)
Gross Fixed Capital	-0.03	-0.01	-0.04	-0.02	-0.04
	(-0.07)	(-0.08)	(-0.07)	(-0.07)	(-0.08)
Secondary Edu(Enr)	-0.04	-0.04	-0.03	-0.04	-0.03
	(-0.03)	(-0.03)	(-0.03)	(-0.04)	(-0.04)
General Gov Expenditures	-0.09	-0.02	-0.09	-0.12	-0.09
	(-0.16)	(-0.17)	(-0.16)	(-0.20)	(-0.15)
Trade	0.00	-0.01	0.00	-0.01	0.00
	(-0.01)	(-0.01)	(-0.01)	(-0.02)	(-0.01)
Population Growth	-2.40**	-2.51**	-2.97***	-2.42	-2.42*
	(-1.13)	(-1.12)	(-1.04)	(-1.51)	(-1.27)
KOPEAN	-0.63*	-0.58	-0.35	-0.45	-0.56
	(-0.34)	(-0.45)	(-0.44)	(-0.53)	(-0.48)
Institutional Index	0.83	0.72	0.60	0.84	0.73
	(-0.56)	(-0.56)	(-0.48)	(-0.68)	(-0.58)
Age Dependence	0.07	0.09*	0.11**	0.08	0.07
	(-0.05)	(-0.05)	(-0.05)	(-0.07)	(-0.06)
Inflation	-0.01**	-0.01**	-0.02***	-0.02**	-0.02***
	(-0.01)	(-0.01)	(0.00)	(-0.01)	(-0.01)
Natural Resource Rents	0.03	0.05	0.08	0.02	0.03
	(-0.05)	(-0.05)	(-0.06)	(-0.06)	(-0.05)
Migrant Stocks	0.14	0.15	0.15	0.13	0.13
	(-0.10)	(-0.10)	(-0.09)	(-0.13)	(-0.11)
Rem*FDI	0.02*	0.03**	0.03**	0.03*	0.03*
	(-0.01)	(-0.01)	(-0.01)	(-0.02)	(-0.01)
Regional Dummies	No	Yes	Yes	Yes	Yes
Observations	317	317	317	317	317
Countries	52	52	52	52	52
AR(1) test	0.04	0.03	0.02	0.06	0.03
AR(2) test	0.23	0.15	0.22	0.16	0.23
P-values Hansen test	0.47	0.53	0.60	0.43	0.43

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Dependent variable is TFP. All regressions include time dummies. DA&ME, DASIA, DECA and DLCC stand for Africa & Middle East dummy, Asian dummy, Europe & Central Asian dummy and Latin America & Caribbean countries dummy, respectively.
Source: Authors' construction.

According to Li and Liu (2005) that a larger technology gaps in developing countries decrease their ability to learn the technology of foreign firms. This ultimately slows down economic growth in the host economies. This could be one of the reasons that why FDI and TFP are negatively associated in our estimation. De Mello (1999) also shows that the impact of the FDI is negative on TFP in non-OECD countries in his sample. He views that FDI reduces TFP growth by increasing producers' capital accumulation, which may cause negative association between FDI and TFP in the technology follower countries. In addition to the above, he further argues that those economies are (i) be less efficient in the use of the new technology embodied (ii) Have difficulty to assimilate capital and technology-intensive improvements or (iii) that the latter are not much more modern or productivity than the ones existing in the recipient economy. In similar lines, Aitken and Harrison (1999), that FDI inflows may negatively affect the productivity of domestic firms through competitions effects as foreign firms exploits their firm specific advantages to acquire a greater market share in the host economy, facing domestic firms to spread their fixed costs over a smaller volume of productivity. They also show that domestic plants in the sectors with more foreign ownership are significantly less productivity than of those in sectors with smaller foreign presence.

Likewise, there are also some other variables, which are statistically significant. The coefficient for the population growth is negative and statistically significant in all specifications. Similarly, the coefficient for inflation is also negative and statistically significant.

Most importantly, the interaction of remittances and FDI is not only positive but also significant which indicates that the combined effect of FDI and remittances supports total factor productivity growth. This is evident from the fact that FDI and remittances bring technological innovation and modern knowledge to recipient countries. This indicates that TFP is an important transmission channel through that remittances and FDI not only influence economic growth but also bring overall economic development. So, it is imperative for policy makers to create opportunities which improve TFP, so that FDI and migrant remittances are used productively in producing desired

outcomes and to bring economic growth and development to the economy. Furthermore, we also include regional and income dummies to check for regional and income heterogeneities. In this respect, we include four regional and three income dummies. Model 2 to 5 show results for regional dummies and there is no stark difference with our previous specification of model 1 of table 6.6. Likewise, we also include income dummies, to check for income heterogeneities in table 6.7. We do find that the coefficient for remittances and FDI interaction is significant only in one specification out of three, although they carry the same positive signs. This indicates that income is an important factor in influencing TFP through the combined effect of remittances and FDI.

Table 6.7: TFP, FDI, Remittances, interaction term and inclusion of income dummies

Variables	**Model 1** **DLI**	**Model 2** **DMI**	**Model 3** **DUMI**
Lagged TFP	-0.05	-0.12	-0.08
	(-0.17)	(-0.14)	(-0.15)
gross FDI	-0.26	-0.30*	-0.27
	-0.24	-0.18	-0.21
Remittances	-0.17	-0.16	-0.14
	(-0.16)	(-0.13)	(-0.13)
Gross Fixed Capital	-0.07	-0.04	-0.05
	(-0.07)	(-0.07)	(-0.07)
Seconary Edu(Enr)	-0.06	-0.03	-0.03
	(-0.04)	(-0.03)	(-0.03)
General Gov Expenditures	-0.12	-0.08	-0.11
	(-0.22)	(-0.16)	(-0.16)
Trade	-0.01	0.00	0.00
	-0.02	-0.01	-0.01
Population Growth	-2.77**	-2.51*	-2.47**
	(-1.08)	(-1.26)	(-1.12)
KOPEAN	-0.78	-0.46	-0.58
	(-0.50)	(-0.50)	(-0.52)
Institutional Index	0.86	0.83	0.73
	(-0.54)	(-0.59)	(-0.58)
Age Dependence	0.09	0.08	0.07
	(-0.07)	(-0.06)	(-0.05)
Inflation	-0.02**	-0.02***	-0.02***
	(-0.01)	(-0.01)	(-0.01)
Natural Resource Rents	0.04	0.03	0.04
	(-0.06)	(-0.05)	(-0.06)
Migrant Stocks	0.16	0.16	0.14
	(-0.11)	(-0.10)	(-0.10)
Rem*FDI	0.02	0.02*	0.02
	(-0.02)	(-0.01)	(-0.02)
Income Dummies	Yes	Yes	Yes
Observations	317	317	317
Countries	52	52	52
AR(1) test	0.05	0.03	0.04
AR(2) test	0.35	0.19	0.27
P-values Hansen Test	0.45	0.48	0.41

Standard errors in parentheses,* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Dependent variable is TFP. All regressions include time dummies. DLI, DMI and DUMI stand for Low income dummy, Lower Middle income and Upper Middle income dummy, respectively. Source: Authors' construction.

Despite this, we do not find any solid evidence that remittances impact economic growth but remittances are still important and essential financial inflows to developing countries. As explained by Jahjah et al. (2003) that remittances are compensatory in nature. Likewise, Gapen et al. (2009) argue that remittances do not promote growth due to the fact that remittances are primarily intended as social insurance to support day to day affairs of the migrant families rather than to use them for productive investment. Migrant remittances are one of the important sources in reducing poverty across the globe. According to IFAD (2020), households in rural areas receive more than 50 per cent of the remittances where 75 percent of the poor are living. Remittances also improve welfare of households and alleviate credit constraints (Fullenkamp et al., 2008) and increase income of recipient families (Taylor, 1999). Similarly, migrant remittances also help in mitigating poverty in recipient countries. According to Adams and Page (2005), migration and migrant remittances help in reducing the intensity of poverty in developing countries. Likewise, (Imai et al., 2014) consider that remittances are essential for overall economic development as these inflows are helpful in reducing poverty.

In similar pattern, there are several other welfare enhancing attributes associated with the inflow of migrant remittances. According to Ratha (2003), migrant remittances are more stable in nature in comparison with

other capital inflows. Similarly, it is also evident from empirical findings (Combes and Ebeke, 2011; Pozo, 2006) that remittances ensure consumption against negative shocks and helpful in reducing macroeconomic volatility (Fullenkamp et al., 2008; Jawaid and Raza, 2016). Another most important aspect of migrant remittances is that they are countercyclical in nature (Frankel, 2011; Schiantarelli, 2005). According to Frankel (2011), migrant remittances are countercyclical in respect to income in the countries of migrants and pro-cyclical in the host countries. It is evident from previous studies that migrant remittances are also helping in increasing savings (Richard, 2002; Ziesemer, 2012). In a similar fashion, remittances also enhance investment in physical (Connell and Brown, 1995) as well as human capital (Barguellil et al., 2013). In short, migrant remittances are essentially very important for households as well as for developing countries. It is therefore, through well developed and clear policies, the desired benefits associated with migrant remittances can easily be achieved.

To summarize our findings, we find that FDI has positive impacts on economic growth through accumulation of capital, knowledge transfer and by brining cutting-edge technology to the host countries. These findings are in line with theoretical as well as empirical literature on FDI-led-growth. Whereas, the findings regarding impact of remittances on economic growth is not clear. According to (Jahjah et al., 2003), inflow of migrant remittances may lead to moral hazard problems which are sufficient to reduce economic activity in an economy. Furthermore, we do not find any solid evidence that remittances and FDI supplement each other in our analysis. In addition to the above, we also try to identity the transmission channel through which FDI and migrant remittances jointly contribute to economic growth. In this respect, we use TFP as transmission channel and find that TFP is an important transmission channel through which FDI and remittances jointly promote productivity growth.

7 Conclusion

In this paper we try to investigate the impact of FDI and migrant remittances directly and indirectly through TFP as transmission channel on economic growth. For the purpose of empirical estimation, we use panel of 52 developing countries over the period of 1990-2017. We employ GMM estimation methodology proposed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). In this respect, GMM is considered efficient as compared to other econometric techniques in a dynamic panel settings. Most importantly, GMM helps in fixing the problem of endogeneity through the use of internal and external instruments.

Our empirical findings in the growth equation suggest that FDI helps in promotion of economic growth in selected developing countries. These findings are in line with available literature of FDI led growth. Whereas, we do not find any significant link between remittances and economic growth. This could be the fact that remittances are not intended primarily for investment purposes as explained by Jahjah et al. (2003) and Gapen et al. (2009). In order to further examine this link, we use interaction of FDI and remittances in the analysis with intention to check whether these inflows have any combined effect on economic growth. The coefficient for interaction of remittances and FDI show negative sign but that is not statistically significant.

In order to further investigate indirect impact of FDI and migrant remittances, we use TFP as transmission channel. We consider TFP is an important transmission channel through which FDI and migrant remittances might act in impacting economic growth. For this purpose, we use TFP as dependent variable and use interaction of FDI and migrant remittances along with other control variables as explanatory variables. We find that TFP is negatively associated with FDI. There are several plausible reasons available in the literature wherein they show that why the link between FDI and TFP is negative. In addition to this, we introduce the interaction of FDI and remittances in TFP equation. We find that the coefficient for the interaction is not only positive but also statistically significant. The results show strong complementarity between FDI and remittances in promotion of productivity led growth.

Despite the fact that remittances do not have any direct impact on economic growth but the benefits associated with remittances cannot be denied. Remittances are still considered important financial inflows for developing countries. In short, both FDI and migrant remittances are key factors in determining overall economic growth in the recipient economies.

8 Appendix

Table A1: Fisher type panel unit root test at Level

Variables	Inverse chi-squared P	Inverse normal Z	Inverse logit t L*	Modified inv. chi-squared Pm
GDPPPC Growth	364.66	-7.80	-11.49	18.07
	(0.00)	(0.00)	(0.00)	(0.00)
Remittances	222.45	-3.40	-5.42	8.66
	(0.00)	(0.00)	(0.00)	(0.00)
Gross FDI	209.12	-6.11	-6.78	7.50
	(0.00)	(0.00)	(0.00)	(0.00)
General Gov Expenditures	269.74	-4.43	-6.82	11.49
	(0.00)	(0.00)	(0.00)	(0.00)
TFP	304.88	-7.60	-9.56	13.93
	(0.00)	(0.00)	(0.00)	(0.00)
Gross Fixed Capital	283.06	-4.20	-7.25	12.42
	(0.00)	(0.00)	(0.00)	(0.00)
Secondary Edu(Enr)	286.89	-2.10	-8.13	13.49
	(0.00)	(-0.02)	(0.00)	(0.00)
Population Growth	398.89	-7.94	-12.59	20.45
	(0.00)	(0.00)	(0.00)	(0.00)
Trade	207.93	-2.18	-3.93	7.21
	(0.00)	(-0.01)	(0.00)	(0.00)
Inflation	3188.11	-51.85	-124.40	218.36
	(0.00)	(0.00)	(0.00)	(0.00)
Institutional Index	217.38	-5.25	-5.94	7.86
	(0.00)	(0.00)	(0.00)	(0.00)
KOPEAN	912.09	-14.83	-32.39	56.03
	(0.00)	(0.00)	(0.00)	(0.00)
Age Dependence	503.71	-5.95	-12.75	27.71
	(0.00)	(0.00)	(0.00)	(0.00)
Migrant Stocks	655.26	-12.41	-21.15	38.22
	(0.00)	(0.00)	(0.00)	(0.00)
Natural Resource Rents	169.23	-1.68	-2.77	4.52
	(0.00)	(-0.05)	(0.00)	(0.00)

P-values are in parenthesis

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