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The Role of FDI and Migrant Remittances in Economic Growth: An Empirical Analysis

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Dedication

To my beloved daughters, Basma and Nangialai. Your presence in my life has been a constant source of joy and motivation.
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Summary

This thesis contributes to the literature on the impact of external financial inflows on economic growth. Chapter 2 studies the impact of FDI and migrant remittances on economic growth in a sample of developing countries to empirically explore the combined impact of remittances and FDI on economic growth. Additionally, identifying transmission channels through which they can impact economic growth. In this respect, we investigate the impact of FDI and migrant remittances on economic growth and introduce the interaction of FDI and remittances. Moreover, total factor productivity (TFP) is used as a transmission channel to investigate productivity growth in recipient economies. The increase in TFP can result from technology spillovers from foreign companies that bring in advanced production techniques and knowledge, which can enhance the productive capacity of domestic firms. At the same time, remittances can influence TFP through their effects on investment in physical and human capital and innovation in recipient countries. Therefore, TFP is a helpful transmission channel to analyze the impact of FDI and remittances on economic growth in developing countries. By doing so, a more comprehensive understanding of how FDI and remittances affect economic growth in developing countries can be achieved. These results indicate a strong complementarity between these two financial inflows in promoting productivity growth in recipient economies. In other words, when FDI and migrant remittances work together, they have a significantly more positive impact on TFP than when they work separately.

Chapter 3 draws on the role of remittances on economic complexity to help improve understanding of the economic effects of remittances and inform policies and interventions aimed at leveraging remittances to promote economic transformation and diversification. The empirical analysis reveals that the interaction of remittances and education is positively associated with economic complexity. Specifically, we find that the positive effect of migrant

remittances on economic complexity is amplified in the presence of higher education levels. These findings suggest that while migrant remittances may not necessarily lead to economic complexity on their own, they can contribute to it when combined with higher levels of education. Our study sheds light on the potential role of education in maximizing the positive impact of remittances on economic development. The results of this study carry significant implications for policymakers and highlight the need for a more nuanced approach to understanding the impact of remittances on economic development.

Chapter 4 analyzes the role of sectoral-level greenfield FDI on economic growth in developing and developed economies. In our analysis, we use the data of greenfield FDI at aggregated and sector-level to check their impact on economic growth. Using 2SLS regression analysis, we find that the overall impact of greenfield FDI on economic growth is positive and statistically significant. Moreover, at the sector level, the manufacturing sector is the main driver in stimulating the economy. The positive impact of manufacturing greenfield FDI on economic growth can be attributed to various factors, such as the transfer of technology, increased competition, job creation, and increased productivity. These factors can help to spur innovation, enhance efficiency, and ultimately increase output in the manufacturing sector. A key policy implication of our findings is that greenfield FDI directed towards the manufacturing sector is more helpful in bringing economic development and increasing overall welfare. Although, a favorable political and social environment is required for productive investment. Moreover, a well-developed institutional framework and enabling environment are necessary to ripe the benefits of FDI.

Resumé

Cette thèse contribue à la littérature sur l'impact des flux financiers externes sur la croissance économique. Le chapitre 2 étudie l'impact des IDE et des transferts de fonds des migrants sur la croissance économique explorant empiriquement l'impact combiné des deux dans un échantillon de pays en développement. En outre, il identifie les canaux de transmission par lesquels les IDE et les transferts de fonds des migrants influencent la croissance économique. À cet égard, nous étudions l'impact de l'IDE et des envois de fonds des migrants sur la croissance économique et introduisons l'interaction de l'IDE et des envois de fonds. Par ailleurs, la productivité totale des facteurs (PTF) est utilisée comme canal de transmission pour étudier la croissance de la productivité dans les économies bénéficiaires. L'augmentation de la PTF peut résulter des retombées technologiques des entreprises étrangères qui apportent des techniques de production et des connaissances avancées, ce qui peut améliorer la capacité de production des entreprises nationales. Les envois de fonds peuvent potentiellement influencer la PTF par leurs effets sur l'investissement en capital physique et humain et sur l'innovation dans les pays bénéficiaires. Par conséquent, la PTF est un canal de transmission utile pour analyser l'impact des IDE et des envois de fonds sur la croissance économique dans les pays en développement. Ce faisant, une compréhension plus complète des mécanismes par lesquels les IDE et les envois de fonds affectent la croissance économique dans les pays en développement est possible. Les résultats empiriques indiquent une forte complémentarité entre ces deux flux financiers dans la promotion de la croissance de la productivité dans les économies bénéficiaires. En d'autres termes, lorsque les IDE et les envois de fonds des migrants agissent de concert, ils ont un impact positif significatif sur la PTF. Le chapitre 3 examine le rôle des envois de fonds sur la complexité économique dans le but d'améliorer la compréhension de leurs effets économiques des effets économiques des envois de fonds et d'informer les politiques et les in-

terventions visant à tirer parti des envois de fonds pour promouvoir la transformation et la diversification de l'économie. L'analyse empirique révèle un résultat intéressant, à savoir que l'interaction entre les envois de fonds et l'éducation est positivement associée à la complexité économique. Plus précisément, l'effet positif de l'éducation sur la complexité économique est amplifié en présence de transferts de fonds. Ces résultats suggèrent que si les envois de fonds des migrants ne conduisent pas nécessairement à la complexité économique en eux-mêmes, ils peuvent y contribuer lorsqu'ils sont combinés à des niveaux d'éducation plus élevés. Le coefficient du terme d'interaction est non seulement positif, mais également significatif. Il suggère que la relation positive entre les envois de fonds des migrants et la complexité économique est plus forte dans les pays où le niveau d'éducation est plus élevé. Le chapitre 4 analyse le rôle des IDE sectoriels sur la croissance économique dans les économies développées et en développement. Dans notre analyse, nous utilisons les données des IDE de type greenfield au niveau agrégé et sectoriel dans cette étude pour vérifier leur impact sur la croissance économique. En utilisant la technique des doubles moindres carrées (2SLS), nous constatons que l'impact global des IDE greenfield sur la croissance économique est positif et statistiquement significatif. En outre, au niveau sectoriel, le secteur manufacturier est le principal moteur de la stimulation de l'économie. L'impact positif des IDE greenfield dans le secteur manufacturier sur la croissance économique peut être attribué à différents facteurs, tels que le transfert de technologie, l'accroissement de la concurrence, la création d'emplois et l'augmentation de la productivité. Ces facteurs peuvent contribuer à stimuler l'innovation, à améliorer l'efficacité et, en fin de compte, à augmenter la production dans le secteur manufacturier. L'une des principales implications de politiques économiques de nos résultats est que les IDE dirigés vers le secteur manufacturier sont plus utiles pour le développement économique et l'augmentation du bien-être général. Cependant, un environnement politique et social favorable est nécessaire pour des investissements productifs. À cet égard, un cadre institutionnel bien développé et un environnement favorable sont nécessaires pour faire mûrir les avantages de tout type d'IDE.

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Chapter 1

General Introduction

1.1 Introduction

Economic development is a multifaceted and complex process involving various economic, social, and political factors (Kuznets & Murphy, 1966). It is not just about the aggregate output but also about the fundamental transformation of an economy, ranging from its sectoral structure to its demographic and geographic makeup and, perhaps more importantly, its entire social and institutional fabric (Acemoglu, 2012). It involves promoting human development, improving access to education, healthcare, and essential services, and ensuring sustainable and inclusive economic growth. Furthermore, economic development changes the structure of production and introduction of new products, techniques, and technologies (Ivić, 2015). Therefore, economic development policies are designed to promote sustainable long-term economic growth and benefit all members of society.

Sustainable economic growth requires a continuous and consistent rise in investment and savings, human capital development, the adoption of productive technologies, and a subsequent rise in output and employment. In this regard, various theories have been proposed to explain the economic growth process and identify factors that influence economic growth. The early models are the Harrod-Domar and Lewis two-sector growth models. These models explain the growth mechanism by investment (Todaro & Smith, 2012). Similarly, Solow (1956) presented his growth model, which is also considered the beginning of modern literature on economic growth and called the Neoclassical growth model. Solow (1956) incorporated growth economics into growth accounting by emphasizing the distinction between shifts of and movement along the aggregate production function (Crafts & Woltjer, 2021). In Solow's growth model, much of the growth in the economy is explained by changes in the amount of labor, emphasizing the role of investment. Moreover, an economic historian, W.W. Rostow[1], argued that to achieve consistent economic growth, there must be a significant increase in the investment rate (King & Levine, 1994).

In the mid-1980s, endogenous growth models were developed in which technological progress and technological change (Romer, 1986; Lucas Jr, 1988) were included in the growth models. Additionally, Barro (1991), Grossman

[1]W.W. Rostow proposed five stages of economic growth: Traditional Society, Preconditions for Takeoff, Takeoff, Drive to Maturity, and Age of High Mass Consumption

and Helpman (1991), and Mankiw et al. (1992) consider human capital and research & development as crucial determinants of economic growth. Overall, the study of economic growth suggests that (a) variations in the accumulation of physical capital at the national level are a significant determinant of differences in national income levels, and (b) a rise in national investment rates can result in significant increases in the rate of economic growth (King & Levine, 1994). Historically, a rising trend has been witnessed in the global GDP per capita. In this connection, Figure 1.1.1 depicts the trend in the growth of GDP per capita across regions and income groups from 1990 to 2020 and suggests that there has been an overall upward trend in GDP per capita over the past three decades across different regions and income groups.

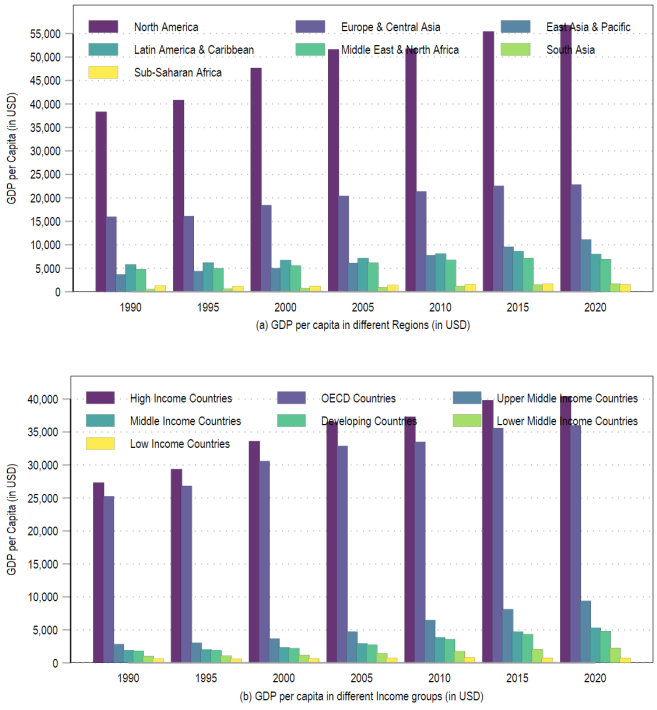


Figure 1.1.1: GDP per Capita across Regions and Income Groups. Source: World Development Indicators (WDI), World Bank

Globalization and other factors, such as greater connectivity and more open economic policies, have caused greater mobility of factors of production (Ahmed et al., 2010). This international mobility/ migration has several cultural, social, economic, and political consequences for countries of origin and destination. Among all, the movement of capital inflows is one of the most

important aspects of globalization. Moreover, these external financial inflows through capital accumulation have been observed to play a significant role in the development process of many countries[2]. Capital inflows[3] are identified in the literature both theoretically[4] and empirically[5] as important catalysts for economic growth. Hence, these financial inflows have a significant role in the economies, regardless of their level of development.

Table 1.1.1: FDI Inflows in the World from 1970-2020

Year	FDI net inflows (in M USD)	FDI, net inflows (% of GDP)
1970	12357.59	0.48
1975	25843.47	0.49
1980	53413.89	0.52
1990	239415.23	1.09
1995	361954.96	1.17
2000	1569111.46	4.61
2005	1562909.69	3.28
2010	1927820.00	2.84
2015	2754780.61	3.60
2020	1141219.16	1.30

Source: Data from the World Development Indicators (WDI), World Bank

The main three external financial flows are foreign direct investment (FDI), migrant remittances, and official development assistance (ODA). FDI, migrant remittances, and ODA inflows have been significant sources of foreign exchange and external finance for all developing countries (Das & Sethi, 2020). In this context, the global FDI inflows in 2021 increased significantly to $1.58 trillion, representing a 64% increase from the level recorded during the first year of the COVID-19 pandemic, which was less than $1 trillion (UNCTAD,

[2]Capital Fundamentalism

[3]Capital inflows are the movement of capital resources into a country for the purpose of investment, trade, or business production.

[4]MacDougall-Kem hypothesis, Industrial organization theory, location Specific theory, eclectic paradigm

[5](Combes et al., 2019; Rajan & Subramanian, 2008; Barajas et al., 2009)

2022). Likewise, FDI inflows to developing economies experienced a 30% increase, reaching $837 billion, with developing Asia recording a 19% growth rate to reach a record of $619 billion (UNCTAD, 2022). There was also a partial recovery in Latin America and the Caribbean region, which received $134 billion, and an increase in Africa, which received $83 billion in FDI inflows (UNCTAD, 2022). Table 1.1.1 shows the inflows of FDI from 1970 to 2020, which indicates a persistent increase in FDI inflows worldwide in terms of absolute and percentage of GDP. In addition, Figure 1.4.1 shows the across different regions and income groups. Similarly, Figure 1.4.2 indicates FDI outflows across regions and income groups. These trends indicate a growing global interconnectedness and increased economic integration among countries.

International migration plays a significant role in economic development, contributing to the growth of economies through channels such as migrant remittances, labor market participation, entrepreneurship, and knowledge and technology transfer. Among all, migrant remittances play a significant impact on economic activity and economic development (Matuzeviciute & Butkus, 2016). The primary reasons for migration can be classified as economic or political reasons. The two factors that constitute the migration process are: (i) push factors[6], and (ii) pull factors[7] (McAuliffeM, 2021). Over the past 50 years, the estimated numbers of international migrants have significantly increased as of 2020, nearly 281 million people lived in a country different from their country of birth, an increase of 128 million compared to 1990, when the estimated numbers were 153 million (McAuliffeM, 2021). This represents a more than threefold increase from the estimated number of international migrants in 1970, which were 84 million. Table 1.1.2 provides valuable information on migration trends and patterns over the past 50 years and helps understand the factors that have driven migration and its impact on different regions.

There are several economic and political reasons to migrate from developing to developed countries. Economic reasons include lack of employment opportunities, low education and poor healthcare system, and poor quality of life in the developing countries. The political reasons include political instability, violence, and social conflicts. Among all, the obvious incentive for migration from developing to developed countries is differences in the wage

[6]Voluntary or forced migration depending upon the quality of life and employment opportunities.

[7]The need for trained workers in host countries or the need to maintain demographic balance.

level across these countries. In high-income countries, wages are five times higher than in developing countries for the same occupational group (Todaro & Smith, 2012). This wage differential allows them to earn more money and remit part of it to their families left behind. The remittances sent not only improve the consumption pattern of emigrant families but also provide them an opportunity to invest by accumulating financial and physical assets. Economically, migrant remittances provide a significant source of income for households in the home country, which can be used for various purposes.

Table 1.1.2: International Migrants from 1970-2020

Year	Number of international migrants	Migrants (% world's population)
1970	84460125	2.3
1975	90368010	2.2
1980	101983149	2.3
1985	113206691	2.3
1990	152986157	2.9
1995	161289976	2.8
2000	173230585	2.8
2005	191446828	2.9
2010	220983187	3.2
2015	247958644	3.4
2020	280598105	3.6

Source: World Migration Report, International Organization for Migration, 2022

Remittances can also have a positive impact on the development of the home country. For example, they can help to improve access to healthcare and education and reduce poverty and inequality. Remittances can also contribute to developing social networks and community organizations, strengthening social capital, and promoting civic engagement. Additionally, remittances can positively affect the balance of payments in the home country. Moreover, migrant remittances represent a significant source of foreign currency inflows and can help stabilize the economy and make it less vulnerable to external shocks. Table 1.1.3 provides information regarding the inflow of migrant remittances in absolute and as a percentage of GDP. It is evident from table 1.1.3 that the total amount of migrant remittances in 1980 was 37,016.42 million

USD[8]. By 2000, migrant remittances had increased significantly to 121,769.73 million USD. In 2020, the total amount of migrant remittances reached 658,064 million USD, indicating a substantial growth in migrant remittances over the past four decades. Moreover, Figure 1.4.3 shows the inflow of remittances across regions and income groups, and Figure 1.4.4 shows the outflows of migrant remittances across regions and income groups.

Table 1.1.3: Migrant Remittances Inflows from 1980-2020

Year	Remittances receive (In M USD)	Remittances receive (% of GDP)
1980	37016.42	0.42
1990	68440.82	0.40
1995	94547.01	0.32
2000	121769.73	0.37
2005	254095.69	0.54
2010	420073.30	0.64
2015	556018.53	0.75
2020	658064.02	0.79

Source: Data from the World Development Indicators (WDI), World Bank

1.2 Nexus between economic growth and Financial inflows

The relationship between external financial inflows and economic growth is fascinating and significant in economics. External financial inflows such as FDI, foreign aid, and remittances are vital sources of capital for developing countries to support their economic growth. However, the relationship between these inflows and economic growth is complex and is affected by various factors such as political stability, institutional quality, and economic policies. Additionally, the impact of external financial inflows on economic growth varies across countries and regions, making it a complex and multifaceted relationship that requires careful analysis and evaluation. Capital inflows help to fill the resource gap to finance the required investment in

[8]Stands for US dollar

countries with inadequate domestic savings. When a country is experiencing a shortage of domestic savings, it may need more resources to finance the necessary infrastructure, technology, and human capital required to achieve sustainable economic growth. This allows the recipient country to invest and consume can help to spur economic growth and development (Levine, 2001; Driffield & Jones, 2013).

There is a widely accepted theoretical argument that financial globalization can help developing countries accumulate capital by providing access to foreign investments that could increase productivity and more efficient allocation of resources (Slesman et al., 2015). Ultimately, these benefits should result in higher economic growth and more stable consumption patterns. In this context, the neoclassical economic growth theory asserts that the liberalization of the capital accounts of host countries, especially developing countries, attracts foreign capital inflows to promote economic growth. Moreover, capital inflows can complement domestic resources by bringing in foreign capital, technology, and expertise, boosting productivity and economic growth. For example, FDI can bring new technologies and management practices, increasing domestic industries' efficiency and productivity.

Additionally, capital inflows are crucial in maintaining macroeconomic stability as they significantly impact various macroeconomic factors, including domestic monetary conditions, exchange rates, interest rates, foreign exchange reserves, savings, and investments (Chigbu et al., 2015). In addition, external financial inflows such as FDI, remittances, and ODA can contribute to economic growth by providing much-needed capital, expertise, and resources to a country. For example, FDI can create jobs, promote technology transfer, and increase productivity. Moreover, FDI inflows have been found to positively impact technology transfer and the adoption of modern management practices in developing countries (UNCTAD, 2022). At the same time, remittances can promote economic growth through financing consumption and investment (Adams Jr & Page, 2005). Remittances can boost household incomes by reducing poverty and income inequality in recipient countries (Pozo & Amuedo-Dorantes, 2006).

The empirical literature on the relationship between external financial inflows and economic growth has not yielded a consensus. In other words, researchers have yet to agree on whether external financial inflows lead to economic growth and, if so, to what extent. That is why researchers are still inter-

ested in studying the impact of these inflows in order to know the potential impact of external inflows on economic growth. In this context, some studies identify a positive relationship between financial inflows and economic growth. For instance, in case of FDI; 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 context, the study by Balasubramanyam et al. (1996) explore how foreign direct investment (FDI) impacts economic growth. The findings indicate that FDI is particularly effective in countries that have 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 a direct effect of FDI on economic growth in the OECD countries, whereas there is no such link to non-OECD countries. While analyzing the role of FDI and trade in boosting economic growth in 66 selected developing countries throughout 1970-2000, Makki and Somwaru (2004) show that FDI and trade are some of the most critical determinants of economic growth. They further show a 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 prerequisites for FDI-led growth. Furthermore, the author posits that the extent of effectiveness is determined by the complementarity (substitution) between FDI and domestic investment. He also argues that spillovers and knowledge transfer from the host country primarily determine long-term growth in the recipient countries.

Likewise, there are several ways through which remittances influence recipient countries' economic growth. According to Giuliano and Ruiz-Arranz (2009), remittances stimulate investment and help reduce credit constraints in the absence of formal credit markets in low-income countries. In this regard, remittances are primarily used to supplement consumption expenditures of migrant households (Jahjah et al., 2003; Pozo & Amuedo-Dorantes, 2006; Glytsos, 1993), which leads to an increase in demand for goods and services in the economy. Moreover, migrant remittances are also used for productive investment, which boosts economic development in developing countries. Remittances also help bring and adapt cutting-edge technologies, bringing innovation to the industries in the recipient economies (Dzeha et al., 2018). Thus, remittances enhance aggregate consumption and bring productive investment

by raising the saving capacity of the remittance-receiving households (Etowa et al., 2014; Chowdhury, 2016). Resultantly, all these factors lead to cause economic growth.

Similarly, there are several other potential channels through which remittances may directly or indirectly impact economic growth (Chowdhury, 2016). According to Le and Bodman (2011), remittances bring technological diffusion, which entails positive externalities necessary for growth. The amount sent by migrants is also used to attain education and acquire required skills and training to enhance chances to get employment (Lutz, 2010; Pozo & Amuedo-Dorantes, 2006; Kunz, 2008). Moreover, many scholars show positive impacts of remittances on child education (Córdova, 2006; Edwards & Ureta, 2003). In the empirical literature, there are several studies, such as Burnside and Dollar (2000); Catrinescu et al. (2009); Gapen et al. (2009); Driffield and Jones (2013) where migrant remittances, along with other financial inflows, have been used as a component of investment. According to Driffield and Jones (2013), investment primarily consists of public and private investment, wherein ODA and FDI partly finance public investment, and migrant remittances finance private investment.

In addition, the effectiveness of external financial inflows in promoting economic growth depends on the quality of institutions and policies in the recipient countries. For instance, if a country lacks good governance, strong institutions, and sound economic policies, external financial inflows may not be able to bring about sustained economic growth. Therefore, recipient countries must have sound policies and institutions to manage capital inflows effectively. Some key policy measures that can help manage capital inflows include maintaining a stable macroeconomic environment, implementing effective prudential regulations for financial intermediaries, pursuing appropriate exchange rate policies, and promoting more significant domestic savings and investment.

However, on the other hand, excessive reliance on external financial inflows can also have negative consequences, such as creating a dependence on foreign capital and exposing a country to external economic shocks. In addition, certain financial inflows, such as short-term capital flows, can be volatile and unstable, leading to economic instability and financial crises (Chigbu et al., 2015). Furthermore, foreign inflows assist in importing inappropriate technology, distort the domestic income distribution, and encourage a bigger, in-

efficient (Griffin & Enos, 1970). There is another perspective that suggests foreign capital can negatively affect the economic growth of developing countries. This perspective argues that foreign capital does not enhance domestic resources but substitutes for them. However, it is being used up entirely, resulting in a lack of investment in domestic resources, which is detrimental to the long-term growth prospects of the recipient country. Some empirical studies in the field of development economics support this perspective. For example, Rodrik (1999) finds that the benefits of FDI are different across different types of countries and that FDI can have negative spillover effects on the host country's domestic firms.

In essence, external financial inflows in the form of FDI and migrant remittances can facilitate investment and encourage economic growth in the recipient countries, and accessing a range of investment options can also lead to more effective investments and ultimately promote growth in the countries providing the savings (Aizenman et al., 2013). On the other hand, excessive capital inflows can lead to inflation, currency appreciation, and current account deficits, which can all negatively affect the economy. Therefore, the relationship between economic growth and external financial inflows is complex and multifaceted, which requires careful analysis of various factors, such as the type of inflows, the quality of institutions and policies in the recipient country, and the potential risks and benefits of external financial inflows.

1.3 Value added of the thesis and main results

This thesis contributes to the literature on the impact of external financial inflows on development in general and economic growth in particular. Chapter 2 studies the impact of FDI and migrant remittances on economic growth in 52 developing countries. In the available literature, some research papers study the individual impacts of FDI and migrant remittances on economic growth. For instance in case of FDI, (Curwin & Mahutga, 2014; Lim, 2001; Makki & Somwaru, 2004; Hansen & Rand, 2006) and in case of migrant remittances (Jahjah et al., 2003; Gapen et al., 2009; Giuliano & Ruiz-Arranz, 2009). However, knowing the importance of FDI and migrant remittances and their subsequent impact on economic growth, economists have never properly tried the combined impact of these international financial inflows on economic

growth. Keeping this research gap in mind, this study is an effort to empirically explore the combined impact of these inflows on economic growth.

Additionally, we will identify a transmission channel through which FDI and migrant remittances impact economic growth. For our empirical strategy, we follow the seminal work of Mankiw et al. (1992), Giuliano and Ruiz-Arranz (2009), and Driffield and Jones (2013). In this respect, we investigate the impact of FDI and migrant remittances on economic growth and introduce the interaction of FDI and migrant remittances. Furthermore, we use TFP as a transmission channel to analyze the impact of FDI and migrant remittances on economic development in developing countries. The increase in TFP can result from technology spillovers from foreign companies that bring in advanced production techniques and knowledge, which can enhance the productive capacity of domestic firms. The impact of migrant remittances on TFP, as remittances, can potentially influence TFP through their effects on investment in physical and human capital, innovation, and entrepreneurship in recipient countries. Therefore, TFP is a potential transmission channel to analyze the impact of FDI and migrant remittances on economic development in developing countries. By doing so, we can gain a more comprehensive understanding of the mechanisms through which FDI and migrant remittances affect economic growth and economic development in developing countries.

Our findings indicate a positive link between economic growth and FDI, while no such link exists in the case of migrant remittances. Furthermore, to check the combined impact of FDI and migrant remittances, we introduce the interaction of FDI and migrant remittances. We do not find any significant relationship between economic growth and the interaction of FDI and migrant remittances. This result suggests that while FDI may individually impact economic growth, the interaction between these two factors does not contribute significantly to economic growth. Moreover, we use TFP as a transmission channel to investigate the relationship between FDI and migrant remittances and check recipient economies' productivity growth. According to our results, we find a negative link between TFP and FDI, which means that an increase in FDI may not necessarily improve productivity growth. However, we find a positive and statistically significant coefficient for the interaction of FDI and remittances. This means that when FDI and migrant remittances work together, they have a significantly positive impact on TFP than when they work separately. This indicates a strong complementarity between these two finan-

cial inflows in promoting productivity growth in recipient economies.

Then chapter 3 draws on the role of migrant remittances on economic complexity in a sample of 121 economies. The objective of the research study is to examine the impact of migrant remittances on economic complexity, focusing on understanding how remittances affect economic diversification, innovation, and productivity. Specifically, the study aims to explore the following research questions:

- How do migrant remittances affect economic complexity, as measured by indicators such as the Economic Complexity Index (ECI)?
- What are the mechanisms through which remittances impact economic complexity, including the role of education/ human capital development in supporting remittances in bringing economic diversification?
- Do the effects of remittances on economic complexity vary across different types of economies, such as low-income versus middle-income countries, by including regional and income dummies to check for regional and income heterogeneities?

By addressing these questions, the study aims to help improve understanding of the economic effects of remittances and inform policies and interventions aimed at leveraging remittances to promote economic development and diversification. Although our results show a negative link between economic complexity and remittances, they reveal interesting findings when the analysis is more precise. We find that the interaction of migrant remittances and education is positively associated with economic complexity. Specifically, we find that the positive effect of migrant remittances on economic complexity is amplified in the presence of higher education levels. These findings suggest that while migrant remittances may not necessarily lead to economic complexity on their own, they can contribute to it when combined with higher levels of education. Our study sheds light on the potential role of education in maximizing the positive impact of remittances on economic development. The coefficient for the interaction term is not only positive but also significant. It suggests that the positive relationship between remittances and economic complexity is stronger among countries with higher levels of education.

Chapter 4 analyzes the role of sectoral-level greenfield FDI on economic growth in both developing and developed economies. Numerous studies have

been conducted regarding the effects of economic growth on aggregated FDI levels (Balasubramanyam et al., 1996; Borensztein et al., 1998; Alfaro et al., 2004, 2008) as well as some at disaggregated or sector level FDI (Alfaro, 2003; Dar et al., 2016; Chaudhury et al., 2020). These studies have discussed in detail the impact of FDI on economic growth. However, to the best of our knowledge, no research has been done on using greenfield FDI data at the sectoral level on economic growth separately. Our analysis uses the data on greenfield FDI at the country level. Furthermore, we incorporate the sector-level greenfield FDI into our study in order to check their impact on economic growth. Using 2SLS regression analysis, we find that the overall impact of greenfield FDI on economic growth is positive and statistically significant. Moreover, at the sector level, the manufacturing sector is the main driver in stimulating economic growth. The impact of manufacturing sector FDI on economic growth is statistically significant and positive. In the case of the extractive and services sectors, the links are found to be ambiguous. Our robust results indicate that FDI inflows into the manufacturing sector can positively impact economic growth.

Furthermore, the positive impact of greenfield FDI on the manufacturing sector can be attributed to various factors, such as the transfer of technology, increased competition, job creation, and increased productivity. These factors can help to spur innovation, enhance efficiency, and ultimately increase output in the manufacturing sector. Moreover, we also use some institutional indicators, showing that countries with strong institutional frameworks help improve the impact of FDI on economic growth. In contrast, we found no association between the mining/ extractive industries and services sectors with economic growth. A key policy implication of our finding is that greenfield FDI directed towards the manufacturing sector is more helpful in bringing economic development and increasing overall welfare. Although, a favorable political and social environment is required for productive investment. In this respect, a well-developed institutional framework and enabling environment are necessary to ripe the benefits of any FDI. In short, these findings indicate that greenfield FDI is just as important as any type of FDI, such as mergers and acquisitions (M&A). Similarly, at the sectoral level, greenfield FDI has a similar impact across sectors like overall FDI.

1.4 Appendix

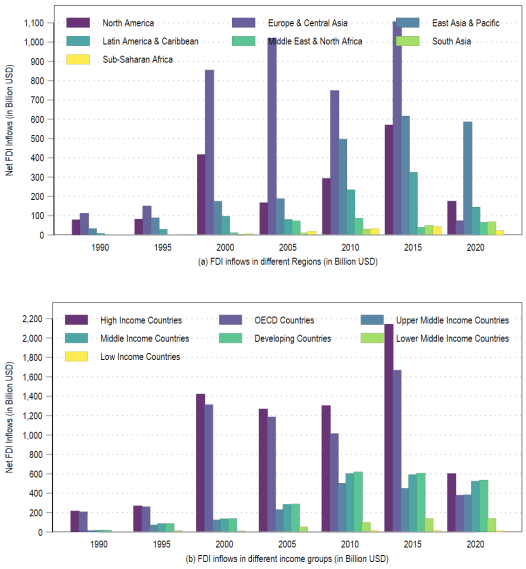


Figure 1.4.1: FDI Inflows across Regions and Income Groups. Source: Data from the World Development Indicators (WDI), World Bank

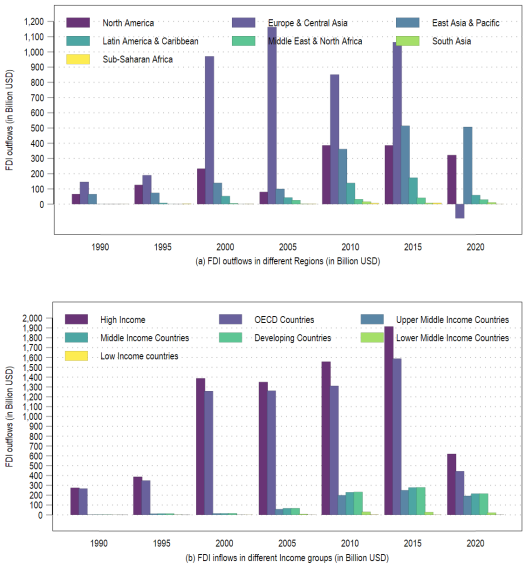


Figure 1.4.2: FDI Outflows across Regions and Income Groups. Source: Data from the World Development Indicators (WDI), World Bank

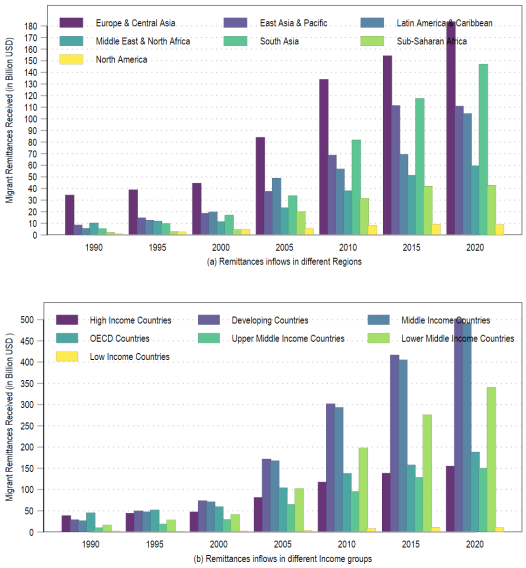


Figure 1.4.3: Migrant Remittances Inflows across different Regions and Income Groups. Source: Data from the World Development Indicators (WDI), World Bank

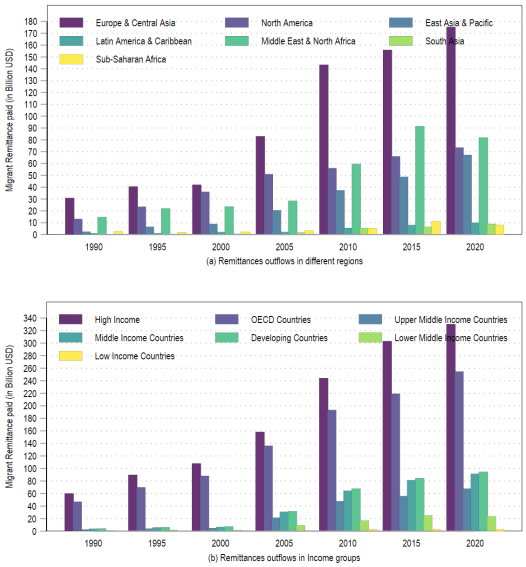


Figure 1.4.4: Migrant Remittances Outflows across Regions and Income Groups. Source: Data from the World Development Indicators (WDI), World Bank

References

Acemoglu, D. (2012). Introduction to economic growth. *Journal of Economic Theory*, *147*(2), 545–550.

Adams Jr, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, *33*(10), 1645–1669.

Ahmed, V., Sugiyarto, G., & Jha, S. (2010). Remittances and household welfare: A case study of Pakistan. *Asian Development Bank Economics Working Paper Series*(194).

Aizenman, J., Jinjarak, Y., & Park, D. (2013). Capital flows and economic growth in the era of financial integration and crisis, 1990–2010. *Open Economies Review*, *24*, 371–396.

Alfaro, L. (2003). Foreign direct investment and growth: Does the sector matter. *Harvard Business School*, *2003*, 1–31.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). Fdi and economic growth: the role of local financial markets. *Journal of International Economics*, *64*(1), 89–112.

Alfaro, L., Kalemli-Ozcan, S., & Volosovych, V. (2008). Why doesn't capital flow from rich to poor countries? an empirical investigation. *The Review of Economics and Statistics*, *90*(2), 347–368.

Balasubramanyam, V. N., Salisu, M., & Sapsford, D. (1996). Foreign direct investment and growth in EP and IS countries. *The Economic Journal*, *106*(434), 92–105.

Barajas, A., Chami, R., Fullenkamp, C., Gapen, M., & Montiel, P. J. (2009). Do workers' remittances promote economic growth? *Available at SSRN 1442255*.

Barro, R. J. (1991). Economic growth in a cross-section of countries. *The Quarterly Journal of Economics*, *106*(2), 407–443.

Borensztein, E., De Gregorio, J., & Lee, J.-W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, *45*(1), 115–135.

Burnside, C., & Dollar, D. (2000). Aid, policies, and growth. *American Economic Review*, *90*(4), 847–868.

Catrinescu, N., Leon-Ledesma, M., Piracha, M., & Quillin, B. (2009). Remittances, institutions, and economic growth. *World Development*, *37*(1), 81–92.

Chaudhury, S., Nanda, N., & Tyagi, B. (2020). Impact of FDI on economic growth in south asia: Does nature of FDI matters? *Review of Market Integration*, *12*(1-2), 51–69.

Chigbu, E. E., Promise, U. C., et al. (2015). Impact of capital inflows on economic growth of developing countries. *International Journal of Management Science and Business Administration*, *1*(7), 7–21.

Chowdhury, M. (2016). Financial development, remittances and economic growth: Evidence using a dynamic panel estimation. *Margin: The Journal of Applied Economic Research*, *10*(1), 35–54.

Combes, J.-L., Kinda, T., Ouedraogo, R., & Plane, P. (2019). Financial flows and economic growth in developing countries. *Economic Modelling*, *83*, 195–209.

Córdova, J. E. L. (2006). *Globalization, migration and development: the role of mexican migrant remittances (working paper itd= Documento de Trabajo itd; n. 20)* (Vol. 20). BID-INTAL.

Crafts, N., & Woltjer, P. (2021). Growth accounting in economic history: findings, lessons and new directions. *Journal of Economic Surveys*, *35*(3), 670–696.

Curwin, K. D., & Mahutga, M. C. (2014). Foreign direct investment and economic growth: New evidence from post-socialist transition countries. *Social Forces*, *92*(3), 1159–1187.

Dar, A. A., Bhatti, H. M. A., & Muhammad, T. (2016). FDI and economic growth in Pakistan: A sector wise multivariate cointegration analysis. *The Pakistan Development Review*, 67–88.

Das, A., & Sethi, N. (2020). Effect of foreign direct investment, remittances, and foreign aid on economic growth: Evidence from two emerging South Asian economies. *Journal of Public Affairs*, *20*(3), 2043.

De Mello, L. R. (1999). Foreign direct investment-led growth: Evidence from time series and panel data. *Oxford Economic Papers*, *51*(1), 133–151.

Driffield, N., & Jones, C. (2013). Impact of FDI, ODA and migrant remittances on economic growth in developing countries: A systems approach. *The European Journal of Development Research*, *25*(2), 173–196.

Dzeha, G. C. O., Turkson, F. E., Agbloyor, E. K., & Abor, J. Y. (2018). Total factor productivity growth and human development: The role of remittances in Africa. *African Journal of Economic and Sustainable Development*, *7*(1), 47–72.

Edwards, A. C., & Ureta, M. (2003). International migration, remittances, and schooling: Evidence from El Salvador. *Journal of Development Economics*, *72*(2), 429–461.

Etowa, E. B., Nweze, N. J., & Arene, C. J. (2014). Effects of migrant remittances on farm household welfare in Nigeria. *Review of Agricultural and Applied Economics (RAAE)*, *18*(395-2016-24341), 3–10.

Gapen, M. T., Chami, M. R., Montiel, M. P., Barajas, M. A., & Fullenkamp, C. (2009). *Do workers' remittances promote economic growth?* (No. 9-153). International Monetary Fund.

Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, *90*(1), 144–152.

Glytsos, N. P. (1993). Measuring the income effects of migrant remittances: A methodological approach applied to Greece. *Economic Development and Cultural Change*, *42*(1), 131–168.

Griffin, K. B., & Enos, J. L. (1970). Foreign assistance: Objectives and consequences. *Economic Development and Cultural Change*, *18*(3), 313–327.

Grossman, G. M., & Helpman, E. (1991). *Innovation and growth in the global economy*. MIT press.

Hansen, H., & Rand, J. (2006). On the causal links between FDI and growth in developing countries. *World Economy*, *29*(1), 21–41.

Ivić, M. M. (2015). Economic growth and development. *Journal of Process Management and New Technologies*, *3*(1), 55–62.

Jahjah, S., Chami, R., & Fullenkamp, C. (2003). *Are immigrant remittance flows a source of capital for development?* (Tech. Rep.). International Monetary Fund.

King, R. G., & Levine, R. (1994). Capital fundamentalism, economic development, and economic growth. In *Carnegie-Rochester Conference Series on Public Policy* (Vol. 40, pp. 259–292).

Kunz, R. (2008). Remittances are beautiful? gender implications of the new global remittances trend. *Third World Quarterly*, *29*(7), 1389–1409.

Kuznets, S., & Murphy, J. T. (1966). *Modern economic growth: Rate, structure, and spread* (Vol. 2). Yale University Press New Haven.

Le, T., & Bodman, P. M. (2011). Remittances or technological diffusion: which drives domestic gains from brain drain? *Applied Economics*, *43*(18), 2277–2285.

Levine, R. (2001). International financial liberalization and economic growth. *Review of International Economics*, *9*(4), 688–702.

Lim, M. E.-G. (2001). *Determinants of, and the relation between, foreign direct investment and growth: a summary of the recent literature* (No. 1-175). International Monetary Fund.

Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, *22*(1), 3–42.

Lutz, H. (2010). Gender in the migratory process. *Journal of Ethnic and Migration Studies*, *36*(10), 1647–1663.

Makki, S. S., & Somwaru, A. (2004). Impact of foreign direct investment and trade on economic growth: Evidence from developing countries. *American Journal of Agricultural Economics*, *86*(3), 795–801.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics*, *107*(2), 407–437.

Matuzeviciute, K., & Butkus, M. (2016). Remittances, development level, and long-run economic growth. *Economies*, *4*(4), 28.

McAuliffeM, T. A. (2021). World migration report 2022. *International Organization for Migration (IOM), Geneva//https://publications. iom. int/books/world-migration-report-2022, accessed*, *20*, 2022.

Pegkas, P. (2015). The impact of FDI on economic growth in Eurozone countries. *The Journal of Economic Asymmetries*, *12*(2), 124–132.

Pozo, S., & Amuedo-Dorantes, C. (2006). Remittances as insurance: Evidence from Mexican migrants. *Journal of Population Economics*, *19*(2), 227–254.

Rajan, R. G., & Subramanian, A. (2008). Aid and growth: What does the cross-country evidence really show? *The Review of Economics and Statistics*, *90*(4), 643–665.

Rodrik, D. (1999). Where did all the growth go? external shocks, social conflict, and growth collapses. *Journal of Economic Growth*, *4*(4), 385–412.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, *94*(5), 1002–1037.

Slesman, L., Baharumshah, A. Z., & Wohar, M. E. (2015). Capital inflows and economic growth: Does the role of institutions matter? *International Journal of Finance & Economics*, *20*(3), 253–275.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, *70*(1), 65–94.

Tiwari, A. K., & Mutascu, M. (2011). Economic growth and FDI in ASIA: A panel-data approach. *Economic Analysis and Policy*, *41*(2), 173–187.

Todaro, M. P., & Smith, S. C. (2012). Economic development 11th ed. *Pearson, Addison Wesley: New York-USA.*.

UNCTAD. (2022). *World investment report 2022: International tax reforms and sustainable investment*. UN.

Vadlamannati, K. C., & Tamazian, A. (2009). Growth effects of FDI in 80 developing economies: The role of policy reforms and institutional constraints. *Journal of Economic Policy Reform*, *12*(4), 299–322.

Chapter 2

FDI, Remittances and Economic Growth: Do FDI and Remittances improve Total Factor Productivity?

Abstract

This study investigates the impact of FDI and migrant remittances on economic growth directly and indirectly through a transmission channel. In this respect, we use a panel of 52 developing countries from 1990 to 2017. Using the system GMM estimation technique, our findings indicate a positive link between economic growth and FDI, while no such link exists in the case of migrant remittances. Furthermore, to check the combined impact of FDI and migrant remittances, we introduce the interaction of FDI and migrant remittances. Our analysis shows that the interaction between FDI and migrant remittances does not significantly impact economic growth. This result suggests that while FDI and migrant remittances may impact economic growth individually, the interaction between these factors does not appear to contribute significantly to economic growth. Moreover, we use total factor productivity (TFP) as a transmission channel to investigate the relationship between FDI and migrant remittances and to check the productivity growth in recipient economies. According to our results, we find a negative link between TFP and FDI, which means that an increase in FDI may not necessarily improve productivity growth. However, we find a positive and statistically significant coefficient for the interaction of FDI and remittances. These results indicate a strong complementarity between these two financial inflows in promoting productivity growth in recipient economies. In other words, when FDI and migrant remittances work together, they have a significantly more positive impact on TFP than when they work separately.

Keywords: Economic growth, FDI, Remittances, TFP, GMM, Developing countries
JEL: C23 F24 O41

2.1 Introduction

Capital accumulation, technological advancement & innovation, and improvement in the capital are some of the prerequisites for economic development (Solow, 1956; Romer, 1990; Aghion & Howitt, 1992). Denault (2011) argues that local or external capital 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 in the race for economic development. As a result, they cannot fully exploit the domestically available resources. So, to sustain economic growth, the economic agendas of 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 & Ulubaşoğlu, 2015). Moreover, these external financial inflows can boost savings and improve the ability to import goods by removing the constraints linked with them (Comes et al., 2018).

Despite several economic owes associated with developing countries, there is still huge potential for economic expansion and better avenues for investment, mainly due to the abundance and unexploited natural resources, availability of large and cheap labor force, etc. Based on these potentials, investors are always keen on investing in developing countries. On the other hand, industries and firms in advanced economies seek cheap labor to smooth economic activities. Because of their sizable populations, developing countries offer inexpensive labor to countries experiencing a labor shortage. As a result, these developing countries receive significant external capital inflows in the form of FDI and migrant remittances.

The recent international financial integration resulting from a significant rise in 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 have also generated policy questions regarding the determinants of growth in the economy. Previously, savings, human resource stock, and financial and political institutions were considered key factors in determining economic growth (Mankiw et al., 1992; Romer, 1986; Solow, 1956). Along with domestic factors, external financial inflows such as FDI, remittances, official development assistance (ODA), and other financial inflows are crucial in determining economic growth (Borensztein et al., 1998; Jahjah et al., 2003; Alfaro et al., 2004; Gapen et al., 2009). The substantial increase in external inflows such as FDI and migrant remittances has many considerable positive impacts on economic development. Most importantly, these inflows are considerably helpful in alleviating poverty and other economic miseries across the globe. Furthermore, they also promote investment and consumption, ameliorate living standards, stimu-

late economic growth, and potentially increase welfare in developing countries.

A significant restructuring in international capital flows has been observed globally 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. In contrast, a decreasing trend in foreign aid and other inflows has been witnessed in recent years. Figures 2.1.1(a) and 2.1.1(b) provide information regarding different financial inflows for the world and developing countries. These charts indicate that both FDI and remittances are substantial sources of inflows worldwide and in developing countries. While in the past, foreign aid or ODA was considered one of the most important sources of foreign exchange for developing countries (Joshi, 2016).

(a) External Inflow in the World

(b) External Inflow in the Developing Countries

Figure 2.1.1: Inflows of FDI, Remittances, and ODA to the World and Developing Countries. Source: Data from WDI, World Bank

Nevertheless, with the rising importance of FDI and remittances as sources of developing finance, the focus has been shifted towards these reliable and more stable sources of foreign exchange. These financial inflows contribute to developing countries' economic well-being in several ways. Additionally, they contribute to the modernization of the host economies by delivering modern technology and transferring technical know-how. Furthermore, they also play a fundamental role in economic growth by providing capital and creating 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.

Given the growing importance and potential for growth of FDI and migrant remittances to developing countries, it is essential to study the possible impact of these

capital flows on economic development, particularly economic growth. This study focuses mainly on the role of FDI and migrant remittances in economic growth in the sample of developing countries. Furthermore, identifying a transmission channel through which these external inflows determine the direction of economic growth. It is worth noting that several studies are available in the literature investigating the effects of FDI and migrant remittances on economic growth. For instance in case of FDI, (Curwin & Mahutga, 2014; Lim, 2001; Makki & Somwaru, 2004; Hansen & Rand, 2006) and in case of migrant remittances (Jahjah et al., 2003; Gapen et al., 2009; Giuliano & Ruiz-Arranz, 2009). However, knowing the importance of FDI and migrant remittances and their subsequent impact on economic growth, economists have never properly tried the combined impact of these international financial flows on economic growth. Keeping this research gap in mind, this study is an effort to empirically explore the combined impact of these inflows on economic growth. Additionally, identifying a transmission channel through which they impact economic growth. This study will be an addition to the body of available literature.

The rest of the paper is organized as follows: section 2.2 highlights some important stylized facts about remittances and FDI. Section 2.3 provides a detailed description of the available literature on the subject matter, and section 2.4 demonstrates academic standings and economic channels through which remittances and FDI impact economic growth. Section 2.5 explains the empirical strategy and the data. Section 2.6 discusses empirical findings, and section 2.7 concludes.

2.2 FDI and Migrant Remittances: Stylized Facts

FDI and migrant remittances are two important sources of external capital inflows in many developing countries. FDI provides local businesses with financing and expertise, creating jobs and improving productivity. On the other hand, immigrant remittances to their countries of origin directly help families and communities and contribute to economic development by promoting consumption, savings, and investment. Recently, special attention has been given to migrant remittances and FDI owing to their potential rise towards developing countries. According to World Bank (2019), 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 worldwide, which increased to 1968 billion USD in 2017, which indicates multiple folds rise in FDI. Similarly, if we glance at the inflow of FDI to developing countries, we can easily find a visible growth in this inflow from 21 billion USD to 549 billion USD from 1990 to 2017, respectively. In a similar manner, a po-

tential rise in the inflow of migrant remittances has been witnessed in the last three decades. In this context, the total amount of remittances worldwide was 68 billion USD in 1990, which increased to 594 billion USD in 2017. Likewise, huge inflows of remittances are also diverted toward developing countries. In this respect, in 1990, the number of remittances received by developing countries was 29 billion USD only, which 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 2.2.1 details the inflow of FDI and migrant remittances to the world and developing countries.

Table 2.2.1: The Inflow of FDI and Migrant Remittances to the World and 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.

Moreover, it is imperative to survey and compare the inflows of migrant remittances and FDI across regions and income groups and trends over a period of time. 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 have remained an issue for policymakers and researchers. In this respect, we highlight the inflows of migrant remittances and FDI to different regions and income groups. Figures 2.2.1 and 2.2.2 provide information regarding inflows of FDI and remittances in the last four decades, respectively. Moreover, inflows of FDI as a percentage of GDP, outflows of FDI in absolute value and as a percentage of can be seen in Figures 2.8.1, 2.8.2 and 2.8.3 respectively. Similarly, the inflow of remittances as a percentage of GDP, the outflow of FDI in absolute terms and as a percentage of GDP can be seen in Figures 2.8.4, 2.8.5, 2.8.6, respectively.

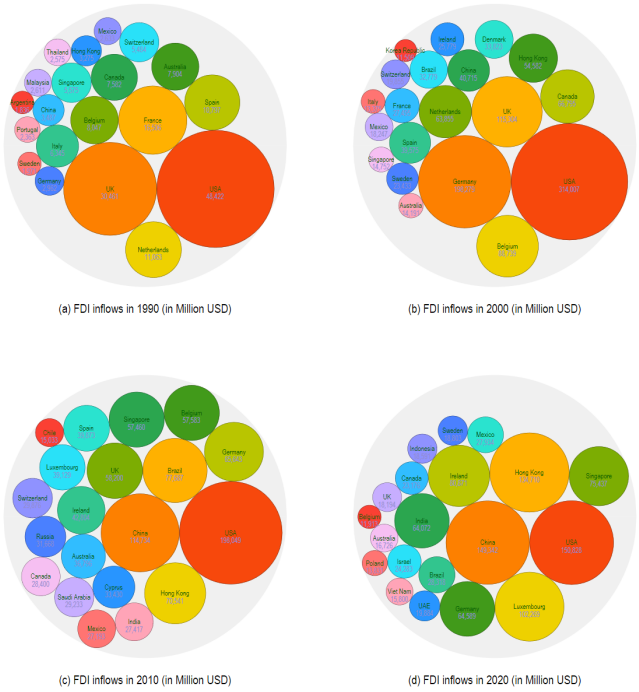
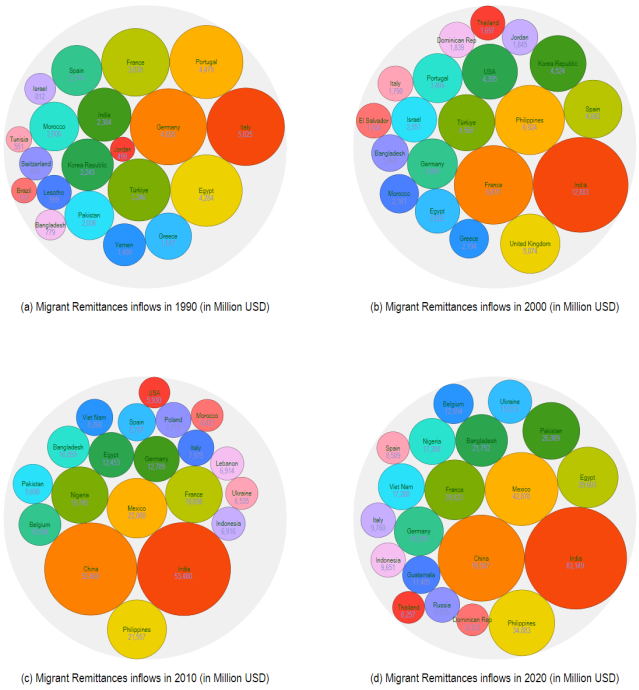


Figure 2.2.1: FDI Inflows in the Years 1990, 2000, 2010, and 2020 (In Million USD). Source: Data are from UNCTAD

Policymakers and researchers are keen on identifying the potential benefits of these inflows in promoting economic development. We glance at the individual impacts of these two external inflows. In that case, several widespread economic and social significance is associated with them both for the host and recipient countries. In this regard, several theoretical and empirical studies have been carried out in the last three decades. Now, let us first look at the economic impacts of foreign remittances. Foreign remittances are important in increasing foreign exchange reserves in developing countries. Migrant remittances are more stable in nature in comparison with other capital inflows (Ratha, 2003; Gopalan & Rajan, 2009), reduce poverty (Adams Jr & Page, 2005; Imai et al., 2014), ensure consumption against negative shocks (Pozo & Amuedo-Dorantes, 2006; Combes & Ebeke, 2011), reduce macroeconomic volatility (Fullenkamp et al., 2008; Jawaid & 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 & Brown, 1995) as well as in human capital (Barguellil et al., 2013), improve the welfare of households, and alleviate credit constraints (Fullenkamp et al., 2008) and increase the income of recipient families (Taylor, 1999).



(a) Migrant Remittances inflows in 1990 (in Million USD)

(b) Migrant Remittances inflows in 2000 (in Million USD)

(c) Migrant Remittances inflows in 2010 (in Million USD)

(d) Migrant Remittances inflows in 2020 (in Million USD)

Figure 2.2.2: Migrant Remittances Inflows in the Years 1990, 2000, 2010, and 2020. Source: Data are from UNCTAD

In recent years, an unprecedented inflow of FDI has been witnessed (Escaleras & Register, 2011). It is still one of the most significant and stable sources of external finance and exceeds by far the sum of commercial bank loans and official inflows (Kosack & Tobin, 2006). In addition, numerous direct and indirect advantages are associated with the inflow of FDI in advancing global economic development. Firstly, FDI is 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 & Ulubaşoğlu, 2015). It also promotes economic growth in the host countries (Borensztein et al., 1998; Alfaro et al., 2004). In comparison with other external sources of capital, FDI is considered potentially more beneficial to developing countries due to its numerous advantages. FDI helps in boosting productive capacity and supplements employment and trade. Furthermore, it brings knowledge through the acquisition of skills and labor training. Additionally, FDI introduces new production processes and creates backward and forward linkages. Lastly, it provides domestic firms access to foreign markets (Iamsiraroj & Ulubaşoğlu, 2015). FDI helps stimulate economic capital accumulation through a well-developed financial system (Wang & Wong, 2009).

Along with several benefits, some disadvantages are associated with inflows of

migrant remittances and FDI. In the case of migrant remittances, such as brain drain, where highly educated and skilled laborers leave their country of origin with the motive to find high-paid jobs in other countries. This brain drain has twofold disadvantages. On the one hand, highly qualified and skilled labor is scarce in developing countries. On the other hand, the government has also invested a lot of money and time in training and education. When these people leave their countries, they deprive of their services and require tremendous 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 the appreciation of foreign exchange rate (Pozo & Amuedo-Dorantes, 2006). This may hamper international competitiveness and adversely influence manufacturing and tradable goods (Acosta et al., 2009) in (Tahir et al., 2019). There is also a possibility of moral hazard and Dutch disease-like problems, which might slow down 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, many remittances may lead to a surge in the consumption of imported goods and services (Lipton, 1980; Russell, 1986), which might reduce demand for domestically produced goods and services.

Similarly, 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 the inflow of FDI to host countries. Haddad and Harrison (1993) are not even sure about the existence of spillover effects from FDI. In addition to these, several types of FDI have different effects on capital accumulation and economic growth. In this respect, some may not impact capital accumulation, such as mergers and acquisitions (Agosin & Machado, 2005). According to Driffield and Jones (2013), the impact of FDI through the spillover effect may have no outcome on domestic productivity but rather just a transfer of resources from domestic to foreign residents.

2.3 Review of Literature

Policymakers and academics have discussed the recent potential increase in external financial flows. They are more interested in the pros and cons of these inflows to host and source countries. Among all, FDI and migrant remittances have recently gotten special attention in policymakers' and researchers' eyes. 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 the last three decades.

As a result of these efforts, a considerable body of literature has been available both for FDI and migrant remittances and their subsequent relationship with economic growth. Although researchers have no explicit agreement on the link between FDI and migrant remittances with economic growth, ambiguity still exists. 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.

2.3.1 FDI and Economic Growth

The literature related to the 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 a positive association between economic growth and FDI, and the second strand ascertains a negative link between FDI and economic growth. In contrast, 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 (Grossman & Helpman, 1991; Aitken & Harrison, 1999; Makiela & Ouattara, 2018; Azman-Saini et al., 2010). However, in the empirical literature, this association is more complex than described in the theoretical framework, even though FDI helps accumulate capital (Neuhaus, 2006), promotion of technology, and transfer of knowledge (De Mello, 1999). According to Almfraji and Almsafir (2014), sample selection, period, model selection/ econometric methodologies are some of the factors mainly responsible for variation in the empirical results in FDI-growth literature.

Several empirical studies identify a 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 a 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 the host country primarily determine long-term growth in the recipient countries. While analyzing the role of FDI and trade in boosting economic growth in 66 selected developing countries throughout 1970-2000, Makki and Somwaru (2004) show that FDI and trade are some of the most critical determinants of economic growth. They further show a strong positive interaction be-

tween 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 prerequisites for FDI-led growth. Furthermore, the authors posit that the extent of effectiveness is determined by the complementarity (substitution) between FDI and domestic investment.

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

On the contrary, Carkovic and Levine (2002); 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 (2002), there is no direct and robust link between FDI and economic growth. Furthermore, Alvarado et al. (2017) examines the link between economic growth and FDI in 19 Latin American countries for 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 only causes growth in high-income countries. Likewise, 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 an economic contraction in the economy. Moreover, Durham (2004) finds no positive link between economic growth and FDI. Likewise, Feeny et al. (2014a) empirically shows that the 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. In this regard, Borensztein et al. (1998); Xu (2000); X. Li and Liu (2005) and Kottaridi and Stengos (2010) link the effectiveness of FDI with a 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. It plays a positive role in the transfer of technology. However, the extent of this relationship is linked to the availability of a 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 a certain minimum level of human capital stock. Furthermore, X. Li and Liu (2005) empirically shows that FDI positively affects economic growth directly and indirectly through the interaction of human capital. In addition, Kottaridi and Stengos (2010) show a robust positive link between FDI and economic growth in the presence of nonlinear human development.

Another critical channel through which FDI impacts economic growth is financial development. Financial development and depth are key factors that help determine sustainable economic growth in an economy. Knowing the importance of financial development, Alfaro et al. (2004) and Samargandi et al. (2015) examine the relationship between FDI and economic growth through channels 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 well-functioning and developed financial markets. Similarly, Samargandi et al. (2015) examine the link between FDI and economic growth in 52 countries from 1980-2008. They employ Principal Component Analysis (PCA) and Autoregressive Distributed Lag (ARDL) models, showing that FDI contributes positively to economic growth in a well-functioning financial system.

TFP is another important aspect of economic growth theory. In literature, it is widely accepted that FDI promotes economic growth by improving 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); C. 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 the industry level. They utilize ten manufacturing sectors for 17 OECD countries from 1973-2001. According to the authors, inward FDI positively impacts domestic productivity, whereas outward FDI harms domestic productivity. Similarly, Woo (2009) and Wang and Wong (2009) explore a positive association between FDI and TFP (Wang & Wong, 2009). Likewise, C. Li and Tanna (2019) examine the link between FDI and TFP in the cross-country analysis of 51 low and lower-middle-income countries for 1984-2010. They show a weak but direct effect of FDI on TFP. However, this impact is enhanced by introducing interaction terms in the model. They also argue that strong institutions are a prerequisite for attaining the fruits of FDI-TFP-led growth.

In contrast to the above, Ng (2006) studies 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. According to the author, open economies enjoy the ben-

efits of external financial inflows, and FDI does not directly affect economic growth; rather, the effect of FDI depends on the host country's level of economic freedom. Whereas Azman-Saini et al. (2010) links the impact of FDI on economic growth with economic freedom. Whereas, Makiela and Ouattara (2018) consider the role of FDI on economic growth by identifying 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. In contrast, Malikane and Chitambara (2017) investigate the impact of FDI on productivity growth by utilizing a panel of 45 African countries from 1980 to 2012. They apply two measures of backwardness, such as the distance from the technological frontier and the income gap. To obtain results, they apply the fixed effect and system GMM methodologies. They show a 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 the regional level, Rothgeb Jr (1988) studies this relationship in Latin American and African countries, whereas Sadik and Bolbol (2001) in Arab countries. Likewise, Bevan, Estrin, and Meyer (2004) study the impact of FDI in transition economies and Adams (2009) in Sub-Saharan Africa (SSA) countries. In this respect, using multiple regression analysis, Rothgeb Jr (1988) finds a positive association between FDI and economic growth from 1967 to 1978 in Latin American and African countries. Furthermore, he also shows that FDI significantly affects economic growth in the transport, telecommunication, and construction sectors, whereas negative/no impact is in the case of the mining sector.

Additionally, Sadik and Bolbol (2001) show a positive link between FDI and economic growth in six Arab countries. While Adams (2009) examines the link among FDI, private investment, and economic growth. He utilizes data from 42 Sub-Saharan African countries (SSA) from 1990-2003 and empirically shows the link between FDI and domestic investment. Furthermore, he shows that FDI inflows erode domestic investment. Similarly, several papers link the relationship between FDI and economic growth at the 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.

2.3.2 Remittances and Economic Growth

The effects of remittances on growth have been discussed extensively in the literature on remittance and growth. Like FDI, migrant remittances are not only important for migrant households but also critical 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, the 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 the household level. Nevertheless, we cannot deny the role of remittances at the macro level. Remittances are also one of the essential sources 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 a discrepancy in data on remittances, different 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 growth in the available literature.

As discussed previously, the literature does not clarify the relationship between remittances and economic growth. In this regard, one strand of the literature tries to find the positive effects of remittances on economic growth. Accordingly, Pradhan et al. (2008) examine the link between remittances and economic growth in 39 developing countries from 1980 to 2004. They apply fixed and random effect models and show a positive association between remittances and economic growth. Similarly, 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. By employing the GMM estimation methodology, he finds a positive association between remittances and economic growth directly and indirectly through saving and expenditure on education. In addition, Chowdhury (2016) investigates the effect of remittances on economic growth through financial development by utilizing the system GMM model in 33 top remittance-receiving countries for 1979-2011. He shows a 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 a negative impact on economic growth (Jahjah et al., 2003; Gapen et al., 2009; Rao & Hassan, 2011; Bettin & Zazzaro, 2012; Feeny et al., 2014b). 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 to this phenomenon as a moral hazard problem. Ultimately, it 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

for 1970-2004, show that remittances have no significant positive and robust impact on long-term economic growth but 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 the remittances to GDP ratio is one percent or more. They apply the 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 link between remittances and economic growth.

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

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

La Porta et al. (1997); Acemoglu et al. (2001) and Rodrik et al. (2004) greatly emphasize the role of institutions in the promotion of economic development. Researchers try to connect remittances and economic growth by including institutional variables in their analysis. To this end, Catrinescu et al. (2009) and Le (2009) show a positive link between remittances and economic growth by including policy and institutional variables in their empirical analysis. On the other hand, Abdih et al. (2012) show that the abundance of remittances is not beneficial for institutional development in developing countries. They argue that with the abundance of remittances, public institutions are more inclined to corrupt practices as citizens do not make them accountable for delivering public services because remittances act as a buffer between public institutions and citizens. In the same order, Adams and Klobodu (2016) examine the relationships among economic growth, remittances, and regime durability in 33 Sub-Saharan African countries from 1970-2012. They use System GMM 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 the 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) examines the link between remittances and TFP in Bangladesh and India. They show an inverted 'U' shaped link in the case of India, whereas a 'U' shaped link is in the case of Bangladesh. Similarly, Hassan et al. (2016) examine the link between long-term economic growth and remittances using TFP as a dependent variable in their empirical model for Bangladesh. They show that the link between remittances and long-term economic growth is 'U' shaped. They argue that this 'U' shaped relationship is mainly because a 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 for 2010-2014. To address the issue of endogeneity, they utilized system GMM models along with fixed effects and a random effect for their empirical findings. Their empirical results show a positive link between remittances and human development and a negative link between TFP and human resource development. Additionally, they introduce the interaction of remittances and TFP into their empirical analysis and show a 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 a positive one.

2.3.3 Combined Effects of Remittances and FDI

In the previous two subsections, we discuss the available literature where the effect of FDI and remittances on economic growth are studied separately. In this section, we will 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 a panel of developing countries from 1990-2006. They use system GMM and show a positive link between 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 speaks of the importance of migrant remittances in contributing 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 for 1984-2007. They use Three-Stage Least Squares (3SLS) and introduce several institutional interaction terms in their empirical analysis. They show positive effects of remittances and FDI on economic growth and negative in the case of ODA. Similarly, Golitsis, Avdiu, and Szamosi (2018) analyze the impact of migrant remittances and FDI on Albania's economic growth for 1996-2004. They show a positive link between remittances and economic growth in the short and long run, whereas there is no link with FDI.

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

Comes et al. (2018) also study the effect of FDI and migrant remittances on eco-

nomic growth using OLS and Fixed effect models using 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 from 2003 to 2013. He applies both static and dynamic panel estimation methodologies. He finds a statistically significant positive link between FDI and economic growth, whereas there is a negative link between remittances and economic growth. According to Mustafa and Anwar (2017), FDI and remittances are positively associated with economic growth. At the same time, Shahid et al. (2013) shows a positive relationship between economic growth and remittances and a negative link between FDI and economic growth.

2.4 Theoretical and Conceptual Framework

Persistent increase in investment and savings, improvement in human capital, adoption of new technologies, and rise in output are some of the prerequisites for sustainable economic growth. In this regard, different theories have been presented over time for understanding economic growth processes and identifying factors contributing to the mechanism through which these factors affect economic growth. The early models in this regard are the Harrod-Domar growth and Lewis two-sector models. These models explain growth mechanism through investment (Todaro & Smith, 2012). In a similar way, Solow (1956) presented his growth model, which is also considered the beginning of modern literature on economic growth and called the Neo-classical growth model. In Solow's growth model (1956), much of the economic growth is explained by changes in the amount of labor, emphasizing the role of investment. In the mid-1980s, endogenous growth models were developed in which technological progress and technological change (Romer, 1986; Lucas Jr, 1988) 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 challenging to fix the problem regarding determinants of economic growth because several factors are responsible for 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 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 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 (Lueth & Ruiz-Arranz, 2006; Gapen et al., 2009).

According to the two-gap model, most developing countries are constrained with low savings to compensate for their domestic investment or face foreign exchange constraints to finance their import bills. The magnitude of saving and foreign exchange gaps might differ across countries (Todaro & Smith, 2012). Lack of financial resources is a significant obstacle to developing countries' underdevelopment despite being rich in natural resources and the availability of a large labor force. In this regard, external financial inflows such as FDI, remittances, and ODA play a significant role in overcoming these problems and improving economic growth. Among other financial inflows, FDI and migrant remittances are essential in bringing financial capital to countries with low savings and foreign exchange shortages. Below, we explain how 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 (C. Li & Tanna, 2019). According to 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 theorists view FDI as an essential agent in transferring skills through acquiring knowledge, which in turn helps enhance the stock of human capital (Elboiashi, 2011). Additionally, FDI is 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 access new technologies and innovations. These increase productive efficiency and ameliorate overall economic activities in the economies. Likewise, Sodu (2002) explicitly explains how FDI impacts 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, resource use efficiency 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 the transfer of technology, the introduction of new production processes, and improvement in managerial skills. In addition, FDI also helps increase labor productivity (Azman-Saini et al., 2010). Technological diffusion is another channel through which

FDI impacts economic growth (Woo, 2009; Eaton & Kortum, 2001). It is also shown in the available literature that FDI through vertical linkages improves domestic productivity (Javorcik, 2004). Hence, there are several mechanisms through which FDI might affect economic growth and bring economic benefits through capital accumulation, technological transfer, and better administrative procedures.

Likewise, there are several ways through which remittances influence recipient countries' economic growth. In this regard, remittances are primarily used to supplement consumption expenditures of migrant households (Jahjah et al., 2003; Pozo & Amuedo-Dorantes, 2006; Glytsos, 1993), which leads to an increase in demand for goods and services in the economy. Similarly, migrant remittances are also used for productive investment, which boosts economic development in developing countries. Remittances also help bring and adapt cutting-edge technologies, bringing innovation to the industries in the recipient economies (Dzeha et al., 2018). Thus, remittances enhance aggregate consumption and bring productive investment by raising the saving capacity of the remittance-receiving households (Etowa et al., 2014; Chowdhury, 2016). Resultantly, all these factors lead to cause economic growth.

According to Giuliano and Ruiz-Arranz (2009), remittances stimulate investment and help in reducing credit constraints in the absence of formal credit markets in low-income countries. Similarly, 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 an investment to enhance economic capital accumulation. Remittances sent through the formal banking system is another channel that helps increase the aggregate amount of deposit that might affect the economy and ultimately lead to capital accumulation (Dzeha et al., 2018).

According to Le and Bodman (2011), remittances bring technological diffusion, which entails positive externalities necessary for growth. The amount sent by migrants is also used to attain education and acquire required skills and training to enhance chances to get employment (Lutz, 2010; Pozo & Amuedo-Dorantes, 2006; Kunz, 2008). In this respect, many scholars show positive impacts of remittances on child education (Córdova, 2005; Edwards & Ureta, 2003). In the empirical literature, there are several studies Burnside and Dollar (2000); Catrinescu et al. (2009); Gapen et al. (2009); Driffield and Jones (2013) where migrant remittances, along with other financial inflows, have been used as a component of investment. According to Driffield and Jones (2013), investment primarily consists of public and private investment, wherein ODA and FDI partly finance public investment, and migrant remittances finance private investment.

TFP is another determinant of economic growth. Solow (1956) in his classical growth model emphasizes the importance of TFP in determining growth in an econ-

omy which he called an unexplained part of the economic growth equation. According to Prescott (1998), TFP is considered an essential factor in determining labor productivity directly and indirectly through the 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 critical 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, Robinson, et al., 2008; Caselli, 2005; Easterly & Levine, 2002). According to Easterly and Levine (2001), 60% of the variation in growth is explained by TFP. Along with the direct effects of FDI and remittances on economic growth, we will also try to identify indirect links through the channel of TFP.

2.5 Empirical Strategy and Data Description

This section will explain the model specification, data, and description of variables used in the analysis.

2.5.1 Model Specification

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

To examine the impact of remittances and FDI on economic growth, we split the sample into nine non-overlapping three-year averages except for the last period, which we average for four 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 are as follows,

$$GDPG_{i,t} = \beta_0 + \beta_1 GDPG_{i,t-1} + \beta_2 FDIg_{i,t} + \beta_3 Rem_{i,t} + \beta_4 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (2.1)$$

Where $GDPG_{i,t}$ is per capita GDP growth, $GDPG_{i,t-1}$ is lagged per capita GDP, and

$FDIg_{i,t}$ is gross FDI as a percentage of GDP. $Rem_{i,t}$ is the inflow of migrant remittances as a percentage of GDP, $X_{i,t}$ is a matrix of control variables, μ_t is the 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, the 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, Fixed effect models and then introduce system GMM in our analysis.

$$GDPG_{i,t} = \beta_0 + \beta_1 GDPG_{i,t-1} + \beta_2 FDIg_{i,t} + \beta_3 Rem_{i,t} + \beta_4 Rem * FDI_{i,t} + \beta_4 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \tag{2.2}$$

In equation (2.2), we introduce the interaction of remittances and FDI. We believe that the 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 complementary/substitution between them. A positive coefficient would indicate that an increase in one inflow will complement the rise in the inflow of others. While a negative sign for interaction term would indicate substitution of one inflow for the other.

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

$$TFP_{i,t} = \beta_0 + \beta_1 TFP_{i,t-1} + \beta_2 FDIg_{i,t} + \beta_3 Rem_{i,t} + \beta_4 Remit * FDI_{i,t} + \beta_5 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \tag{2.3}$$

Apart from the 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; a dummy for Asia, a dummy for Europe & central Asia, a dummy for Latin & the Caribbean, and a dummy for Africa & Middle East. Similarly, three income dummies are included; a dummy for low-income, lower-middle-income, and upper-middle-income countries.

2.5.2 Problem of Endogeneity

According to Temple (1999), the problem frequently faced in cross-country studies is the endogeneity among variables considered for analysis. Although the endogeneity problem can be avoided by applying instrumental variables (Borensztein et al., 1998). In the available literature, dependent and independent variables lags are mainly used as internal instruments (Borensztein et al., 1998; Alfaro et al., 2010). The instruments should be exogenous (Greene, 2002) i.e., and they should be correlated with explanatory variables but not with the error term. Bearing this in mind, this study utilizes the 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.

The empirical literature suggests the GMM approach is 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 address the problem of endogeneity, GMM includes lagged dependent variable values among other independent variables. Second, GMM estimators also help remove 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 the time period (T) is shorter than the number of countries (N) in a panel setting (Roodman, 2009).

Apart from the lags of 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]. Similarly, we construct an instrument for FDI using different geographical and demographic factors that might impact FDI inflows to account for the endogeneity of FDI. Using the method of Davies and Voy (2009), we construct an instrument for FDI to cater for the endogeneity of FDI in our model. For this purpose, we use the country's latitude, the total population, the share of the population living in rural areas, the total area in square kilometers, and the political index from freedom house. In addition to the above, two other variables are included in the model to measure the country's attractiveness towards FDI. The first is proximity, the sum of real GDP for all countries weighted by the distance in kilometers between countries j and i. The second is the colonial link, the sum of GDP for all countries with that country j has a colonial link. After regressing FDI on the above-stated factors, we take the fitted values of FDI as an instrument. The colonial link, distance, area, and latitude data are taken from the CEPII website. Thirdly, we use the unemployment rate in the host

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

countries as an instrument.

After applying instruments, it is essential to check for the validity and consistency of these instruments. In this respect, several tests are available in the econometric literature mainly used for consistency of the GMM estimator, which consequently depends 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 the overall validity of instruments and the Arellano-Bond test to check for serial correlation in the model (Carkovic & Levine, 2002). We also include orthogonal transformation as it produces efficient results in missing values in the panel (Hayakawa et al., 2009).

2.5.3 Data

We use unbalanced panel data from 52 low and middle-income countries from 1990-2017. The list of countries is given in Table 2.8.1. The rationale behind using low and middle-income countries is that most of the remittances are received by these countries. Likewise, developing countries also need FDI to pursue their development agendas and overcome financial constraints. It is pertinent to mention here that the selection of these developing countries is solely based on data availability. The selected period is also relevant to our study owing to the potential surge in the inflow of FDI and migrant remittance toward developing countries during this period. 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 correctly help identify the long-term impact of economic growth (Harrison, 1996). Most of the data for our sample come from the World Development Indicators (WDI), World Bank. The gross FDI and institutional variables data are from United Nations Conference on Trade and Development (UNCTAD) and International Country Risk Guide (ICRG) databases. We use the Chinn-Ito database to get data on financial development, whereas data for TFP come from the conference board database[2].

[2]Tha data can be accessed online: https://data-central.conference-board.org/

2.5.4 Description of Variables

Macroeconomic Variables: In our analysis, the following macroeconomic variables are included in the model, such as the government's size (proxied by government consumption as a share of GDP). This variable considers the government's capacity to provide 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 out by Barro (1997) that "big government is bad for growth." Sachs et al. (1995) show that open economies grow faster than closed ones. Trade is measured by the sum of imports and exports (as a share of GDP). Financial development is also an important determinant of economic growth, and great emphasis has been put on the recent literature. According to King and Levine (1993), financial development is vital in achieving long-term productivity. We use KAOPEN Index from Chinn and Ito (2006) for financial openness. Similarly, TFP is another crucial factor in the promotion of economic growth. Aghion et al. (2005) and (Alfaro et al., 2010) have emphasized the importance of TFP. Likewise, macroeconomic and policy stability are also vital for long-term economic growth. Inflation is used as a proxy to cater to macroeconomic and policy Stability. Inflation may positively or negatively impact economic growth (Gossel, 2018). A lower inflation rate is favorable for investment, trade, and, ultimately for, overall economic growth (Fisher & Modigliani, 1978). Alternatively, as pointed out by Gossel (2018), increasing inflation may necessitate an upward push in the interest rate, which certainly brings equity-based FDI due to the 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 economic development, capital accumulation is vital 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 (Romer, 1990; Lucas Jr, 1988; Nelson & Phelps, 1966). In this regard, secondary school enrollment is a better proxy for human capital (Barro, 1991; Mankiw et al., 1992; Curwin & Mahutga, 2014; Ferdaous, 2016). We also include the age-dependence ratio in the list of our control variables.

Institutional Variables: Several studies have highlighted the importance of institutions in the development process 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 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 development process. We construct an index of institutional variables using principal component analysis (PCA)[3]. In this regard, we use the following variables from the ICRG database for the construction of our institutional index; government stability (govsta), investment profile (invpro), law and order (Law & order), democratic accountability (demacc) and bureaucratic stability (burqua). So our institutional index is as follows;

$$INS = f(govsta, invpro, Law\&order, demacc, burqua) \tag{2.4}$$

Table 2.5.1: Description of Variables

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

Demographic Variables: Along with economic variables, recent literature also emphasizes the importance of demographic characteristics in econometric modeling

[3]PCA is a statistical method that is used to identify principal components.

to best fit the empirical models. In this domain, we include the following demographic variables, such as population growth, to cater to demographic characteristics. Population growth, exogenous in the standard growth theory, is crucial 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. Therefore, population growth is considered a key variable in economic growth models. In addition to the above demographic variables, international migrant stocks are also included as a percentage of the total population. On one side, these migrants in host counties send remittances to their respective countries. On the other side, these migrant stocks might also influence the inflow of FDI by creating social networking in the source countries.

In addition to the above-stated variables, we include regional and income dummies to cater for the heterogeneity in the sample. Moreover, the coefficient of regional dummies takes into account any residual variation not already explained by the variables specified in the model (Carkovic & Levine, 2002). Likewise, we also use time and country fixed effects, as pointed out 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".

2.6 Results and Discussion

In this section, we present the main empirical findings of our study, highlighting the important patterns and trends that emerged from our data analysis. Table 2.6.1 presents descriptive statistics. In this respect, the mean GDP per capita growth rate is 1.98, with a standard deviation of 3.92. The minimum observed value is -25.81, while the maximum observed value is 14.47. These statistics provide an initial overview of the distribution of GDP per capita growth rates in our sample. The mean gross FDI is 3.04, with a standard deviation of 3.07. The minimum observed value is -1.62, while the maximum observed value is 30.04. Table 2.8.2 reports information regarding the pairwise correlation matrix.

After presenting descriptive statistics and correlation matrix, Table 2.6.2 presents the baseline results. Regarding empirical analysis, Column 1 has the output from the pooled OLS method, and Columns 2 and 3 have the findings from the fixed-effect approach as a preliminary exercise. Whereas columns 4 to 6 contain the outcomes of the system GMM approach. Column 4 includes only internal instruments, while Column 5 utilizes both internal and external instruments in our analysis. In Column 6, we

have included the FDI-remittances interaction and the instruments used in Column 5, providing a more detailed and thorough examination of the relationship between the variables of interest in our study. In the first three specifications, we do not include the lagged value of the dependent variable due to the Nickell bias[4].

According to convergence theory, the 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 lagged per capita GDP growth coefficient is negative but not significant.

Table 2.6.1: Summary Statistics

	Mean	SD	Min	Max	N
gdppc growth	1.98	3.92	-25.81	14.47	468
Gross FDI	3.04	3.07	-1.62	30.04	436
Remittances(Percentage of GDP)	3.57	4.49	0.00	23.28	439
Gross Fixed Capital (Percentage of GDP)	23.49	7.55	0.00	48.88	466
Secondary Edu (Enrollment)	63.09	28.01	5.33	123.16	405
General Gov Expenditures (Percentage of GDP)	13.41	4.30	1.07	25.15	464
Trade Openness (Percentage of GDP)	64.82	30.16	16.22	213.78	464
Population Growth	1.69	1.22	-2.26	5.27	468
KOPEAN	-0.29	1.15	-2.00	2.00	454
Institutional Index	0.00	0.91	-2.57	1.90	458
(mean) tfp	0.04	3.49	-30.28	16.31	468
Age Dependence	69.43	19.76	35.74	111.68	468
Inflation	73.91	485.79	-4.35	8767.32	450
Total Natural Resource Rents	7.55	8.10	0.04	45.44	468
Migrant stock	3.90	6.67	0.03	43.60	468

Moreover, the coefficient for FDI in the growth equations is statistically significant and positively associated with economic growth. More specifically, in Column 4, the coefficient for FDI is 0.225, which is statistically significant at the 5% level. This suggests that FDI positively impacts GDP per capita growth, meaning that an increase in FDI is associated with an increase in GDP per capita growth. The coefficient of 0.225 for FDI indicates that for all other factors being held constant, a one percentage

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

points increase in FDI is associated with a 0.225 percentage points increase in GDP per capita growth. At the same time, this impact increases to 0.416 percentage points by introducing the interaction of remittances and FDI in Column 6. These results are indicative of the fact that FDI promotes economic growth. Our findings are consistent with previous studies on FDI, as they support the existing empirical literature on the subject (Makki & Somwaru, 2004; Alfaro et al., 2004; Malikane & Chitambara, 2017). Through the transfer of advanced technology and knowledge, FDI improves economic growth in developing countries (Makki & Somwaru, 2004). De Mello (1999) argues that spillovers and knowledge transfer from the host country primarily determine long-term growth in the recipient countries. Furthermore, the author posits that the effectiveness of FDI is determined by the complementarity (substitution) between FDI and domestic investment.

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

Apart from the above, we construct an index of institutional quality using PCA. Our results are statistically significant, with a positive sign in all our specifications. It is clear from theoretical and empirical literature that institutions play an essential role in improving economic growth and development. In this vein, well-established institutions bring stability and help properly utilize economic resources (Yildirim & Gokalp, 2016; Acemoglu et al., 2008). Acemoglu et al. (2008) emphasizes the importance of institutional development and links economic well-being with institutional quality.

Table 2.6.2: Per Capita GDP growth, FDI, Remittances and Inclusion of Interaction term of Rem*FDI

	(1) Pooled OLS	(2) FE	(3) FE	(4) System GMM	(5) System GMM	(6) System GMM
L.gdppc growth				0.002	−0.016	−0.001
				(0.250)	(0.240)	(0.064)
Gross FDI	0.151**	0.129**	0.121**	0.225**	0.213*	0.416**
	(0.062)	(0.062)	(0.053)	(0.096)	(0.113)	(0.179)
Remittances(Percentage of GDP)	0.006	−0.026	−0.104	−0.034	−0.061	0.038
	(0.055)	(0.056)	(0.071)	(0.135)	(0.142)	(0.158)
Gross Fixed Capital (Percentage of GDP)	0.091***	0.090***	0.081**	0.004	−0.030	−0.055
	(0.032)	(0.030)	(0.036)	(0.104)	(0.090)	(0.074)
Secondary Edu (Enrollment)	−0.027**	−0.023*	−0.021	0.016	−0.012	−0.017
	(0.011)	(0.012)	(0.019)	(0.034)	(0.035)	(0.028)
General Gov Expenditures (Percentage of GDP)	−0.099**	−0.103**	−0.104	−0.031	−0.052	−0.177
	(0.044)	(0.043)	(0.105)	(0.154)	(0.166)	(0.142)
Trade Openness (Percentage of GDP)	−0.002	−0.002	0.001	−0.015	−0.034	−0.035
	(0.005)	(0.005)	(0.012)	(0.019)	(0.026)	(0.022)
Population Growth	−1.028***	−1.043***	−2.143***	−1.543**	−1.369*	−1.627*
	(0.264)	(0.254)	(0.465)	(0.731)	(0.782)	(0.828)
KOPEAN	−0.051	−0.106	−0.270	−0.461	−0.630*	−0.635
	(0.144)	(0.142)	(0.162)	(0.372)	(0.351)	(0.430)
Institutional Index	0.369**	0.511*	0.549***	1.802***	1.585***	1.398***
	(0.173)	(0.257)	(0.201)	(0.365)	(0.469)	(0.499)
Age Dependence	−0.019	−0.012	0.047	0.025	−0.005	−0.008
	(0.021)	(0.022)	(0.033)	(0.036)	(0.046)	(0.042)
Inflation	−0.002***	−0.002***	−0.002***	−0.007	−0.009	−0.009
	(0.000)	(0.000)	(0.000)	(0.010)	(0.009)	(0.007)
Total Natural Resource Rents	−0.002	−0.020	0.135**	−0.028	−0.039	−0.034
	(0.029)	(0.029)	(0.055)	(0.045)	(0.041)	(0.043)
Migrant stock	0.044	0.053	0.035	−0.056	0.076	0.192
	(0.036)	(0.035)	(0.219)	(0.123)	(0.134)	(0.145)
Rem*FDI						−0.043
						(0.033)
Time FE	No	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes	Yes
Observations	344	344	344	318	318	317
Countries			52	52	52	52
R-Square	0.324	0.393	0.353			
AR1 (p-values)				0.066	0.101	0.002
AR2 (P-values)				0.627	0.491	0.443
Number of Instruments				37	40	42
Hansen test(p-values)				0.230	0.324	0.217

Note: Standard errors in parentheses are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.10. The dependent variable is per capita GDP growth.

The negative coefficient for population growth in all the specifications means that as a country's population increases, its economic growth decreases, all else being equal. These results are in line with the literature (Barro, 1991). In other words, population growth harms economic growth. There are several reasons why population growth can have a negative impact on economic growth. For example, as the population grows, it puts pressure on the country's resources, such as land, water, and food, which can lead to resource depletion, lowering productivity and hindering economic growth.

After looking into our primary findings, in Column 6 of Table 2.6.2, we introduce the interaction of remittances and FDI to check how their combined effect influences

economic growth. In this regard, the coefficient for the interaction term is negative but not statistically significant. This means there is no evidence that the effect of FDI on economic growth changes depending on the level of migrant remittances or vice versa. In other words, a negative but statistically insignificant coefficient for the interaction of FDI and migrant remittances suggests that the two variables do not have a significant joint effect on economic growth beyond their individual effects.

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 a dummy for Africa &Middle East (DA&ME), a dummy for Asia (DASIA), a dummy for Europe and Central Asia (DECA), and a dummy for Latin and Caribbean countries (DLCC). In this respect, Table 2.6.3 reports results regarding different regional dummies. The fact that coefficient for FDI is positive in the case of a dummy for Asia (DASIA), a dummy for Europe and Central Asia (DECA), and a dummy for Latin and Caribbean countries (DLCC). The inclusion of regional dummies suggests that FDI positively affects the dependent variable in those regions. However, in Africa & the Middle East (DA&ME), the coefficient for FDI becomes insignificant, indicating that FDI negatively affects the economic growth in Africa & the Middle East region. There are no stark differences in the other explanatory variables' magnitude and the sign of coefficients but with some minor changes.

Moreover, in Table 2.6.4, we report the empirical findings by including different income dummies. The fact that the coefficient for FDI remains significant after controlling for the upper middle-income dummy suggests that FDI has a strong and positive effect on economic growth. Nevertheless, the coefficient for FDI becomes insignificant when the low-income and lower-middle-income dummies are included, suggesting that the effect of FDI on the dependent variable may be weaker in these income categories compared to upper-middle-income countries. This could be due to several factors, such as lower levels of human capital, weaker institutional quality, or higher levels of risk and uncertainty in these countries, which may make it more difficult for FDI to impact the dependent variable significantly.

After performing empirical analysis regarding the role of FDI and remittances on economic growth, now, as a next step, we want to identify a 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 a channel through that remittances, and FDI may impact economic growth. We use TFP as a dependent variable with the same explanatory variables which are used in per capita GDP growth equations. In this respect, Table 2.6.5 shows findings regarding the role of TFP as a transmission channel. The coefficient for FDI is negative and statistically

significant in Column 1 of Table 2.6.5. The coefficient implies that a one percentage points increase in FDI leads to a 0.311 percentage points decrease in the total productivity growth, holding all else constant. Generally, it is viewed that FDI inflows could increase TFP via knowledge spillovers, technology transfers, and fostering linkages with domestic firms depending on the local conditions (Alfaro et al., 2010). However, in the literature, several research papers show the negative link between FDI and TFP (Herzer & Donaubauer, 2018; C. Li & Tanna, 2019).

Table 2.6.3: Per Capita GDP Growth, FDI, Remittances, Interaction term and Regional Dummies

	(1) DA& ME	(2) DASIA	(3) DECA	(4) DLCC
L.gdppc growth	−0.119	−0.057	−0.086	−0.053
	(0.223)	(0.165)	(0.185)	(0.235)
Gross FDI	0.285	0.213*	0.309*	0.333*
	(0.219)	(0.124)	(0.164)	(0.193)
Remittances(Percentage of GDP)	0.041	0.054	0.014	0.112
	(0.156)	(0.144)	(0.147)	(0.142)
Gross Fixed Capital (Percentage of GDP)	0.034	0.011	0.034	−0.008
	(0.099)	(0.089)	(0.087)	(0.105)
Secondary Edu (Enrollment)	0.001	0.039	−0.013	0.013
	(0.039)	(0.038)	(0.037)	(0.039)
General Gov Expenditures (Percentage of GDP)	0.046	0.070	0.024	−0.017
	(0.151)	(0.149)	(0.141)	(0.166)
Trade Openness (Percentage of GDP)	−0.036	−0.029**	−0.036	−0.032
	(0.025)	(0.014)	(0.026)	(0.024)
Population Growth	−0.949	−1.419**	−2.158*	−0.769
	(0.798)	(0.579)	(1.097)	(0.885)
KOPEAN	−0.797**	−0.607*	−0.656*	−0.614*
	(0.333)	(0.350)	(0.339)	(0.356)
Institutional Index	1.510***	1.420***	1.627***	1.556***
	(0.418)	(0.405)	(0.396)	(0.378)
Age Dependence	0.016	0.066	0.034	0.003
	(0.041)	(0.046)	(0.041)	(0.042)
Inflation	−0.009	−0.005	−0.005	−0.007
	(0.009)	(0.007)	(0.007)	(0.007)
Total Natural Resource Rents	−0.016	0.014	−0.053	−0.043
	(0.036)	(0.041)	(0.034)	(0.038)
Migrant stock	0.081	0.037	0.148	0.070
	(0.139)	(0.090)	(0.117)	(0.138)
Rem*FDI	−0.022	−0.001	−0.025	−0.028
	(0.034)	(0.009)	(0.022)	(0.033)
Regional Dummy	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	317	317	317	317
Countries	52	52	52	52
AR1 (p-values)	0.137	0.025	0.058	0.093
AR2 (P-values)	0.273	0.376	0.321	0.399
Number of Instruments	41	41	41	41
Hansen test(p-values)	0.572	0.649	0.606	0.581

Note: Standard errors in parentheses are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.10. The dependent variable is per capita GDP growth. DA& ME, DASIA, DECA, and DLCC stand for Africa and Middle East dummy, Asian dummy, Europe & Central Asia dummy, and Latin America & Caribbean countries dummy, respectively.

Table 2.6.4: Per Capita GDP Growth, FDI, Remittances, Interaction Term, and Income Dummies

	(1) DLI	(2) DMI	(3) DUMI
L.gdppc growth	−0.089	−0.103	−0.068
	(0.237)	(0.237)	(0.229)
Gross FDI	0.356	0.350	0.414*
	(0.242)	(0.214)	(0.212)
Remittances(Percentage of GDP)	0.060	0.053	0.094
	(0.198)	(0.155)	(0.151)
Gross Fixed Capital (Percentage of GDP)	0.021	0.027	0.020
	(0.102)	(0.097)	(0.103)
Secondary Edu (Enrollment)	−0.002	0.013	0.029
	(0.040)	(0.034)	(0.038)
General Gov Expenditures (Percentage of GDP)	−0.013	−0.010	−0.076
	(0.210)	(0.172)	(0.159)
Trade Openness (Percentage of GDP)	−0.034	−0.034	−0.032
	(0.022)	(0.022)	(0.021)
Population Growth	−1.011	−1.106	−1.163
	(0.944)	(0.895)	(0.870)
KOPEAN	−0.758**	−0.668*	−0.702**
	(0.334)	(0.353)	(0.342)
Institutional Index	1.575***	1.549***	1.577***
	(0.449)	(0.423)	(0.393)
Age Dependence	0.031	0.030	0.013
	(0.062)	(0.050)	(0.038)
Inflation	−0.007	−0.008	−0.008
	(0.009)	(0.007)	(0.006)
Total Natural Resource Rents	−0.049	−0.049	−0.046
	(0.043)	(0.045)	(0.040)
Migrant stock	0.142	0.136	0.157
	(0.145)	(0.135)	(0.130)
Rem*FDI	−0.038	−0.033	−0.042
	(0.036)	(0.031)	(0.030)
Income Dummy	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Observations	317	317	317
Countries	52	52	52
AR1 (p-values)	0.122	0.136	0.087
AR2 (P-values)	0.376	0.359	0.402
Number of Instruments	41	41	41
Hansen test(p-values)	0.518	0.603	0.523

Note: Standard errors in parentheses are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.10. The dependent variable is per capita GDP growth. DLI, DMI, and DUMI stand for Low-income, Lower Middle, and Upper Middle-income dummies, respectively.

Our results are in line with Herzer and Donaubauer (2018) where they show that, on average, the impact of FDI on TFP is negative in developing countries, and the reasoning behind the such negative association is linked to the fact that higher productivity and higher wages are linked with discouraging FDI inflows to developing countries.

Table 2.6.5: TFP, FDI, Remittances, Interaction term and Inclusion of Regional Dummies

	(1) Interaction Term	(2) DSSA	(3) DASIA	(4) DECA	(5) DLCC
L.TFP	0.100	0.095	0.109	0.106	0.098
	(0.104)	(0.102)	(0.105)	(0.109)	(0.108)
Gross FDI	−0.311***	−0.292***	−0.249**	−0.297**	−0.320***
	(0.108)	(0.102)	(0.104)	(0.141)	(0.106)
Remittances(Percentage of GDP)	−0.166	−0.170	−0.157	−0.129	−0.142
	(0.114)	(0.117)	(0.109)	(0.118)	(0.118)
Gross Fixed Capital (Percentage of GDP)	−0.057	−0.064	−0.043	−0.086	−0.096
	(0.105)	(0.097)	(0.095)	(0.098)	(0.101)
Secondary Edu (Enrollment)	−0.051	−0.045	−0.037	−0.039	−0.032
	(0.037)	(0.033)	(0.030)	(0.033)	(0.040)
General Gov Expenditures (Percentage of GDP)	−0.239*	−0.268**	−0.244*	−0.257	−0.232
	(0.127)	(0.133)	(0.136)	(0.161)	(0.143)
Trade Openness (Percentage of GDP)	−0.008	−0.006	−0.008	−0.012	−0.014
	(0.011)	(0.015)	(0.011)	(0.013)	(0.012)
Population Growth	−2.694***	−2.736***	−3.111***	−2.414**	−2.316***
	(0.901)	(0.860)	(0.687)	(1.173)	(0.811)
KOPEAN	−0.591	−0.558	−0.429	−0.519	−0.483
	(0.395)	(0.374)	(0.413)	(0.386)	(0.478)
Institutional Index	0.711	0.761	0.793	0.588	0.613
	(0.786)	(0.749)	(0.790)	(0.741)	(0.781)
Age Dependence	0.028	0.032	0.069*	0.033	0.028
	(0.036)	(0.037)	(0.037)	(0.054)	(0.037)
Inflation	−0.020***	−0.021***	−0.019**	−0.023***	−0.021***
	(0.007)	(0.006)	(0.007)	(0.006)	(0.006)
Total Natural Resource Rents	0.051	0.036	0.066	0.051	0.055
	(0.062)	(0.070)	(0.048)	(0.060)	(0.059)
Migrant stock	0.200**	0.196***	0.206**	0.189*	0.168
	(0.083)	(0.071)	(0.077)	(0.104)	(0.108)
Rem*FDI	0.032**	0.030**	0.029**	0.030*	0.033**
	(0.013)	(0.012)	(0.013)	(0.017)	(0.012)
Regional Dummy	No	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Observations	317	317	317	317	317
Countries	52	52	52	52	52
AR1 (p-values)	0.002	0.002	0.002	0.002	0.003
AR2 (P-values)	0.322	0.303	0.323	0.352	0.376
Number of Instruments	49	50	50	50	50
Hansen test (p-values)	0.219	0.219	0.191	0.290	0.207

Note: Standard errors in parentheses are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.10. The dependent variable is TFP. DA&ME, DASIA, DECA, and DLCC stand for Africa & Middle East dummy, Asian dummy, Europe & Central Asia dummy, and Latin America & Caribbean countries dummy, respectively.

In addition to the above, the empirical findings of Wang and Wong (2009) show a negative link between FDI and TFP. According to X. Li and Liu (2005), higher 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, which can be negatively linked between FDI and TFP. De Mello (1999) also shows that

the impact of the FDI is negative on TFP in non-OECD countries. According to him, FDI reduces TFP growth by increasing producers' capital accumulation, which may cause a negative association between FDI and TFP in technology-follower countries. In addition to the above, he further argues that technology-follower economies are (i) less efficient in the use of the new technology embodied and (ii) have difficulty in assimilating capital and technology-intensive improvements. In similar lines, Aitken and Harrison (1999), show that FDI inflows may negatively affect the productivity of domestic firms through competition effects as foreign firms exploit 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.

Most importantly, the interaction of remittances and FDI is positive and significant, indicating that the combined effect of FDI and remittances supports TFP growth. The positive sign of the coefficient indicates that the interaction between FDI and migrant remittances on TFP is positive, suggesting that the joint impact of FDI and migrant remittances on TFP is greater than the sum of their individual effects. It is evident from the fact that FDI and remittances bring technological innovation and modern knowledge to recipient countries. In fact, it indicates that TFP is a vital transmission channel through which remittances and FDI influence economic growth and bring overall economic development. So, policymakers must create opportunities to utilize FDI and migrant remittances effectively to have productive growth and achieve desired outcomes.

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. Columns 2-5 show results for regional dummies, and there are no stark differences from our previous specification of Column 1 in Table 2.6.5. Likewise, we also include income dummies to check for income heterogeneities in table 2.6.6. The coefficient for remittances and FDI interaction is significant only in one specification out of three. However, they carry the same positive sign, which indicates that income is important in influencing TFP through the combined effect of remittances and FDI. In many developing countries, migrant remittances constitute a significant share of the total investment in the economy and can be used to finance small businesses and other entrepreneurial activities. The possible explanation for our findings is that migrant remittances may act as a complementary source of investment to FDI when FDI is combined with migrant remittances, leading to an efficient allocation of resources and greater overall economic growth. Another explanation is that migrant remittances may have a positive spillover effect on the overall economy, which in turn can enhance the impact of FDI. For example, remittances can increase household income and consumption, stimulating demand for goods and services and

increasing economic activity. This can create a more favorable climate for foreign investment and lead to higher inflows of FDI.

Table 2.6.6: TFP, FDI, Remittances, Interaction term and Inclusion of Income Dummies

	(1) DLI	(2) DMI	(3) DUMI
L.TFP	0.083	0.051	0.050
	(0.119)	(0.118)	(0.123)
Gross FDI	−0.392***	−0.294***	−0.300**
	(0.118)	(0.110)	(0.124)
Remittances(Percentage of GDP)	−0.172	−0.168	−0.152
	(0.111)	(0.119)	(0.110)
Gross Fixed Capital (Percentage of GDP)	−0.077	−0.057	−0.071
	(0.091)	(0.101)	(0.090)
Secondary Edu (Enrollment)	−0.045	−0.053	−0.030
	(0.060)	(0.036)	(0.039)
General Gov Expenditures (Percentage of GDP)	−0.256	−0.232*	−0.260*
	(0.197)	(0.127)	(0.132)
Trade Openness (Percentage of GDP)	−0.014	−0.008	−0.010
	(0.012)	(0.013)	(0.014)
Population Growth	−2.500***	−2.870***	−2.667***
	(0.776)	(0.937)	(0.732)
KOPEAN	−0.640*	−0.435	−0.375
	(0.324)	(0.424)	(0.405)
Institutional Index	0.637	0.624	0.644
	(0.766)	(0.749)	(0.827)
Age Dependence	0.041	0.034	0.016
	(0.048)	(0.039)	(0.038)
Inflation	−0.021**	−0.021***	−0.022***
	(0.008)	(0.007)	(0.007)
Total Natural Resource Rents	0.079	0.064	0.071
	(0.066)	(0.058)	(0.058)
Migrant stock	0.205***	0.201**	0.205**
	(0.068)	(0.085)	(0.090)
Rem*FDI	0.039***	0.032**	0.031**
	(0.013)	(0.014)	(0.014)
Income Dummy	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Observations	317	317	317
Countries	52	52	52
AR1 (p-values)	0.005	0.005	0.005
AR2 (P-values)	0.360	0.253	0.278
Number of Instruments	50	50	50
Hansen test(p-values)	0.300	0.272	0.195

Note: Standard errors in parentheses are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.10. The dependent variable is TFP. DLI, DMI, and DUMI stand for Low-income dummy, Lower Middle income, and Upper Middle-income dummies, respectively.

Likewise, there are also some other statistically significant variables. The coef-

ficient for population growth is negative and statistically significant in all specifications. Similarly, the coefficient for inflation is also negative and statistically significant. Migrant remittances are one of the important sources in reducing global poverty.

Although we do not find any solid evidence that remittances impact economic growth, remittances are still essential financial inflows to developing countries. As explained by Jahjah et al. (2003), remittances are compensatory. Likewise, Gapen et al. (2009) argue that remittances do not promote growth because remittances are primarily intended as social insurance to support day to day affairs of migrant families rather than to use them for productive investment. According to IFAD (2020), households in rural areas receive more than 50 percent of the remittances, whereas 75 percent of the poor. Remittances also improve the welfare of households and alleviate credit constraints (Fullenkamp et al., 2008), and increase the 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 reduce poverty in developing countries. Likewise, Imai et al. (2014) consider remittances essential for overall economic development as these inflows help reduce poverty.

In a similar way, several other welfare-enhancing attributes are associated with the inflow of migrant remittances. According to Ratha (2003), migrant remittances are more stable than other capital inflows. Similarly, it is also evident from empirical findings of Pozo and Amuedo-Dorantes (2006); Combes and Ebeke (2011) that remittances ensure consumption against adverse shocks and help reduce macroeconomic volatility (Fullenkamp et al., 2008; Jawaid & Raza, 2016). Another vital aspect of migrant remittances is that they are countercyclical (Schiantarelli, 2005; Frankel, 2011). According to Frankel (2011), migrant remittances are countercyclical 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). Similarly, remittances also enhance investment in physical (Connell & 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. Therefore, well-developed and specific policies can quickly achieve the desired benefits associated with migrant remittances.

To summarize our findings, we find that FDI positively impacts economic growth through the accumulation of capital, knowledge transfer, and bringing cutting-edge technology to the host countries. These findings are aligned with the theoretical and empirical literature on FDI-led growth. In contrast, the findings regarding the impact of remittances on economic growth are unclear. According to Jahjah et al. (2003), the

inflow of migrant remittances may lead to moral hazard problems, sufficient to reduce economic activity in an economy. Furthermore, we do not find solid evidence that remittances and FDI directly supplement each other in the promotion of economic growth. However, when FDI and migrant remittances are channelized through total productivity growth, the FDI and migrant remittances jointly contribute to productivity growth. In this respect, we use TFP as a transmission channel and find that TFP is a vital transmission channel through which FDI and remittances jointly promote productivity growth in developing countries.

2.7 Conclusion

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

The empirical findings showed a positive link between economic growth and FDI, which means that FDI is positively associated with economic growth but no significant link in the case of migrant remittances, which indicates that the relationship between migrant remittances and growth is not statistically significant. This could be because remittances are not intended primarily for investment purposes, as explained by Jahjah et al. (2003) and Gapen et al. (2009). In addition, we introduce the interaction of FDI and migrant remittances to check the combined effect of FDI and migrant remittances on economic growth. However, we found that this interaction term is statistically insignificant, which means that the combination of FDI and migrant remittances could not significantly impact economic growth beyond their individual effects.

In order to further investigate the indirect impact of FDI and migrant remittances, we used TFP as a transmission channel. TFP is considered a critical channel through which FDI and migrant remittances might impact economic growth. For this purpose, we used TFP as a transmission, the interaction of FDI and migrant remittances, and other control variables as explanatory variables. We found that TFP is negatively associated with FDI. Several plausible reasons in the literature showed why the link between FDI and TFP is negative. FDI can lead to the transfer of technology and knowl-

edge from the foreign firm to the host country, enhancing TFP. However, suppose the technology transfer is incomplete, or the host country needs the necessary complementary factors, such as skilled labor or infrastructure. In that case, the benefits of FDI may not be fully realized, and the TFP may not increase. In some cases, transferring outdated or inappropriate technology may lead to lower TFP. Moreover, FDI can also lead to increase competition in the host country's market, which can drive down prices and reduce profit margins for domestic firms. This can lead to a shift away from high-productivity firms, as they may be the ones most affected by the increased competition. In addition, FDI can also lead to the crowding out of domestic resources, such as labor and capital. This can occur when foreign firms use resources that could have been used by domestic firms, leading to a reduction in domestic investment and innovation.

In addition, we introduce the interaction of FDI and remittances in the TFP equation. We found that the coefficient for the interaction is not only positive but also statistically significant. The results show strong complementarity between FDI and remittances in promoting productivity-led growth. These findings suggest that the presence of both FDI and remittances in an economy can synergistically enhance the economy's overall productivity. This synergy can lead to long-term economic growth and development, as it provides access to new technologies, expertise, and financial resources that can be used to boost productivity in different sectors of the economy. The study's conclusion underscores the importance of policies encouraging both FDI and remittance inflows into developing countries to promote productivity and economic growth. By leveraging the complementarity between FDI and remittances, policymakers can design strategies that foster a conducive environment for foreign investment and encourage diaspora contributions to their home countries.

Even though remittances have no direct impact on economic growth, the benefits of remittances cannot be overstated. Remittances are still considered important financial inflows for developing countries. Remittances still play an essential role in the economic development of many countries. This is because remittances can have other positive effects, such as reducing poverty and promoting social development. For example, a study by Adams Jr and Page (2005) found that remittances significantly impacted poverty reduction in developing countries by providing households with additional income, which they could use to invest in education, health, and other productive activities. This, in turn, led to increased human capital development and overall development. Similarly, Chami et al. (2005) found that remittances could help to reduce financial market volatility in developing countries as they showed that remittances are stable sources of external financing that could help to reduce the volatility of a country's current account balance and improve its external financial

position. In short, both FDI and migrant remittances are key factors in determining overall economic growth and development in the recipient economies.

2.8 Appendix

Table 2.8.1: 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				

Table 2.8.2: Pairwise Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Gross FDI	1.00													
Remittances(Percentage of GDP)	0.18***	1.00												
Gross Fixed Capital (Percentage of GDP)	0.17**	0.02	1.00											
Secondary Edu (Enrollment)	0.24***	0.13*	0.19***	1.00										
General Gov Expenditures (Percentage of GDP)	0.08	0.05	-0.06	0.18**	1.00									
Trade Openness (Percentage of GDP)	0.38***	0.21***	0.16**	0.30***	0.20***	1.00								
Population Growth	-0.15**	-0.02	-0.20***	-0.67***	-0.03	-0.11*	1.00							
KOPEAN	0.24***	0.32***	-0.11*	0.30***	-0.02	0.16**	-0.18**	1.00						
Institutional Index	0.18**	0.03	0.11*	0.03	0.10	0.18***	-0.07	-0.05	1.00					
TFP	0.06	0.09	-0.03	0.09	-0.07	0.10	-0.24***	0.01	0.11*	1.00				
Age Dependence	-0.17**	-0.00	-0.34***	-0.84***	-0.05	-0.24***	0.81***	-0.20***	-0.08	-0.15**	1.00			
Inflation	-0.07	-0.06	-0.07	0.02	-0.08	-0.07	-0.01	-0.05	-0.13*	-0.11*	0.00	1.00		
Total Natural Resource Rents	0.03	-0.34***	0.16**	-0.10	-0.03	-0.01	0.24***	-0.25***	0.06	0.03	0.17**	-0.02	1.00	
Migrant stock	0.25***	0.41***	0.05	0.21***	0.34***	0.40***	0.15**	0.18***	0.16**	0.14**	-0.06	-0.03	-0.04	1.00

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

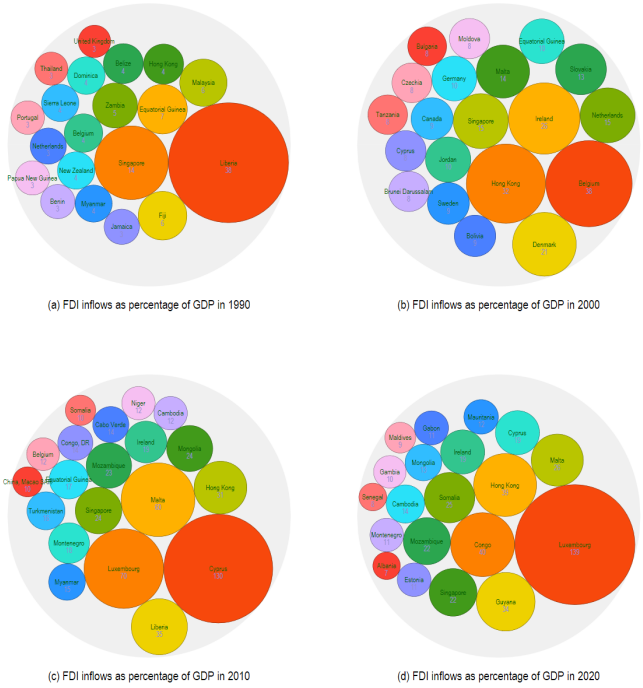


Figure 2.8.1: FDI Inflows as a Percentage of GDP in the Years 1990, 2000, 2010, and 2020. Source: Data are from UNCTAD

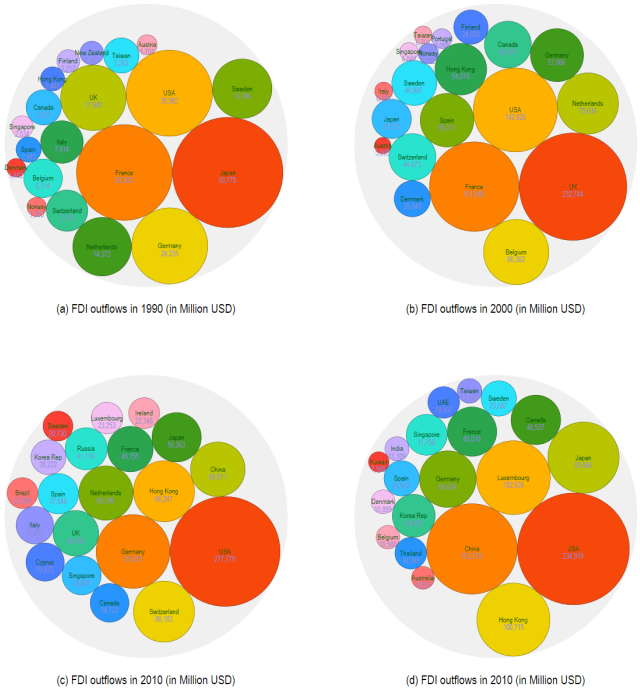


Figure 2.8.2: FDI Outflows in the Years 1990, 2000, 2010, and 2020 (In Million USD). Source: Data are from UNCTAD

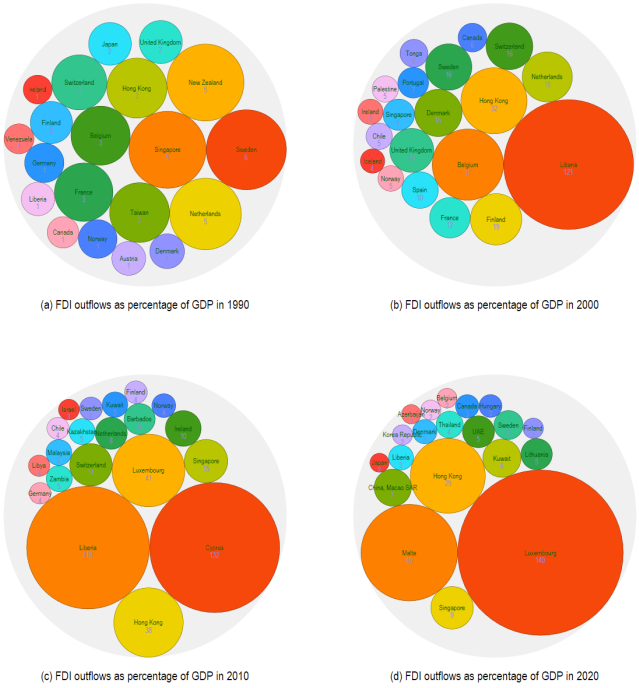


Figure 2.8.3: FDI Outflows as a Percentage of GDP in the Years 1990, 2000, 2010, and 2020. Source: Data are from UNCTAD

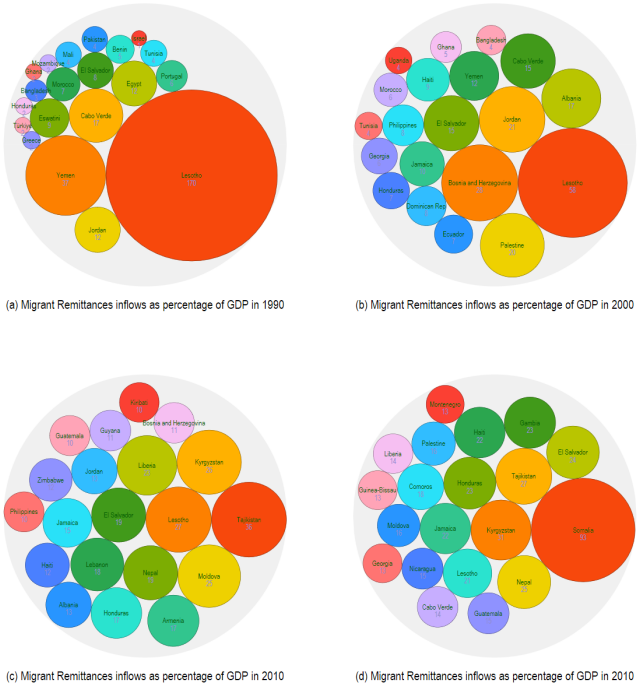


Figure 2.8.4: Migrant Remittances Inflows as a Percentage of GDP in the Years 1990, 2000, 2010, and 2020. Source: Data are from UNCTAD

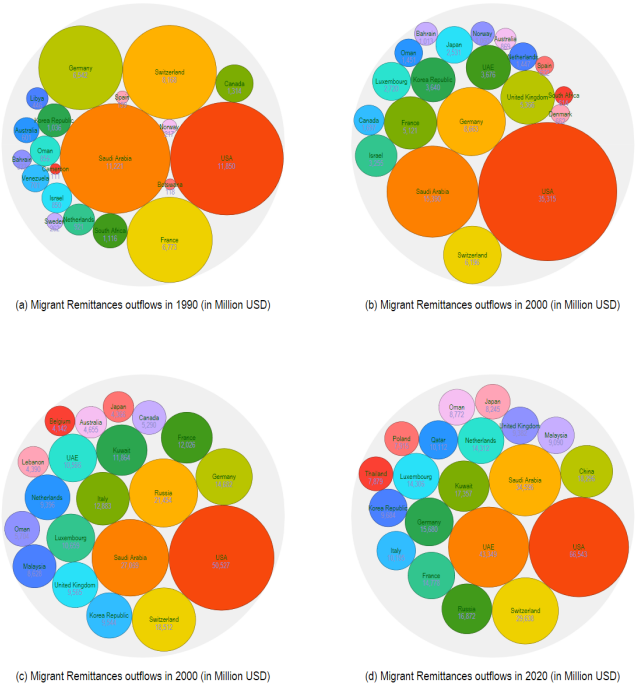


Figure 2.8.5: Migrant Remittances Outflows in the Years 1990, 2000, 2010, and 2020 (In Million USD). Source: Data are from UNCTAD

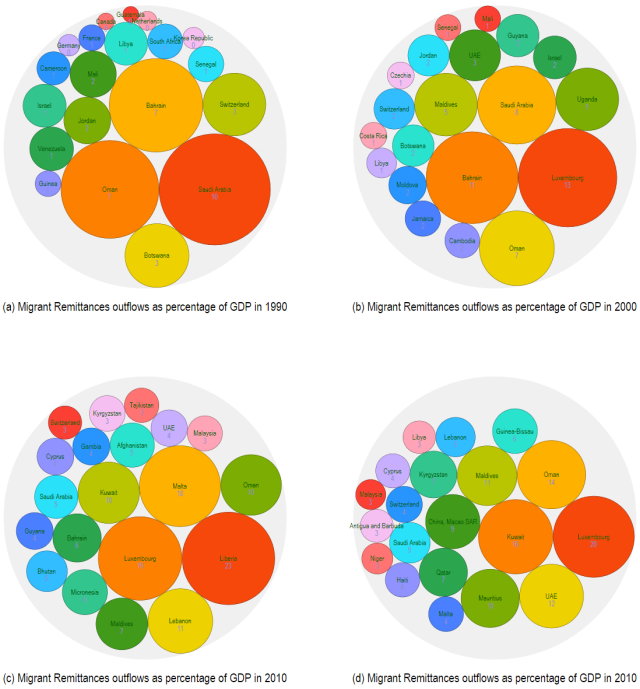


Figure 2.8.6: Migrant Remittances Outflows as a Percentage of GDP in the Years 1990, 2000, 2010, and 2020. Source: Data are from UNCTAD

References

Abdih, Y., Chami, R., Dagher, J., & Montiel, P. (2012). Remittances and institutions: Are remittances a curse? *World Development*, *40*(4), 657–666.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, *91*(5), 1369–1401.

Acemoglu, D., Robinson, J., et al. (2008). *The role of institutions in growth and development* (Vol. 10). World Bank Washington, DC.

Acosta, P. A., Lartey, E. K., & Mandelman, F. S. (2009). Remittances and the dutch disease. *Journal of International Economics*, *79*(1), 102–116.

Adams, S. (2009). Foreign direct investment, domestic investment, and economic growth in Sub-Saharan Africa. *Journal of Policy Modeling*, *31*(6), 939–949.

Adams, S., & Klobodu, E. K. M. (2016). Remittances, regime durability and economic growth in Sub-Saharan Africa (SSA). *Economic Analysis and Policy*, *50*, 1–8.

Adams Jr, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, *33*(10), 1645–1669.

Aghion, P., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica*, *60*(2), 323–351.

Aghion, P., Howitt, P., & Mayer-Foulkes, D. (2005). The effect of financial development on convergence: Theory and evidence. *The Quarterly Journal of Economics*, *120*(1), 173–222.

Agosin, M. R., & Machado, R. (2005). Foreign investment in developing countries: does it crowd in domestic investment? *Oxford Development Studies*, *33*(2), 149–162.

Aitken, B. J., & Harrison, A. E. (1999). Do domestic firms benefit from direct foreign investment? Evidence from Venezuela. *American Economic Review*, *89*(3), 605–618.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). Fdi and economic growth: the role of local financial markets. *Journal of International Economics*, *64*(1), 89–112.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2010). Does foreign direct investment promote growth? exploring the role of financial markets on linkages. *Journal of Development Economics*, *91*(2), 242–256.

Almfraji, M. A., & Almsafir, M. K. (2014). Foreign direct investment and economic growth literature review from 1994 to 2012. *Procedia-Social and Behavioral Sciences*, *129*, 206–213.

Alvarado, R., Iniguez, M., & Ponce, P. (2017). Foreign direct investment and economic growth in Latin America. *Economic Analysis and Policy*, *56*, 176–187.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277–297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, *68*(1), 29–51.

Azman-Saini, W. N. W., Law, S. H., et al. (2010). Fdi and economic growth: New evidence on the role of financial markets. *Economics Letters*, *107*(2), 211–213.

Balasubramanyam, V. N., Salisu, M., & Sapsford, D. (1996). Foreign direct investment and growth in Ep and Is countries. *The Economic Journal*, *106*(434), 92–105.

Barguellil, A., Zaiem, M. H., & Zmami, M. (2013). Remittances, education and economic growth a panel data analysis. *Journal of Business Studies Quarterly*, *4*(3), 129.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, *106*(2), 407–443.

Barro, R. J. (1997). *Determinants of economic growth.* Cambridge, Ma: MIT Press.

Barro, R. J. (2001). Human capital and growth. *American Economic Review*, *91*(2), 12–17.

Benmamoun, M., & Lehnert, K. (2013). Financing growth: comparing the effects of FDI, ODA, and international remittances. *Journal of Economic Development*, *38*(2), 43.

Bettin, G., & Zazzaro, A. (2012). Remittances and financial development: substitutes or complements in economic growth? *Bulletin of Economic Research*, *64*(4), 509–536.

Bevan, A., Estrin, S., & Meyer, K. (2004). Foreign investment location and institutional development in transition economies. *International Business Review*, *13*(1), 43–64.

Bitzer, J., & Görg, H. (2009). Foreign direct investment, competition and industry performance. *World Economy*, *32*(2), 221–233.

Blomström, M., Kokko, A., & Mucchielli, J.-L. (2003). The economics of foreign direct investment incentives. *NBER Working Paper 9489, National Bureau of Economic Research*.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115–143.

Borensztein, E., De Gregorio, J., & Lee, J.-W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, *45*(1), 115–135.

Burnside, C., & Dollar, D. (2000). Aid, policies, and growth. *American Economic Review*, *90*(4), 847–868.

Carkovic, M., & Levine, R. (2002). Does foreign direct investment accelerate economic growth? mimeo. *Department of Finance, University of Minnesota*.

Caselli, F. (2005). Accounting for cross-country income differences. *Handbook of Economic Growth*, *1*, 679–741.

Catrinescu, N., Leon-Ledesma, M., Piracha, M., & Quillin, B. (2009). Remittances, institutions, and economic growth. *World Development*, *37*(1), 81–92.

Chami, R., Fullenkamp, C., & Jahjah, S. (2005). Are immigrant remittance flows a source of capital for development? *IMF Staff papers*, *52*(1), 55–81.

Chinn, M. D., & Ito, H. (2006). What matters for financial development? capital controls, institutions, and interactions. *Journal of Development Economics*, *81*(1), 163–192.

Chowdhury, M. (2016). Financial development, remittances and economic growth: Evidence using a dynamic panel estimation. *Margin: The Journal of Applied Economic Research*, *10*(1), 35–54.

Combes, J.-L., & Ebeke, C. (2011). Remittances and household consumption instability in developing countries. *World Development*, *39*(7), 1076–1089.

Comes, C.-A., Bunduchi, E., Vasile, V., & Stefan, D. (2018). The impact of foreign direct investments and remittances on economic growth: A case study in central and eastern europe. *Sustainability*, *10*(1), 238.

Connell, J., & Brown, R. P. (1995). Migration and remittances in the south pacific: Towards new perspectives. *Asian and Pacific Migration Journal*, *4*(1), 1–33.

Coon, M., & Neumann, R. (2018). Follow the money: Remittance responses to fdi inflows. *Journal of Globalization and Development*, *8*(2).

Córdova, J. E. L. (2005). Globalization, migration and development: the role of Mexican migrant remittances. *Economia*, *6*(1), 217–256.

Curwin, K. D., & Mahutga, M. C. (2014). Foreign direct investment and economic growth: New evidence from post-socialist transition countries. *Social Forces*, *92*(3), 1159–1187.

Davies, R. B., & Voy, A. (2009). The effect of fdi on child labor. *Journal of Development Economics*, *88*(1), 59–66.

De Mello, L. R. (1999). Foreign direct investment-led growth: evidence from time series and panel data. *Oxford Economic Papers*, *51*(1), 133–151.

Denault, J. (2011). A comparative analysis of development: Foreign direct investment and remittances in Latin America. *Bryant Economic Research Paper*, *4*(3), 22–35.

Driffield, N., & Jones, C. (2013). Impact of FDI, ODA and migrant remittances on economic growth in developing countries: A systems approach. *The European Journal of Development Research*, *25*(2), 173–196.

Durham, J. B. (2004). Absorptive capacity and the effects of foreign direct investment and equity foreign portfolio investment on economic growth. *European Economic Review*, *48*(2), 285–306.

Dzeha, G. C. O., Turkson, F. E., Agbloyor, E. K., & Abor, J. Y. (2018). Total factor productivity growth and human development: The role of remittances in Africa. *African Journal of Economic and Sustainable Development*, *7*(1), 47–72.

Easterly, W., & Levine, R. (2002). It's not factor accumulation: stylized facts and growth models. *World Bank Economic Review*, *15*, 177–219.

Eaton, J., & Kortum, S. (2001). Trade in capital goods. *European Economic Review*, *45*(7), 1195–1235.

Edwards, A. C., & Ureta, M. (2003). International migration, remittances, and schooling: evidence from El Salvador. *Journal of Development Economics*, *72*(2), 429–461.

Elboiashi, H. A. (2011). *The effect of fdi and other foreign capital inflows on growth and investment in developing economies* (Unpublished doctoral dissertation). University of Glasgow.

Escaleras, M., & Register, C. A. (2011). Natural disasters and foreign direct investment. *Land Economics*, *87*(2), 346–363.

Etowa, E. B., Nweze, N. J., & Arene, C. J. (2014). Effects of migrant remittances on farm household welfare in Nigeria. *Review of Agricultural and Applied Economics (RAAE)*, *18*(395-2016-24341), 3–10.

Feeny, S., Iamsiraroj, S., & McGillivray, M. (2014a). Growth and foreign direct investment in the Pacific Island countries. *Economic Modelling*, *37*, 332–339.

Feeny, S., Iamsiraroj, S., & McGillivray, M. (2014b). Remittances and economic growth: larger impacts in smaller countries? *The Journal of Development Studies*, *50*(8), 1055–1066.

Ferdaous, J. (2016). Impact of remittances and fdi on economic growth: A panel data analysis. *Journal of Business Studies Quarterly*, *8*(2), 58.

Frankel, J. (2011). Are bilateral remittances countercyclical? *Open Economies Review*, *22*(1), 1–16.

Fullenkamp, C., Cosimano, M. T. F., Gapen, M. T., Chami, M. R., Montiel, M. P., & Barajas, M. A. (2008). *Macroeconomic consequences of remittances* (No. 259). International Monetary Fund.

Gapen, M. T., Chami, M. R., Montiel, M. P., Barajas, M. A., & Fullenkamp, C. (2009). *Do workers' remittances promote economic growth?* (No. 9-153). International Monetary Fund.

Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, *90*(1), 144–152.

Globerman, S., & Shapiro, D. M. (1999). The impact of government policies on foreign direct investment: The Canadian experience. *Journal of International Business Studies*, *30*(3), 513–532.

Glytsos, N. P. (1993). Measuring the income effects of migrant remittances: A methodological approach applied to Greece. *Economic Development and Cultural Change*, *42*(1), 131–168.

Golitsis, P., Avdiu, K., & Szamosi, L. T. (2018). Remittances and FDI effects on economic growth: A VECM and GIRFs for the case of Albania. *Journal of East-West Business*, *24*(3), 188–211.

Gopalan, S., & Rajan, R. S. (2009). *Remittances as a source of external financing in South Asia*. Institute of South Asian Studies, National University of Singapore.

Gossel, S. J. (2018). FDI, democracy and corruption in Sub-Saharan Africa. *Journal of Policy Modeling*, *40*(4), 647–662.

Greene, W. H. (2002). *Econometric analysis*. Prentice Hall.

Grossman, G. M., & Helpman, E. (1991). *Innovation and growth in the global economy*. MIT press.

Haddad, M., & Harrison, A. (1993). Are there positive spillovers from direct foreign investment?: Evidence from panel data for Morocco. *Journal of Development Economics*, *42*(1), 51–74.

Hall, R. E., & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others? *The Quarterly Journal of Economics*, *114*(1), 83–116.

Hansen, H., & Rand, J. (2006). On the causal links between FDI and growth in developing countries. *World Economy*, *29*(1), 21–41.

Hansen, H., & Tarp, F. (2001). Aid and growth regressions. *Journal of Development Economics*, *64*(2), 547–570.

Harrison, A. (1996). Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of Development Economics*, *48*(2), 419–447.

Hassan, G. M., Chowdhury, M., & Bhuyan, M. (2016). Growth effects of remittances in Bangladesh: Is there a u-shaped relationship? *International Migration*, *54*(5), 105–121.

Hayakawa, K., et al. (2009). First difference or forward orthogonal deviation-which transformation should be used in dynamic panel data models?: A simulation study. *Economics Bulletin*, *29*(3), 2008–2017.

Herzer, D., & Donaubauer, J. (2018). The long-run effect of foreign direct investment on total factor productivity in developing countries: a panel cointegration analysis. *Empirical Economics*, *54*(2), 309–342.

Iamsiraroj, S., & Ulubaşoğlu, M. A. (2015). Foreign direct investment and economic growth: A real relationship or wishful thinking? *Economic Modelling*, *51*, 200–213.

Imai, K. S., Gaiha, R., Ali, A., & Kaicker, N. (2014). Remittances, growth and poverty: New evidence from Asian countries. *Journal of Policy Modeling*, *36*(3), 524–538.

Inoue, T. (2018). Financial development, remittances, and poverty reduction: Empirical evidence from a macroeconomic viewpoint. *Journal of Economics and Business*, *96*, 59–68.

Jahjah, S., Chami, R., & Fullenkamp, C. (2003). *Are immigrant remittance flows a source of capital for development?* (Tech. Rep.). International Monetary Fund.

Javorcik, B. S. (2004). Does foreign direct investment increase the productivity of domestic firms? in search of spillovers through backward linkages. *American Economic Review*, *94*(3), 605–627.

Javorcik, B. S., Özden, Ç., Spatareanu, M., & Neagu, C. (2011). Migrant networks and foreign direct investment. *Journal of Development Economics*, *94*(2), 231–241.

Jawaid, S. T., & Raza, S. A. (2016). Effects of workers' remittances and its volatility on economic growth in South Asia. *International Migration*, *54*(2), 50–68.

Joshi, N. (2016). The effect of foreign direct investment, foreign aid and international remittance on economic growth in South Asian countries https://repository.stcloudstate.edu/econ_etds.

Kathuria, V. (2001). Foreign firms, technology transfer and knowledge spillovers to Indian manufacturing firms: a stochastic frontier analysis. *Applied Economics*, *33*(5), 625–642.

King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics*, *108*(3), 717–737.

Klenow, P. J., & Rodriguez-Clare, A. (1997). The neoclassical revival in growth economics: Has it gone too far? *NBER Macroeconomics Annual*, *12*, 73–103.

Kosack, S., & Tobin, J. (2006). Funding self-sustaining development: The role of aid, FDI and government in economic success. *International Organization*, *60*(1), 205–243.

Kottaridi, C., & Stengos, T. (2010). Foreign direct investment, human capital and non-linearities in economic growth. *Journal of Macroeconomics*, *32*(3), 858–871.

Kratou, H., & Gazdar, K. (2018). Do institutions and financial development determine the remittances-growth nexus in Africa? *Mondes en Developpement*(3), 91–112.

Kumar, R. R., Stauvermann, P. J., Kumar, N. N., & Shahzad, S. J. H. (2018). Revisiting the threshold effect of remittances on total factor productivity growth in South Asia: a study of Bangladesh and India. *Applied Economics*, *50*(26), 2860–2877.

Kunz, R. (2008). 'remittances are beautiful'? gender implications of the new global remittances trend. *Third World Quarterly*, *29*(7), 1389–1409.

La Porta, R., Lopez-de Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal determinants of external finance. *The Journal of Finance*, *52*(3), 1131–1150.

Le, T. (2009). Trade, remittances, institutions, and economic growth. *International Economic Journal*, *23*(3), 391–408.

Le, T., & Bodman, P. M. (2011). Remittances or technological diffusion: which drives domestic gains from brain drain? *Applied Economics*, *43*(18), 2277–2285.

Li, C., & Tanna, S. (2019). The impact of foreign direct investment on productivity: New evidence for developing countries. *Economic Modelling*, *80*, 453–466.

Li, X., & Liu, X. (2005). Foreign direct investment and economic growth: an increasingly endogenous relationship. *World Development*, *33*(3), 393–407.

Lim, M. E.-G. (2001). *Determinants of, and the relation between, foreign direct investment and growth: a summary of the recent literature* (No. 1-175). International Monetary Fund.

Lipton, M. (1980). Migration from rural areas of poor countries: the impact on rural productivity and income distribution. *World Development*, *8*(1), 1–24.

Liu, X., & Wang, C. (2003). Does foreign direct investment facilitate technological progress?: Evidence from Chinese industries. *Research Policy*, *32*(6), 945–953.

Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, *22*(1), 3–42.

Lueth, E., & Ruiz-Arranz, M. (2006). *A gravity model of workers' remittances* (No. 2006-2290). International Monetary Fund.

Lutz, H. (2010). Gender in the migratory process. *Journal of Ethnic and Migration Studies*, *36*(10), 1647–1663.

Makiela, K., & Ouattara, B. (2018). Foreign direct investment and economic growth: Exploring the transmission channels. *Economic Modelling*, *72*, 296–305.

Makki, S. S., & Somwaru, A. (2004). Impact of foreign direct investment and trade on economic growth: Evidence from developing countries. *American Journal of Agricultural Economics*, *86*(3), 795–801.

Makun, K. K. (2018). Imports, remittances, direct foreign investment and economic growth in Republic of the Fiji Islands: An empirical analysis using ARDL approach. *Kasetsart Journal of Social Sciences*, *39*(3), 439–447.

Malikane, C., & Chitambara, P. (2017). Foreign direct investment, democracy and economic growth in southern Africa. *African Development Review*, *29*(1), 92–102.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics*, *107*(2), 407–437.

Mencinger, J. (2003). Does foreign direct investment always enhance economic growth? *Kyklos*, *56*(4), 491–508.

Mustafa, R., & Anwar, S. R. (2017). Effects of remittances and fdi on the economic growth of Bangladesh. *International Journal of Economics, Business and Management Research*, *1*(5), 497–504.

Narayan, P. K., Narayan, S., & Mishra, S. (2011). Do remittances induce inflation? fresh evidence from developing countries. *Southern Economic Journal*, *77*(4), 914–933.

Nelson, R. R., & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. *The American Economic Review*, *56*(1/2), 69–75.

Neuhaus, M. (2006). *The impact of FDI on economic growth: an analysis for the transition countries of Central and Eastern Europe*. Springer Science & Business Media.

Ng, T. H. (2006). Foreign direct investment and productivity: evidence from the East Asian economies. *UNIDO, Staff working paper*, *3*, 2006.

Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society*, 1417–1426.

Nsiah, C., & Fayissa, B. (2013). Remittances and economic growth in Africa, Asia, and Latin American-Caribbean countries: a panel unit root and panel cointegration analysis. *Journal of Economics and Finance*, *37*(3), 424–441.

Pegkas, P. (2015). The impact of fdi on economic growth in Eurozone countries. *The Journal of Economic Asymmetries*, *12*(2), 124–132.

Pozo, S., & Amuedo-Dorantes, C. (2006). Remittances as insurance: Evidence from mexican migrants. *Journal of Population Economics*, *19*(2), 227–254.

Pradhan, G., Upadhyay, M., & Upadhyaya, K. (2008). Remittances and economic growth in developing countries. *The European Journal of Development Research*, *20*(3), 497–506.

Prescott, E. C. (1998). Lawrence R. Klein lecture 1997: Needed: A theory of total factor productivity. *International Economic Review*, 525–551.

Rao, B. B., & Hassan, G. M. (2011). A panel data analysis of the growth effects of remittances. *Economic Modelling*, *28*(1-2), 701–709.

Ratha, D. (2003). Workers' remittances: An important and stable source of external development finance. *Global Development Finance*.

Richard, A. H. J. (2002). *Precautionary saving from different sources of income: evidence from rural pakistan*. The World Bank.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of Economic Growth*, *9*(2), 131–165.

Romer, P. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, *94*(5), 1002–1037.

Romer, P. (1990). Endogenous technological change. *Journal of Political Economy*, *98*(5), S71–102.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system gmm in stata. *The Stata Journal*, *9*(1), 86–136.

Rothgeb Jr, J. M. (1988). Direct foreign investment in mining and manufacturing in underdeveloped states. *The Social Science Journal*, *25*(1), 21–43.

Russell, S. S. (1986). Remittances from international migration: A review in perspective. *World Development*, *14*(6), 677–696.

Sachs, J. D., Warner, A., Åslund, A., & Fischer, S. (1995). Economic reform and the process of global integration. *Brookings Papers on Economic Activity*, *1995*(1), 1–118.

Sadik, A. T., & Bolbol, A. A. (2001). Capital flows, fdi, and technology spillovers: evidence from Arab countries. *World Development*, *29*(12), 2111–2125.

Samargandi, N., Fidrmuc, J., & Ghosh, S. (2015). Is the relationship between financial development and economic growth monotonic? Evidence from a sample of middle-income countries. *World Development*, *68*, 66–81.

Schiantarelli, F. (2005). *Global economic prospects 2006: economic implications of remittances and migration*. The World Bank.

Shahid, F., Hassan, S., Bakhsh, K., & Tabasam, N. (2013). Role of foreign direct investment and remittances in the economic growth of Pakistan. *Forman Journal of Economic Studies*, *9*.

Sodu, K. (2002). *Foreign direct investment for development. maximizing benefits minimizing costs.* OECD Report.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, *70*(1), 65–94.

Tahir, M., Estrada, M. A. R., & Afridi, M. A. (2019). Foreign inflows and economic growth: An empirical study of the SAARC region. *Economic Systems*, *43*(3-4), 100702.

Tahir, M., Khan, I., & Shah, A. M. (2015). Foreign remittances, foreign direct investment, foreign imports and economic growth in Pakistan: A time series analysis. *Arab Economic and Business Journal*, *10*(2), 82–89.

Taylor, E. J. (1999). The new economics of labour migration and the role of remittances in the migration process. *International Migration*, *37*(1), 63–88.

Temple, J. (1999). The new growth evidence. *Journal of Economic Literature*, *37*(1), 112–156.

Tiwari, A. K., & Mutascu, M. (2011). Economic growth and FDI in Asia: A panel-data approach. *Economic Analysis and Policy*, *41*(2), 173–187.

Todaro, M. P., & Smith, S. C. (2012). *Economic development.* Pearson.

Vadlamannati, K. C., & Tamazian, A. (2009). Growth effects of FDI in 80 developing economies: The role of policy reforms and institutional constraints. *Journal of Economic Policy Reform*, *12*(4), 299–322.

Vargas-Silva, C., Jha, S., & Sugiyarto, G. (2009). Remittances in Asia: Implications for the fight against poverty and the pursuit of economic growth. *Asian Development Bank Economics Working Paper Series*(182).

Wang, M., & Wong, M. S. (2009). Foreign direct investment and economic growth: The growth accounting perspective. *Economic Inquiry*, *47*(4), 701–710.

Woo, J. (2009). Productivity growth and technological diffusion through foreign direct investment. *Economic Inquiry*, *47*(2), 226–248.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. MIT press.

Xu, B. (2000). Multinational enterprises, technology diffusion, and host country productivity growth. *Journal of Development Economics*, *62*(2), 477–493.

Yildirim, A., & Gokalp, M. (2016). Institutions and economic performance: A review on the developing countries. *Procedia Economics and Finance*, *38*, 347–359.

Ziesemer, T. H. (2012). Worker remittances, migration, accumulation and growth in poor developing countries: Survey and analysis of direct and indirect effects. *Economic Modelling*, *29*(2), 103–118.

Chapter 3

Migrant Remittances and Economic Complexity: Evidence from Panel Data Approach

Abstract

In development economics, the main emphasis has been on transforming economies from traditional sectors of production to more sophisticated(productive) sectors to transform them. In this study, we explore the role of migrant remittances on economic complexity. In order to study empirically, we use the economic complexity index (ECI) and migrant remittances inflows over the period of 2005 to 2020. To perform econometric analysis, we use the system GMM. Our results show a negative link between economic complexity and migrant remittances. However, our analysis reveals an interesting finding that the interaction of migrant remittances and education is positively associated with economic complexity. Specifically, we find that the positive effect of migrant remittances on economic complexity is amplified in the presence of higher education levels. These findings suggest that while migrant remittances may not necessarily lead to economic complexity on their own, they can contribute to it when combined with higher levels of education. Our study sheds light on the potential role of education in maximizing the positive impact of remittances on economic development. The results of this study carry significant implications for policymakers and highlight the need for a more comprehensive approach to fully understand the impact of remittances on economic development through economic sophistication.

Keywords: Economic Complexity Index, Migrant Remittances, Education, System GMM, Panel data

JEL: F21 F22 O15 O40

3.1 Introduction

Economic development is a very complex phenomenon. In economic development, countries continuously strive to upgrade their production capabilities to move into higher productive sectors (Ferrarini & Scaramozzino, 2013). So, in understanding the mechanics of economic development, knowing productivity capabilities essentially become important. According to Hidalgo and Hausmann (2009), goods produced by countries can be determined by their productive capabilities, such as inputs, technologies, ideas, and collective knowledge used in the production processes. These productive capabilities actually determine the economic frontiers of an economy.

It is not easy to measure such diverse and complex productive capabilities. It is, therefore, Hidalgo and Hausmann (2009), introducing the economic complexity index (ECI) as a proxy to measure productive capabilities indirectly by looking at the products exported by countries. According to Hidalgo and Hausmann (2009), the primary idea is that these productive capabilities determine a basket of products produced in a country, which in turn determines the export bundles of that country and, thereby, determines the economic capability of that economy. For instance, if two countries export the same basket of products, it will be considered that both countries have similar productive capabilities to produce similar products.

The literature has acknowledged the importance of the underlying capabilities as a condition for long-term growth in development economics. Many years ago, the pioneers of development economics like Singer (1950); Lewis (1955); Rostow (1959); Kaldor (1967) and many other development economists have given greater emphasis on the role of structural transformation of the economies. i.e., changing from traditional economies (agricultural) to more diversified economies (industrial) through the use of modern technological know-how and technologies in the production processes (Hartmann et al., 2017). Along the same lines, Kremer (1993) has greatly emphasized the role of capabilities in promoting innovation, economic growth, and development. Hence, the structural change supported by innovation is critical in creating new sectors crucial for sustainable economic development (Saviotti et al., 2016).

Due to the complex nature of the production processes, it was challenging to gauge the productive abilities of the economies. However, the introduction of economic complexity measures has increased the interest in the macroeconomic role of structural transformation. This economic complexity measure helps quantify a country's productive structure (Hartmann et al., 2017). Additionally, the economic complexity measure helps determine economies' global productive capabilities. In this respect, production capabilities are stronger in countries with more complex production structures. A country's development process will be faster with greater produc-

tion capabilities, enabling it to participate in production with greater productivity (Felipe et al., 2012). Therefore, ECI helps develop strategies that promote the accumulation of capabilities, which further leads to the creation of new capabilities and products (Hidalgo & Hausmann, 2009). In order to achieve economic and resource transformations, it is necessary to optimally utilize the available physical and human resources to improve production capabilities.

In recent times, the measure of economic complexity has received wide recognition among researchers and policymakers due to the fact that ECI is highly predictive of future economic growth. It has been argued in the economic complexity approach that countries with high income are more likely to produce more complex and sophisticated products and export more technology-intensive products (Tacchella et al., 2013). Similarly, higher GDP growth of developed economies is linked to their production of more complex goods interlinked with diverse sets of products and industries (Ferrarini & Scaramozzino, 2016). This economic diversification leads to income and economic growth in an economy (Hidalgo & Hausmann, 2009). The countries with greater abilities to produce complex products are more likely to have high yields compared to countries with lesser production abilities (Tacchella et al., 2013). In this regard, economic complexity can predict long-term growth (Ourens, 2012). In view of Kremer (1993); Acemoglu and Zilibotti (1999); Bell et al. (1995) capabilities play a central role in acquiring economic growth and development. It is also evident from the economic complexity literature that differences in income among countries are mainly due to the differences in their economic capabilities.

Migrant remittances[1] are one of the key external financial inflows that play a crucial role in shaping countries' economic fortunes. Most importantly, many social and economic benefits are associated with these inflows. Remittances, along with the monetary aspects, have also played a pivotal role in constant circulation between migrants and their countries of origin (Taborga, 2008). Remittances are believed to be critical in developing the countries of origin (Taborga, 2008). In addition, remittances are important in increasing investment and overall income (Glytsos, 2002; Bjuggren & Dzansi, 2008). For a long time, remittances have had the potential to create conditions by which households attain a better quality of life and increased potential for improving living conditions and overall well-being (Orozco, 2013). There are several positive aspects associated with migrant remittances in the promotion of economic development. Remittances help in reducing the severity of poverty (Plaza & Ratha, 2011).

[1]The terms migrant remittances, personal remittances, and remittances are used interchangeably throughout this chapter.

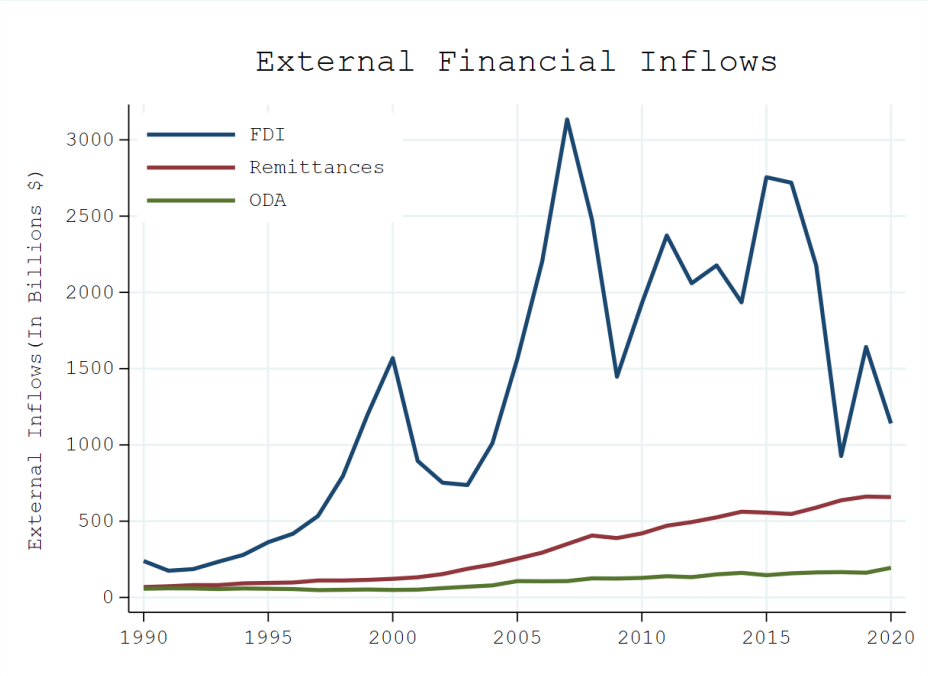


Figure 3.1.1: FDI, Migrant Remittances and ODA in the World (in billion $). Source: Data from WDI, World Bank

Similarly, Bjuggren and Dzansi (2008) show that remittances with high-quality institutional frameworks and developed credit markets have the potential to increase investment in the recipient economies. Remittances also diversify household income and help bring investment (Plaza & Ratha, 2011). Moreover, remittances are also helpful in improving financial position and creating opportunities for investment (Le, 2011). The diaspora's contribution ranges from sending remittances and sharing knowledge to boosting trade links and better access to foreign capital markets (Plaza & Ratha, 2011). In addition, studies have shown that remittances significantly impact investments in education, healthcare, and other essential services.

Migrant remittances exhibit a consistent upward trend in comparison to the other external inflows, such as FDI and ODA. In this respect, Figure 3.1.1 shows external financial inflows from 1990 to 2020 worldwide. Similarly, Figure 3.1.2 shows the inflow of FDI, migrant remittances, and ODA in developing countries over the period of 1990-2020. It is clear from Figure 3.1.2 that migrant remittances are increasing faster in developing countries than in the world. This shows that migrant remittances are significant for countries in both households and at the country's level.

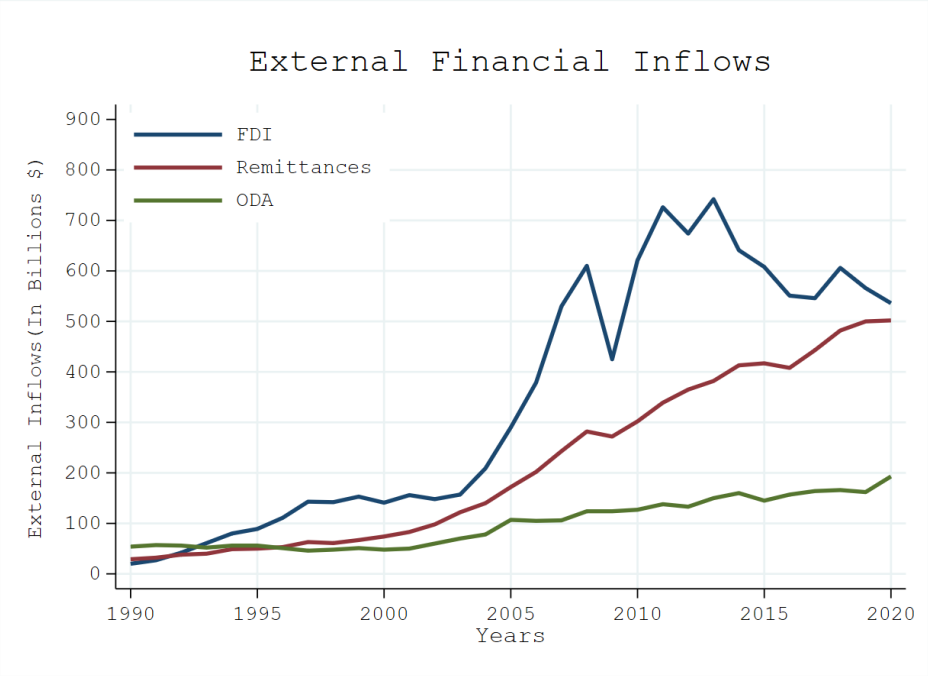


Figure 3.1.2: FDI, Migrant Remittances and ODA in Developing Countries (in billion $). Source: Data from WDI, World Bank

Keeping in mind the importance of migrant remittances in the macroeconomic context, we aim to investigate how remittances contribute to structural change and economic development directly or indirectly through education.

3.1.1 Objectives of the Study

It is clear from the literature on economic complexity that countries with strong capabilities grow faster and enjoys the fruits of development (Hausmann et al., 2014; Hidalgo & Hausmann, 2009; Hartmann et al., 2017). Policymakers and economists are searching for ways to improve production capabilities in countries, but this question is still open to discussion and further research. The objective of this research study is to examine the impact of migrant remittances on economic complexity, focusing on understanding how remittances affect economic diversification, innovation, and productivity. Specifically, the study aims to explore the following research questions:

- How do migrant remittances affect economic complexity, as measured by indicators such as the Economic Complexity Index (ECI)?
- What are the mechanisms through which remittances impact economic complexity, including the role of remittances in supporting human capital development?

- How do the effects of remittances on economic complexity vary across different types of economies, such as low-income versus middle-income countries or resource-rich versus resource-poor countries, by including regional and income dummies to check for the regional and income heterogeneities in our sample?

By addressing these questions, the study aims to help improve understanding of the economic effects of remittances and inform policies and interventions aimed at leveraging remittances to promote economic development and diversification.

The remainder of the paper is organized as follows. Section 3.2 discusses the review of the literature and explains the link between migrant remittances and economic complexity. Section 3.3 sheds light on empirical strategy and data. Section 3.4 outlines the results, and section 3.5 provides some robustness checks. Section 3.6 concludes.

3.1.2 Economic Complexity and Migrant Remittances: Some Stylized Facts

The study of economic complexity and migrant remittances has provided valuable insights, offering a set of established patterns that can enhance our comprehension of the subject. In this respect, the reports on economic complexity[2] give sufficient evidence of how the level of complexity of economies is changing over the period. Table 3.1.1 depicts the ranking and economic complexity of the top ten complex economies over a period of time. It is shown how the economic complexity of different economies is changing over time. In this respect, in 2000, South Korea was not on the list of top complex economies. However, in 2020, it was the fourth on the list. Similarly, the USA was among the top ten complex economies in 2000 but did not find a spot in the top ten complex economies in 2020. These trends of changing economic complexity among economies across the globe indicate the pattern of evolution of economic complexity and production patterns.

Among many aspects of globalization, migration is one of the most prominent aspects. The influx of migrant stock has increased multi folds during the last three decades. In this respect, statistics show that the share of the foreign-born population in OECD countries alone has increased from 7 to 13 percent on average between 1970 and 2010 (Bahar et al., 2020). In fact, some countries have even witnessed an exponential rise in the inflow of migrants, i.e., Spain (1.1 to 15%), Greece (1 to 10%), and Portugal (1 to 9%) during the period of 1970 to 2010. These demographic changes in

[2]See Altas of Economic complexity.

Table 3.1.1: Top Ten Countries based on Highest ECI in the Years 2000, 2010, and 2020

2000			2010			2020		
Country	**Ranking**	**ECI**	**Country**	**Ranking**	**ECI**	**Country**	**Ranking**	**ECI**
Japan	1	2.82	Japan	1	2.44	Japan	1	2.27
Germany	2	2.38	Switzerland	2	2.14	Switzerland	2	2.14
Switzerland	3	2.27	Germany	3	2.12	Germany	3	1.96
United Kingdom	4	2.10	Singapore	4	2.01	South Korea	4	1.95
Sweden	5	2.09	Austria	5	1.82	Singapore	5	1.87
USA	6	1.99	Sweden	6	1.82	Czechia	6	1.78
Finland	7	1.97	Czechia	7	1.77	Austria	7	1.70
Austria	8	1.82	South Korea	8	1.75	Sweden	8	1.59
Ireland	9	1.65	Finland	9	1.69	Hungary	9	1.54
France	10	1.64	Hungary	10	1.65	United Kingdom	10	1.54

Source: Data from Atlas of Economic Complexity

the OECD countries are mainly due to migration from developing countries (Bahar et al., 2020). According to International Fund for Agricultural Development (IFAD) (2021), 200 million out of 250 million international migrants send remittances and support their families[3].

Table 3.1.2: Top Ten Remittances Receiving Countries (in Billion US $)

2000		2010		2020	
Country	**Remittance Inflows**	**Country**	**Remittance Inflows**	**Country**	**Remittance Inflows**
India	12.88	India	53.48	India	83.15
France	8.87	China	52.46	China	59.51
Mexico	7.52	Mexico	22.08	Mexico	42.88
Philippines	6.92	Philippines	21.56	Philippines	34.88
United Kingdom	5.07	France	19.90	Egypt	29.60
Spain	4.86	Nigeria	19.74	France	28.82
Turkey	4.56	Germany	12.79	Pakistan	26.09
Korea, Rep.	4.52	Egypt	12.45	Bangladesh	21.75
USA	4.40	Belgium	10.99	Germany	19.36
Germany	3.60	Bangladesh	10.85	Nigeria	17.21
Developing Countries	**70.49**	**Developing Countries**	339.72	**Developing Countries**	**541.94**
World	**122.48**	**World**	**472.06**	**World**	**711.04**

Source: Data taken from World Bank.

In this respect, Table 3.1.2 shows the top ten remittance-receiving countries. It is evident from the information in Table 3.1.2 that most of the top remittance-receiving countries are developing countries. On the other hand, most of the remittances are received from countries are developed countries. That is why remittances are one of the most important external financial inflows for low and middle-income countries. According to World Bank (2022), in 2020, 771.04 billion US $ was received across the globe, out of which 541.94 billion US $ was received only by developing countries. This is indicative of the fact that how migrant remittances are important for developing

[3]https://www.ifad.org/en/remittances

Table 3.1.3: Top Ten Remittances Receiving Countries as a Percentage of GDP

2000		2010		2020	
Country	**Remittance/GDP**	**Country**	**Remittance/GDP**	**Country**	**Remittance/GDP**
Lesotho	53.83	Tajikistan	35.81	Tonga	39.30
Bosnia and Herzegovina	28.40	Lesotho	27.30	Kyrgyz Republic	31.14
Jordan	21.81	Kyrgyz Republic	26.41	Tajikistan	26.88
West Bank and Gaza	20.03	Moldova	25.13	Somalia	25.21
Samoa	17.38	Nepal	21.65	Nepal	24.25
Albania	17.18	Samoa	20.36	El Salvador	24.15
Cabo Verde	16.65	Tonga	20.18	Haiti	23.82
El Salvador	14.97	Bermuda	19.01	Samoa	23.50
Moldova	13.78	Kosovo	18.84	Honduras	23.45
Yemen, Rep.	13.34	El Salvador	18.82	Gambia, The	22.98

Source: Data taken from World Bank.

countries.

Table 3.1.3 shows the inflows of migrant remittances as a percentage of GDP in the top ten recipient countries. One of the most prominent features of the migrant remittances inflows as a percentage of GDP are mostly among developing countries. In this respect, all top ten recipient counties are developing economies or small economies. For example, in 2020, the remittance inflow as a percentage of GDP was 39.30 percent of Tonga, a small island economy. In a similar fashion, Figures 3.7.1 and 3.7.2 show the trends of migrant remittances across different regions and income groups.

3.2 Literature Review and Linking Economic Complexity and Migrant Remittances

The importance of economic complexity and sophistication in boosting the economic growth of nations has been widely recognized by numerous researchers. This fact is reflected in the existing literature on the topic. It has been demonstrated how the network of production and types of economic activities influence economic growth and diversification (Ferraz et al., 2021). The importance of economic diversity in attaining economic development has been addressed in both trade and regional and local development literature (Rodrik, 2005; ?, ?). Economic expansion through economic activities and market give rise to economic sophistication. This economic diversity helps expand economic activities in the countries while reducing their exposure to economic downturns, market fluctuations, and technological shifts (Ferraz et al., 2021).

Acquiring appropriate knowledge and skills are some of the most important inputs in the process of production. So, in order to increase productivity and efficiency,

people and businesses must specialize in certain activities based on available knowledge (Chu & Hoang, 2020). Although to put this knowledge into work, it should be together through organizational and individual networks (Hausmann et al., 2014). Ultimately, in formulating, managing, and operating industrial activities, individuals with diverse knowledge interact (Felipe et al., 2012). As a result, individuals, organizations, and organizational networks build productive skills at various levels (Hausmann et al., 2014). Hence, a huge amount of knowledge can easily be communicated through large networks, which ultimately helps in the creation of diverse and complex products (Le Caous & Huarng, 2021). It is greatly emphasized in the modern literature on economic development literature regarding the role of economic complexity and sophistication in bringing competition and growth (Hausmann & Rodrik, 2003; Rodrik, 2004; Saviotti & Pyka, 2004; Frenken et al., 2007; Hidalgo et al., 2007). In this regard, the economic complexity index is primarily used to quantify the knowledge and capabilities available in a country. So, through the exchange of knowledge and professional experiences, a vast network is established, enabling for transmission and improvement of collective knowledge allowing for the production of diverse and complex goods (Le Caous & Huarng, 2021).

Migrant remittances, an important aspect of migration (King et al., 2016), are potential external financial inflow, playing a significant role in creating opportunities in the form of increasing consumption, bringing investment, and improving the overall economic welfare of the countries. In achieving broad-based development, migration and remittances are pivotal (Imai et al., 2014). According to Plaza and Ratha (2011), migrant remittances have played a significant role at household and aggregated levels through macroeconomic management, labor force participation, education and health outcomes, income distribution, and patterns of household expenditure. Remittances are considered an effective way of "bottom-up"[4] development by directing resources to the more needy and deserving (King et al., 2016). Remittances stimulate economic development (Mlambo & Kapingura, 2020).

According to New Economics of Labour Migration (NELM)[5], remittances serve as a form of "insurance" against economic shocks and uncertainty. They can play an es-

[4]Bottom-up development is an approach to economic and social development that emphasizes the participation and empowerment of local communities in identifying their own needs, setting their priorities, and designing and implementing their development projects. In this approach, development is driven by the grassroots rather than imposed from above by external actors such as governments or international organizations.

[5]The New Economics of Labour Migration (NELM) is a theoretical framework developed by economists to explain the motivations and impacts of international labor migration. The NELM approach emphasizes the role of household decision-making and social networks in shaping migration behavior and the importance of understanding the context-specific factors that drive migration. One of the critical insights of the NELM framework is the role of remittances in shaping the economic impacts of migration.

sential role in promoting household welfare and investment in human and physical capital and promote economic development through the rise in income and stimulate investment (Wouterse, 2010). According to Lucas and Stark (1985), there are basically two main motives for migrants to remit, pure altruism, with the desire to support their family back home, and pure self-interest, to invest in their home country, in order to accumulate physical and capital assets. In a similar manner, Elbadawi and Rocha (1992) divide the remittances literature into the “endogenous" approach and the “portfolio" approach. In this regard, the endogenous approach is solely based on the economics of the family. According to this approach, migrants send remittances based on altruism motive. In the portfolio approach, migrants allocate savings assets between their home and host country. According to the portfolio approach, the behavior of remittances is similar to that of all other external financial inflows.

In view of Barajas et al. (2009), remittances may influence economic growth and development in three different ways through capital accumulation, labor force participation, and total factor productivity (TFP). Firstly, remittances can directly improve capital accumulation in the recipient countries by bringing financial capital, which increases physical and human capital. Secondly, remittances influence economic growth through labor force participation in economic activities. Thirdly, remittances may affect TFP through effects on the efficiency of domestic investments and the size of the productive domestic sectors. It is also further emphasized by Imai et al. (2014) that remittances help stimulate growth through capital accumulation and increasing TFP.

Although, it is primarily considered that remittances are used for consumption purposes (Chami et al., 2005). But, along with consumption, there are many other aspects where remittances are contributing to the economic prosperity of countries across the globe. In this respect, remittances help in reducing poverty (Adams Jr & Page, 2005; Taylor et al., 2008; Adams Jr, 2006; Lokshin et al., 2010). It is also evident from the available literature that remittances support education in developing countries (Edwards & Ureta, 2003). Additionally, remittances along with consumption are also used to bring investment in education, and housing (Adams Jr & Cuecuecha, 2010) and business and trade (Woodruff & Zenteno, 2007; Le, 2011) and bring economic sophistication in the form of using advanced knowledge and skills shared by the migrants along with sending remittances.

Remittances through high income provide incentives for higher investment in physical capital assets, education, and health and enable access to a larger pool of knowledge (Imai et al., 2014). Furthermore, remittances also help in the accumulation of capital through access to finance, but this is conditional to the marginal propensity to consume (MPC) of the recipients (Imai et al., 2014). Additionally, remittances are

also used for the purpose of productive investment (Massey & Parrado, 1994; Azizi, 2018). It is noted that households who receive remittances have a high propensity to save. This paves the way for capital investment (IOM, 2006).

Migrant remittances can provide important opportunities for productive investment in countries with limited access to credit (Richter, 2008; Wouterse, 2010). In many developing economies, access to credit can be limited due to weak financial systems, high interest rates, or a lack of collateral. Migrant remittances can help fill this financing gap by providing a source of external finance not tied to traditional lending channels. It is precisely indicated by Bjuggren and Dzansi (2008) that remittances in the presence of well-established institutional and financial framework promote productive investment in the recipient economies. According to Giuliano and Ruiz-Arranz (2009) "Remittances might become a substitute for inefficient or nonexistent credit markets by helping local entrepreneurs bypass lack of collateral or high lending costs and start productive activities." So, their empirical findings show that remittances enhance economic growth in countries with less developed financial systems by providing an alternative way to finance investment and helping overcome liquidity constraints. It is further argued by Aggarwal et al. (2011); Fromentin (2017) that remittances help in the promotion of financial sector development in developing countries.

Migrants rely heavily on remittances as essential investments to boost productivity in their agricultural and non-agricultural ventures (Rozelle et al., 1999; Woodruff & Zenteno, 2007). According to Letsoalo and Ncanywa (2020), migrant remittances help in the promotion of trade. Similarly, remittances through potential spillover effects (Brinkerhoff, 2006) provide significant channels through which they may bring structural changes in the economy. Similarly, remittances can provide capital to small businesses when channeling through credit cooperatives, micro-enterprises, and banking systems (Brinkerhoff, 2006). Consequently, a more sophisticated and diversified structure of the economy will evolve over time. Migration and remittances provide capital and help to improve the productive capabilities (Richter, 2008). "Structural transformation induced by remittances has both economic and social implications related to poverty, income distribution, and economic welfare that, in turn, affect consumption patterns and savings with further implications on development through changes in investment and trade" (Glytsos, 2002). Migrant remittances can also contribute to development and growth as foreign funds for the purchase of capital goods and as a domestic income which gives rise to saving (Glytsos, 2002). It is stated by Adams (2007) that households who receive remittances invest more on average than households without remittances.

Another important aspect through which remittances may affect economic capa-

bilities in the migrants' origin countries is education and human development. According to Ul Haq (1990), human development is the improvement in the capabilities and skills of the people so that they can actively participate in the economic development of their respective countries. In this regard, Irdam (2012) study the impact of remittances on human development and show that remittances positively impact human development in remittance-receiving countries. Similarly, Adenutsi (2010), while studying the impact of migrant remittances in SSA countries, show that remittances help in the promotion of human development in the countries under study. In addition, migrant remittances have a pronounced effect on the level of education in remittance-receiving countries. It is argued by Brinkerhoff (2006) that remittances have increased the level of education in remittance-receiving countries. In a similar vein, a study by Ambler et al. (2015) show that remittances improve educational expenditures and higher private school attendance in El-Salvador households. Hence education is an important channel through which remittances can influence economic development and bring structural transformation in the recipient economies.

Another positive aspect through which remittances may influence economic complexity is research & innovation, and transfer of technology. In this regard, it is also important to note that migrant remittances may also help in facilitating research and innovation, technology transfer, and skill development (Plaza & Ratha, 2011). This point is further elaborated in the literature that households who receive remittances are more likely to use new agricultural technology (Zahonogo, 2011; Quinn, 2009). Likewise, remittances also contribute to the modernization of agriculture through the use of modern technology (Garson, 1994). By the same token, remittances contribute to better access to production technology which helps in improving agriculture productivity (Zahonogo, 2011).

There is another interesting aspect of migrant remittances, social remittances[6], which is not primarily highlighted in the recent literature on remittances. The phrase social remittances were first introduced by sociologist Peggy Levitt in her book "The transnational villagers," wherein the author mentions that migrants send home more

[6]Social remittances refer to behaviors, values, and the transfer of ideas from migrants in their host countries back to their home countries or communities. These ideas can be related to cultural, social, or political aspects of life. Social remittances are transmitted through various channels, such as personal communication, media, and social networks. They can influence the attitudes and behaviors of people in the home country and lead to changes in social norms, practices, and institutions. For example, a migrant who has been exposed to democratic values and practices in their host country may bring back those ideas to their home country and influence political discourse and actions. Similarly, a migrant who has been exposed to new technologies or business practices may bring back those ideas and stimulate economic development in their home country. Social remittances are seen as a positive aspect of migration because they can contribute to social and economic development in the home country.

than money. Social remittances are the norms, ideas, beliefs, and democratic values that migrants transmit back to their home countries through regular interaction with families and friends (Levitt, 1998). Remittances can also affect the economic development framework through social remittances.

In conclusion, the literature review underlines the importance of examining how remittances facilitate economic sophistication and foster economic diversification. Nevertheless, no specific study has been done in the literature to explore the link between economic complexity and migrant remittances. Specifically, from an empirical point of view, to the best of our knowledge, there is no specific paper that directly examines the relationship between migrant remittances and economic complexity. Considering this research gap, this study aims to explain the underlying mechanisms through which this significant financial inflow contributes to enhancing economic complexity on a global scale. Moreover, we aim to explore the role of education as a channel through which migrant remittances can potentially influence economic sophistication and drive structural transformation. By shedding light on these dynamics, this research provides valuable insights for policymakers and stakeholders seeking to leverage the positive impact of remittances on economic development and promote sustainable growth. Hence, this research will be an addition to the literature on economic complexity and migrant remittances.

3.3 Methodology and Data

This section will explain the econometric methodology and data used in the analysis.

3.3.1 Econometric Methodology

To examine the impact of remittances on economic complexity, we use data from 2005-2020, which is the latest data available for ECI. Our empirical equations are as follows,

$$ECI_{i,t} = \beta_0 + \beta_1 ECI_{i,t-1} + \beta_2 Rem_{i,t} + \beta_3 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \tag{3.1}$$

Where $ECI_{i,t}$ is the economic complexity index, $ECI_{i,t-1}$ is lagged economic complexity index, $Rem_{i,t}$ is the inflow of migrant remittances as a percentage of GDP, $X_{i,t}$ is a 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. As a preliminary exercise, we first estimate the impact of remittances on economic growth with pooled OLS and Fixed effect models and then introduce the System Generalized Method of moments (GMM) in our analysis.

It is important to note that usual approaches, such as OLS or fixed effects, are not appropriate with dynamic panel estimates. Indeed, OLS estimates are upward biased[7] since the lagged dependent variable is correlated with the individual component of the error term[8]. Fixed effects are not even more consistent (downward-biased) since the within transformation, in the case of samples with small T and large N, creates a correlation between the error term and the lagged dependent variable (Nickell, 1981).

Our analysis relies, therefore, on the system GMM estimator (Blundell & Bond, 1998), which deals with problems of endogeneity of the lagged dependent variable. The system GMM estimator takes into account both the endogeneity of the variable of interest and all the regressors using their own lags as instruments. It combines into one system the regression in differences (Arellano & Bond, 1991) and the regression in levels (Arellano & Bover, 1995).

In order to further check the impact of remittances on ECI, we introduce the interaction of remittances and human capital. In this regard, it is really important to look for any joint impact of migrant remittances and human capital on ECI. In this respect, in equation 3.2, along with other variables, we included the interaction term of remittances and education.

$$ECI_{i,t} = \beta_0 + \beta_1 ECI_{i,t-1} + \beta_2 Rem_{i,t} + \beta_3 Rem * edu_{i,t} + \beta_4 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (3.2)$$

In order to check for any non-linear impact of remittances on ECI, we introduce the square of remittances in equation 3.3, and in equation 3.4, we use the interaction term and square term of remittances simultaneously.

$$ECI_{i,t} = \beta_0 + \beta_1 ECI_{i,t-1} + \beta_2 Rem_{i,t} + \beta_3 rem^2_{i,t} + \beta_4 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (3.3)$$

$$ECI_{i,t} = \beta_0 + \beta_1 ECI_{i,t-1} + \beta_2 Rem_{i,t} + \beta_3 rem^2_{i,t} + \beta_3 Rem * edu_{i,t} + \beta_4 X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (3.4)$$

[7]Upward bias in econometrics refers to a situation where the estimated coefficients in a statistical model are systematically higher than the true coefficients. There can be several reasons

[8]The term "Nickell bias" refers to a statistical bias that can arise in econometric models when estimating the long-run effects of changes in economic variables over time. Specifically, it is a bias that can occur when estimating the coefficient of a lagged dependent variable in a dynamic panel data model with fixed effects.

3.3.2 Data

We use data from 121 countries from 2005-2020. The selection of countries is solely based on the availability of data. Table 3.3.1 provides information regarding variables with definitions. The list of countries has been given in Table 3.7.1. In this respect, we use data on the economic complexity index (ECI) from the Atlas of Economic Complexity[9]. The ECI measures a country's productive structure through the products it exports and the ubiquity of its products[10] (Hidalgo & Hausmann, 2009).

The idea behind ECI is that advanced economies are diverse and export products that, on average, have low ubiquity because only a few diverse economies can produce these sophisticated products. By the same token, less sophisticated economies are expected to produce products requiring less diverse production processes, so the exported products are more ubiquitous. This variation in the diversity of economic complexity of the countries and ubiquity of products give rise to the measurement of ECI. ECI is calculated using export data of the products in which countries have revealed comparative advantage (RCA) (Hidalgo & Hausmann, 2009). The primary argument behind this idea is that countries export those products in which they have RCA. This means that countries only export products in which they have a certain set of capabilities to produce them. So countries with more complex products in their export basket possess more complex capabilities. Likewise, the products which are less ubiquitous require special capabilities to produce. Whereas the countries with low capabilities produce and export more ubiquitous products.

We are mainly focusing on migrant remittances as our main area of interest for analysis. To ensure accuracy, we will also be including several control variables such as secondary education duration, which is used proxy for human capital in the literature, gross fixed capital formation, trade, unemployment, total natural resource rent, internet usage, and labor force participation, which is also a key factor when analyzing migrant remittances. The data on these variables are obtained from the World Development Indicators (WDI) World Bank. Additionally, we will be utilizing two institutional variables sourced from the Worldwide Governance Indicators (WGI), World Bank. It is shown in the literature on economic complexity that institutions are key to achieving a well-structured economy.

[9]The Atlas of Economic Complexity is an online platform and a comprehensive resource developed by the Center for International Development (CID) at Harvard University. It provides data on the economic complexity of countries, allowing users to explore and understand various aspects of economic development and diversification.

[10]Consult Atlas of economic complexity for definitions and explanations of technical terms for further details.

Table 3.3.1: Definition of Variables

VARIABLES	Definition of Variables	Sources of Data
ECI	The Economic Complexity Index, or ECI, is a measure of an economy's capacity which can be inferred from data connecting locations to the activities in them.	Atlas of Economic Complexity database
Remittances	Personal remittances as a percentage of GDP. Personal remittances comprise personal transfers and compensation of employees.	World Development Indicators
FDI	Foreign Direct Investment (net inflows) as a percentage of GDP. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital, as shown in the balance of payments.	World Development Indicators
Human Capital	Human Capital refers to Secondary education duration, that is, the number of grades (years) in secondary school.	World Development Indicators
Trade Openness	Trade as a percentage of GDP.	World Development Indicators
Gross Fixed Capital Formation (GFCF)	Gross fixed capital formation as a percentage of GDP	World Development Indicators
Unemployment	Unemployment, total (% of total labor force)	World Development Indicators
Total Natural Resource Rent	Total natural resources rents are the sum of oil rents, natural gas rents, and coal rents as a percentage of GDP	World Development Indicators
Internet Usage	Individuals using the Internet (% of population)	World Development Indicators
Labor Force Participation	Labor force participation rate, total (% of total population ages 15-64)	World Development Indicators
Government Effectiveness	Government Effectiveness captures perceptions of the quality of public services, civil service and policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimate gives the country's score on the aggregate indicator in units of standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.	Worldwide Governance Indicators
Rule of Law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, Estimate gives the country's score on the aggregate indicator in units of standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.	Worldwide Governance Indicators

3.4 Empirical Results and Discussion

In this section, we highlight the impact of economic complexity on migrant remittances in the sample of 121 countries over the period of 2005-2020. In this respect, Table 3.4.1 details the descriptive statistics of the variables. The variable ECI has a mean of 0.04 and a standard deviation of 1.00, meaning that economic complexity values across countries vary widely. The minimum value of economic complexity is -2.78, which indicates that some countries have shallow levels of economic complexity. The maximum value is 2.65 indicates that some countries have very high levels of economic complexity. Similarly, the mean for migrant remittances is 3.84, and the standard deviation of 6.00 shows a wide variation in remittances across different countries in the sample under study. The minimum value of 0.00 indicates that some countries receive very little remittances. In contrast, the maximum value of 44.13 shows that some countries are highly dependent on remittances as a source of external income. These statistics suggest the economic importance of remittances and their widespread variation across different countries, and such variation can be influenced by factors such as the size and structure of the migrant population in source countries, the income levels of migrants, and the economic conditions in the home country of the migrants.

Table 3.4.1: Descriptive Statistics

	Mean	SD	Min	Max	N
ECI	0.04	1.00	-2.78	2.65	2048
Remittances(Percentage of GDP)	3.84	6.00	0.00	44.13	2042
FDI(Percentage of GDP)	5.26	14.17	-40.08	280.13	2044
Trade Openness (Percentage of GDP)	83.56	43.39	11.86	437.33	1944
Human Capital	6.44	0.93	4.00	9.00	2048
Unemployment	7.76	5.86	0.10	37.25	2048
Total Natural Resource Rent	7.46	11.32	0.00	68.05	2047
Internet Usage	42.80	30.22	0.07	99.65	1998
Gross Fixed Capital Formation(Percentage of GDP)	23.63	6.75	2.00	81.02	1905
Labor Force Participation	67.96	10.09	41.47	90.34	1920
Government Effectiveness	0.07	0.94	-1.84	2.43	2048
Rule of Law	-0.01	0.97	-1.87	2.12	2048

Similarly, Table 3.7.2 reports a pairwise correlation matrix among variables used for estimation. A correlation coefficient of -0.17 indicates a negative correlation between the ECI and migrant remittances and is statistically significant. This negative

correlation means an increase in ECI tends to decrease the inflows of migrant remittances. Likewise, a correlation coefficient of 0.13 indicates a positive correlation between the ECI and human capital which is also statistically significant. This positive correlation shows that when ECI increases (i.e., indicating greater economic complexity), the value of human capital also tends to increase.

We present our baseline results in Table 3.4.2. In Columns 1-3, we used Pooled OLS and fixed effect models to examine how migrant remittances affect ECI. The first three specifications did not include the lagged dependent variable (Lagged ECI) due to the possibility of Nickell bias[11]. Instead, we used Pooled OLS and fixed effect models to estimate the impact of migrant remittances on ECI, taking into account other relevant variables. These results provide initial insights into the relationship between migrant remittances and ECI but should be viewed cautiously, given the potential endogeneity issues.

In order to further investigate the impact of remittances on ECI in Columns 4-7 of Table 3.4.2, we use the system GMM proposed by Blundell and Bond (1998) to correct the problem of endogeneity. Including the lagged variable in the model allows us to capture the dynamic relationship between the dependent variable and its past values. The lagged variable serves as a proxy for past values' influence on the dependent variable's current value. The lagged ECI is positive and statistically significant in all specifications. These positive coefficients suggest that there is some degree of persistence in the variable over time.

We analyze the impact of migrant remittances on the Economic Complexity Index (ECI) in our study. In Column 4, we find that the coefficient for remittances is negative but not statistically significant. However, when we introduced the interaction of migrant remittances and human capital in Column 5, the coefficient for migrant remittances became negative and statistically significant. Specifically, the coefficient of migrant remittances is -0.172, indicating a negative relationship between the remittances as a percentage of GDP and the ECI. This means an increase in migrant remittances is associated with a decrease of 0.172 units in ECI, holding all other variables constant. In other words, a one percent increase in the percentage of remittances as a share of GDP is associated with a 0.172 unit decrease in the ECI. The negative relationship between migrant remittances and ECI can be explained by several arguments, such as the fact that remittances may not be used to fund productive activities. The relationship between migrant remittances and ECI can be negative because remittances can act as a disincentive for a country to diversify and develop its economy

[11]Using OLS for this empirical problem poses an immediate issue because ECI_{t-1} is correlated with fixed effects in the error terms, leading to "dynamic panel bias," (Nickell, 1981) as cited in (Roodman, 2009)

(Amuedo-Dorantes & Pozo, 2011; Chami et al., 2005). Suppose a country is heavily reliant on remittances as a source of income. In that case, there may be less pressure to invest in its industries and infrastructure and less incentive for entrepreneurs to develop new products and services. For example, if a country depends on remittances as a major source of income, it may not prioritize improving its economy and expanding its ability to export goods. This can result in a lower ECI score because the country may only export primary products instead of manufacturing more sophisticated products.

In Column 6, we introduce the square term of migrant remittances to check for any non-linearity between migrant remittances and ECI, although we do not find any such link. In Column 7, we introduce interactions of migrant remittances and human capital and the square term of migrant remittances simultaneously. Our findings suggest that the sign of the coefficient for migrant remittances is still negative and statistically significant in all the specifications. The interaction term is not only positive but also statistically significant. The positive and statistically significant coefficient for the interaction between migrant remittances and human capital suggests that remittances' impact on economic diversification and sophistication depends on the level of education in the migrant-receiving countries. In other words, the effect of remittances on ECI is stronger when there is a higher level of human capital. These findings align with the idea that remittances can be a source of investment for education and human capital development, contributing to a more diverse and complex economy. When remittances are used to invest in education and skill-building, they can help develop a more productive and innovative workforce that can, in turn, produce and export more complex products.

In Table 3.4.2, we also included control variables in addition to our main variables. The negative coefficients for total natural resource rents in Columns 4, 5, and 7 indicate that there is a negative relationship between economic diversification and sophistication and natural resource rents. This means that countries that rely heavily on natural resource rents tend to have lower levels of economic complexity and diversification. When countries depend too much on natural resource rents, they may be less likely to invest in other industries, such as manufacturing, technology, and services, which results in a less diverse and less sophisticated economy. These findings support the resource curse theory, which suggests that countries relying heavily on natural resource exports may face adverse effects on their economic development due to factors like corruption, volatility in commodity prices, and lack of investment in other sectors.

In our study, we also considered the use of the Internet as a factor that could affect economic diversification and sophistication. The Internet provides access to in-

Table 3.4.2: Baseline Result Using Pooled OLS, FE, and System GMM

	(1) Pooled OLS	(2) FE	(3) FE	(4) System GMM	(5) System GMM	(6) System GMM	(7) System GMM
L.ECI				0.492***	0.475***	0.840***	0.472***
				(0.127)	(0.123)	(0.109)	(0.118)
Remittances(Percentage of GDP)	−0.024***	−0.017***	0.001	−0.006	−0.172*	0.011	−0.162*
	(0.003)	(0.003)	(0.006)	(0.012)	(0.097)	(0.023)	(0.097)
Remittances*Human Capital					0.025*		0.030*
					(0.015)		(0.015)
Remittances Square						−0.000	−0.001
						(0.000)	(0.001)
FDI(Percentage of GDP)	−0.002*	−0.003***	0.000	0.000	−0.000	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
Trade Openness (Percentage of GDP)	0.004***	0.003***	0.001	0.002	0.003	0.002	0.002
	(0.000)	(0.000)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Human Capital	0.095***	0.075***	−0.045	0.066	−0.077	0.006	−0.081
	(0.016)	(0.014)	(0.051)	(0.129)	(0.177)	(0.081)	(0.177)
Unemployment	−0.004*	−0.008***	−0.002	−0.003	−0.006	−0.002	−0.002
	(0.003)	(0.002)	(0.003)	(0.006)	(0.006)	(0.003)	(0.007)
Total Natural Resource Rent	−0.037***	−0.036***	−0.007**	−0.019***	−0.021***	−0.007	−0.018***
	(0.002)	(0.001)	(0.003)	(0.005)	(0.005)	(0.004)	(0.006)
Internet Usage	0.016***	0.022***	−0.001	0.010***	0.010***	0.003	0.011***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)
Gross Fixed Capital Formation(Percentage of GDP)	0.004*	0.006***	0.004**	0.002	−0.003	0.004	0.002
	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.004)	(0.005)
Labor Force Participation	−0.002	−0.003*	0.003	0.001	−0.002	0.001	0.003
	(0.002)	(0.002)	(0.004)	(0.005)	(0.006)	(0.004)	(0.006)
Time FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes	Yes	Yes
Observations	1755	1755	1755	1642	1642	1642	1642
Countries			121	121	121	121	121
R-Square	0.630	0.714	0.045				
AR1 (p-values)				0.000	0.000	0.000	0.000
AR2 (P-values)				0.391	0.439	0.270	0.464
Hansen test(p-values)				0.119	0.302	0.270	0.300

Note: Robust standard errors in parentheses are clustered at the country level. The dependent variable ECI is the Economic Complexity Index .*** p<0.01, ** p<0.05, * p<0.10. All regressions include a constant term and are estimated by OLS, Fixed Effect, and System GMM. L.ECI is the lag of the dependent variable. Remittances(Percentage of GDP) are migrant remittances received as a percentage of GDP. Remittances*Human Capital is the interaction of migrant remittances and Human capital. Remittances Square is the square tern of remittances. FDI(Percentage of GDP) is the net inflows of FDI as a percentage of GDP. Trade Openness (Percentage of GDP) is trading as a percentage of GDP. Human Capital Human Capital refers to Secondary education duration. Unemployment refers to total unemployment (% of the total labor force). Total Natural Resource Rent is the sum of oil, natural gas, and coal rents as a percentage of GDP. Internet Usage is the individuals using the Internet (% of the population). Gross Fixed Capital Formation (Percentage of GDP) Gross fixed capital formation as a percentage of GDP. Labor Force Participation is the Labor force participation rate, total (% of the total population ages 15-64.

Table 3.4.3: Inclusion of Regional and Income Dummies in the Regression Analysis

	(1) EAP	(2) E & CA	(3) LA& CC	(4) NA & ME	(5) N. America	(6) South Asia	(7) SSA	(8) HI	(9) LI	(10) LMI	(11) UMI
L.ECI	0.474***	0.480***	0.468***	0.469***	0.473***	0.471***	0.478***	0.478***	0.471***	0.483***	0.468***
	(0.114)	(0.115)	(0.121)	(0.120)	(0.118)	(0.117)	(0.118)	(0.116)	(0.118)	(0.122)	(0.116)
Remittances(Percentage of GDP)	−0.170*	−0.190*	−0.161	−0.160	−0.162*	−0.161	−0.183*	−0.161*	−0.166*	−0.159	−0.165*
	(0.094)	(0.097)	(0.098)	(0.099)	(0.097)	(0.099)	(0.100)	(0.093)	(0.097)	(0.106)	(0.094)
Remittances*Human Capital	0.031**	0.033**	0.029*	0.029*	0.030*	0.029*	0.031**	0.032**	0.030*	0.029*	0.031**
	(0.015)	(0.015)	(0.015)	(0.016)	(0.015)	(0.015)	(0.016)	(0.014)	(0.015)	(0.017)	(0.015)
Remittances Square	−0.001*	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001*	−0.001	−0.001	−0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FDI(Percentage of GDP)	0.000	−0.000	0.000	0.000	0.000	0.000	−0.000	−0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Trade Openness (Percentage of GDP)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Human Capital	−0.110	−0.159	−0.080	−0.080	−0.081	−0.086	−0.093	−0.133	−0.078	−0.074	−0.102
	(0.179)	(0.200)	(0.179)	(0.193)	(0.176)	(0.185)	(0.180)	(0.174)	(0.178)	(0.189)	(0.180)
Unemployment	−0.003	−0.006	−0.003	−0.002	−0.002	−0.002	−0.002	−0.000	−0.003	−0.003	−0.002
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Total Natural Resource Rent	−0.018***	−0.018***	−0.019***	−0.018***	−0.018***	−0.018***	−0.019***	−0.016***	−0.018***	−0.018***	−0.018***
	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Internet Usage	0.011***	0.010***	0.011***	0.011***	0.011***	0.011***	0.009***	0.009***	0.011***	0.010***	0.012***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Gross Fixed Capital Formation(Percentage of GDP)	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Labor Force Participation	0.002	−0.000	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.002	0.003
	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
Regional Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Income Dummy	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1642	1642	1642	1642	1642	1642	1642	1642	1642	1642	1642
Countries	121	121	121	121	121	121	121	121	121	121	121
AR1 (p-values)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR2 (P-values)	0.474	0.477	0.463	0.470	0.465	0.468	0.469	0.501	0.469	0.467	0.469
Hansen test(p-values)	0.305	0.350	0.294	0.294	0.301	0.300	0.352	0.286	0.308	0.212	0.303

Note: Robust standard errors in parentheses are clustered at the country level. The dependent variable ECI is the Economic Complexity Index .*** p<0.01, ** p<0.05, * p<0.10. All regressions include a constant term and are estimated by SGMM. L.ECI is the lag of the dependent variable. Remittances(Percentage of GDP) are migrant remittances received as a percentage of GDP. Remittances*Human Capital is the interaction of migrant remittances and Human capital. Remittances Square is the square tern of remittances. FDI(Percentage of GDP) is the net inflows of FDI as a percentage of GDP. Trade Openness (Percentage of GDP) is trading as a percentage of GDP. Human Capital Human Capital refers to Secondary education duration. Unemployment refers to total unemployment (% of the total labor force). Total Natural Resource Rent is the sum of oil, natural gas, and coal rents as a percentage of GDP. Internet Usage is the individuals using the Internet (% of the population). Gross Fixed Capital Formation(Percentage of GDP) Gross fixed capital formation as a percentage of GDP. Labor Force Participation is the Labor force participation rate, total (% of the total population ages 15-64.. Regional dummies include East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa, South Asia, North America, and Sub-Saharan Africa. Income dummies include High, low, lower-middle, and upper-middle-income countries.

formation and resources, allows communication and collaboration, and creates new opportunities for businesses and individuals. The positive coefficients for internet usage in Columns 4, 5, and 7 indicate that there is a positive correlation between the number of internet users and the level of economic diversity and sophistication in a country (Lapatinas, 2019; Hausmann et al., 2014). This means that countries with a higher number of internet users tend to have higher levels of economic complexity and diversification. Our findings support the notion that the Internet can stimulate innovation, entrepreneurship, and knowledge sharing, which are crucial factors for economic development.

To investigate regional and income disparities, we present the empirical findings in Table 3.4.3 by incorporating regional and income dummies[12]. Specifically, estimates in Table 3.4.3 are based on regional dummies in Columns 1-7, which include East Asia and the Pacific, Europe and Central Asia, the Middle East and North Africa, North America, South Asia, and Sub-Saharan Africa. In this case, the coefficient for migrant remittances remains unchanged after incorporating regional dummies. However, in some instances, the significance is lost. Overall, our findings suggest that regional differences do not mainly influence the impact of migrant remittances on the ECI. Additionally, in Table 3.4.3, Columns 8-11 employ income dummies for various income groups, including low-income, low-middle, upper-middle, and high-income. The results are similar to what we have in Table 3.4.2 but with minor exceptions.

3.5 Robustness Checks

After presenting our main findings in the previous section, we will conduct various tests to assess the strength of our results under different model specifications and assumptions. Specifically, in section 3.5.1, we will introduce additional variables and divide the sample into two categories: after the financial crisis of 2008-2009 and the pre-coronavirus pandemic. While subsection 3.5.2 will exclude some of the top migrant remittances.

[12]Regional dummies are utilized to capture the unobserved factors that vary across various regions, such as cultural, economic conditions, and regulatory policies. On the other hand, income dummies are used to measure the impact on income level.

3.5.1 Inclusion of Additional Variables and Splitting of Sample into Different Time Periods

Table 3.5.1: Inclusion of Additional Variables and Splitting of Time Period

	(1) Government Effectiveness	(2) Rule of Law	(3) After 2008 Fin Crisis	(4) Before Covid-19 Crisis
L.ECI	0.479***	0.458***	0.659***	0.472***
	(0.111)	(0.117)	(0.089)	(0.118)
Remittances(Percentage of GDP)	−0.163*	−0.172*	−0.110*	−0.162*
	(0.093)	(0.095)	(0.060)	(0.097)
Remittances*Human Capital	0.031**	0.035**	0.019*	0.030*
	(0.014)	(0.015)	(0.010)	(0.015)
Remittances Square	−0.001**	−0.001**	−0.001	−0.001
	(0.000)	(0.001)	(0.001)	(0.001)
FDI(Percentage of GDP)	−0.000	−0.000	0.000	0.000
	(0.000)	(0.001)	(0.001)	(0.001)
Trade Openness (Percentage of GDP)	0.002	0.001	0.003*	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Human Capital	−0.091	−0.083	−0.105	−0.081
	(0.137)	(0.159)	(0.114)	(0.177)
Unemployment	−0.004	−0.002	−0.009	−0.002
	(0.006)	(0.006)	(0.006)	(0.007)
Total Natural Resource Rent	−0.013**	−0.013**	−0.013***	−0.018***
	(0.006)	(0.006)	(0.004)	(0.006)
Internet Usage	0.006*	0.008**	0.006**	0.011***
	(0.003)	(0.003)	(0.003)	(0.003)
Gross Fixed Capital Formation(Percentage of GDP)	0.001	0.003	−0.005	0.002
	(0.004)	(0.005)	(0.004)	(0.005)
Labor Force Participation	0.003	0.006	−0.002	0.003
	(0.004)	(0.005)	(0.004)	(0.006)
Government Effectiveness	0.206**			
	(0.098)			
Rule of Law		0.188**		
		(0.092)		
Time FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	1642	1642	1291	1642
Countries	121	121	121	121
AR1 (p-values)	0.000	0.000	0.000	0.000
AR2 (P-values)	0.621	0.629	0.343	0.464
Hansen test(p-values)	0.275	0.288	0.262	0.300

Note: Robust standard errors in parentheses are clustered at the country level. The dependent variable ECI is the Economic Complexity Index .*** p<0.01, ** p<0.05, * p<0.10. All regressions include a constant term and are estimated by SGMM. L.ECI is the lag of the dependent variable. Remittances(Percentage of GDP) are migrant remittances received as a percentage of GDP. Remittances*Human Capital is the interaction of migrant remittances and Human capital. Remittances Square is the square tern of remittances. FDI(Percentage of GDP) is the net inflows of FDI as a percentage of GDP. Trade Openness (Percentage of GDP) is trading as a percentage of GDP. Human Capital Human Capital refers to Secondary education duration. Unemployment refers to total unemployment (% of the total labor force). Total Natural Resource Rent is the sum of oil, natural gas, and coal rents as a percentage of GDP. Internet Usage is the individuals using the Internet (% of the population). Gross Fixed Capital Formation(Percentage of GDP) Gross fixed capital formation as a percentage of GDP. Labor Force Participation is the Labor force participation rate, total (% of the total population ages 15-64.

In Table 3.5.1, we present the results of our analysis which includes additional variables and sub-time periods to observe the behavior of our main variables. Columns 1-2 show the inclusion of the additional variables, and our findings indicate a posi-

tive and statistically significant coefficient for government effectiveness and the rule of law. This suggests that these variables positively impact the economic complexity index (ECI), meaning higher levels of government effectiveness and the rule of law are linked to higher economic complexity. Furthermore, even after controlling for government effectiveness and the rule of law, the coefficient for migrant remittances remains statistically significant and of the same sign, indicating that the impact of migrant remittances on ECI is independent of government effectiveness and the rule of law.

In Columns 3-4, we split the sample into two sub-time periods keeping in mind the important event that took place in our period of study. In this regard, we included the time period after the 2008 economic crisis[13]. Column 4 excludes the period of coronavirus and checks the impact of migrant remittances on ECI. This suggests that the relationship is not affected by changes in the economic or financial crisis that occurred during the financial crisis of 2008. Similarly, we also excluded the time period of the coronavirus. Even with these changes, our results remain robust.

3.5.2 Exclusion of Top Migrant Remittances Receiving Countries

In the previous subsection, we used additional variables and divided the sample into sub-time periods. In this subsection, we removed some of the top countries that receive migrant remittances from our sample. Table 3.5.2 displays the results of this exclusion. Column 1 excludes the top country receiving remittances compared to their GDP. Column 2 excludes the top three countries receiving remittances as a percentage of their GDP. Similarly, in Columns 3 and 4, we exclude the top five and ten remittance-receiving countries. Most of our results are consistent with our baseline estimations, except for the top ten migrant remittance-receiving countries. In conclusion, our main findings remain reliable despite the changes made in this section.

[13]The economic crisis 2008, also known as the global financial crisis. The starting point of the crisis was the collapse of the US housing market, which led to widespread credit shortages and an overall decline in activity

Table 3.5.2: Exclusion of Top Migrant Remittances (as Percentage of GDP) Recipient Countries

	(1) Top 1	(2) Top 3	(3) Top 5	(4) Top 10
L.ECI	0.549***	0.566***	0.594***	0.611***
	(0.131)	(0.126)	(0.130)	(0.139)
Remittances(Percentage of GDP)	−0.169*	−0.215**	−0.245**	−0.171
	(0.089)	(0.096)	(0.109)	(0.131)
Remittances*Human Capital	0.029*	0.034**	0.038**	0.035
	(0.015)	(0.015)	(0.017)	(0.021)
Remittances Square	−0.000	0.001	0.001	−0.004
	(0.001)	(0.001)	(0.001)	(0.003)
FDI(Percentage of GDP)	0.000	0.000	0.000	−0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Trade Openness (Percentage of GDP)	0.004**	0.004**	0.004**	0.003
	(0.002)	(0.002)	(0.002)	(0.002)
Human Capital	−0.182	−0.202	−0.189	−0.133
	(0.139)	(0.125)	(0.135)	(0.141)
Unemployment	−0.008	−0.010*	−0.010	−0.008
	(0.006)	(0.006)	(0.006)	(0.007)
Total Natural Resource Rent	−0.015**	−0.015***	−0.015**	−0.014**
	(0.006)	(0.006)	(0.006)	(0.007)
Internet Usage	0.009***	0.008***	0.008**	0.008**
	(0.003)	(0.003)	(0.003)	(0.003)
Gross Fixed Capital Formation(Percentage of GDP)	−0.002	−0.003	−0.003	−0.000
	(0.004)	(0.004)	(0.004)	(0.005)
Labor Force Participation	−0.001	−0.003	−0.003	−0.003
	(0.003)	(0.003)	(0.003)	(0.004)
Time FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	1632	1606	1578	1524
Countries	120	118	116	112
AR1 (p-values)	0.000	0.000	0.000	0.000
AR2 (P-values)	0.403	0.475	0.476	0.358
Hansen test(p-values)	0.201	0.238	0.244	0.129

Note: Robust standard errors in parentheses are clustered at the country level. The dependent variable ECI is the Economic Complexity Index .*** p<0.01, ** p<0.05, * p<0.10. All regressions include a constant term and are estimated by SGMM. L.ECI is the lag of the dependent variable. Remittances(Percentage of GDP) are migrant remittances received as a percentage of GDP. Remittances*Human Capital is the interaction of migrant remittances and Human capital. Remittances Square is the square tern of remittances. FDI (Percentage of GDP) is the net inflows of FDI as a percentage of GDP. Trade Openness (Percentage of GDP) is trading as a percentage of GDP. Human Capital Human Capital refers to Secondary education duration. Unemployment refers to total unemployment (% of the total labor force). Total Natural Resource Rent is the sum of oil, natural gas, and coal rents as a percentage of GDP. Internet Usage is the individuals using the Internet (% of the population). Gross Fixed Capital Formation(Percentage of GDP) Gross fixed capital formation as a percentage of GDP. Labor Force Participation is the Labor force participation rate, total (% of the total population ages 15-64.

3.6 Conclusion

In this study, we analyzed the relationship between ECI and migrant remittances using panel data from a sample of 121 countries from 2005-2020. To address the issue of endogeneity, we employed the system GMM method suggested by Arellano and Bover (1995) and Blundell and Bond (1998). Our results suggest a statistically significant but negative link between migrant remittances and ECI. The relationship between migrant remittances and ECI is negative because remittances can be a disincentive for a country to diversify and develop its economy (Amuedo-Dorantes & Pozo, 2011; Chami et al., 2005). In order to check migrant remittances' impact on economic complexity, we used the interaction of migrant remittances and human development. The coefficient for the interaction term is not only positive but also significant. It suggests that the positive relationship between migrant remittances and economic complexity is stronger among countries with higher levels of education.

In this respect, our research confirms that education plays a crucial role in the link between migrant remittances and ECI. Remittances are commonly invested in education, which leads to improved human development. This increase in human capital not only boosts skilled labor but also enhances the economy's structural composition. Furthermore, as noted by Levitt (1998), migrants not only provide financial remittances but also social remittances, which can contribute to an economy's overall economic sophistication. Remittances are also an important instrument in the eradication of poverty. So reducing poverty will impact the overall economic activities of the economy and ultimately bring some positive structural changes in the composition and structure of the economy, which consequently lead to economic sophistication.

These findings have important implications for policymakers and researchers interested in understanding how remittances contribute to economic diversification and development. Policymakers should consider strategies that aim to improve economic complexity and address the broader social, cultural, and economic factors that influence migration patterns and remittance flow. By identifying such strategies, policymakers can design targeted interventions that promote education and encourage migrants to send remittances back to their home countries, ultimately bringing structural transformation and helping to boost economic development. In conclusion, our findings suggest that the relationship between economic complexity and migrant remittance is complex and that policymakers should strive for a holistic approach to managing these complex economic phenomena. It is highly recommended that policymakers, particularly in developing countries, prioritize education and skill development in their respective countries to get the fruits of development and bring struc-

tural transformation. In short, productive capabilities result in higher economic sophistication combined with other socioeconomic indicators to improve overall economic development and economic well-being of the people across countries.

3.7 Appendix

Figure 3.7.1: Migrant Remittance Inflows across Different Regions (in Billion $). Source: Data from WDI, World Bank

Figure 3.7.2: Migrant Remittance Inflows across Different Income Groups (in Billion $). Source: Data from WDI, World Bank

Table 3.7.1: List of Countries

Developing Countries			Developed Countries	
Albania	Gabon	Namibia	Australia	Portugal
Algeria	Georgia	Nicaragua	Austria	Saudi Arabia
Angola	Ghana	Nigeria	Belgium	Slovak Republic
Argentina	Guatemala	North Macedonia	Canada	Slovenia
Armenia	Guinea	Pakistan	Chile	Singapore
Azerbaijan	Honduras	Paraguay	Croatia	Spain
Bangladesh	India	Peru	Cyprus	Sweden
Belarus	Indonesia	Philippines	Czechia	Switzerland
Bolivia	Iran, Islamic Rep.	Romania	Denmark	United Kingdom
Bosnia and Herzegovina	Jamaica	Russian Federation	Estonia	United States
Botswana	Jordan	Senegal	Finland	Uruguay
Brazil	Kazakhstan	Serbia	France	
Bulgaria	Kenya	South Africa	Germany	
Burkina Faso	Kyrgyz Republic	Sri Lanka	Greece	
Cambodia	Lao PDR	Tajikistan	Hungary	
Cameroon	Lebanon	Tanzania	Ireland	
China	Libya	Thailand	Israel	
Colombia	Madagascar	Togo	Italy	
Congo, Dem. Rep.	Malaysia	Tunisia	Japan	
Congo, Rep.	Mali	Turkiye	Korea, Rep.	
Costa Rica	Mauritania	Turkmenistan	Latvia	
Cote d'Ivoire	Mauritius	Uganda	Lithuania	
Dominican Republic	Mexico	Ukraine	Netherlands	
Ecuador	Moldova	Uzbekistan	New Zealand	
Egypt, Arab Rep.	Mongolia	Zambia	Norway	
El Salvador	Morocco	Zimbabwe	Oman	
Eswatini	Mozambique		Panama	
Ethiopia	Myanmar		Poland	

Table 3.7.2: Pairwise Correlation Matrix

	1	2	3	4	5	6	7	8	9	10
ECI	1.00									
Remittances(Percentage of GDP)	-0.17***	1.00								
FDI(Percentage of GDP)	0.04	-0.00	1.00							
Trade Openness (Percentage of GDP)	0.32***	0.03	0.24***	1.00						
Human Capital	0.13***	0.05*	-0.08***	-0.05*	1.00					
Unemployment	-0.00	0.07**	0.02	0.06*	0.07**	1.00				
Total Natural Resource Rent	-0.54***	-0.17***	-0.02	-0.07**	-0.00	0.01	1.00			
Internet Usage	0.69***	-0.24***	0.04	0.23***	0.11***	0.03	-0.36***	1.00		
Gross Fixed Capital Formation(Percentage of GDP)	-0.07**	-0.03	0.04	0.12***	0.03	-0.08**	0.18***	-0.12***	1.00	
Labor Force Participation	0.24***	-0.37***	0.06*	0.08**	-0.12***	-0.37***	-0.18***	0.27***	-0.05	1.00

Note: *** p<0.01, ** p<0.05, * p<0.10.

References

Acemoglu, D., & Zilibotti, F. (1999). Information accumulation in development. *Journal of Economic Growth*, 5–38.

Adams, R. (2007). *"International remittances and the household: Analysis and review of global evidence" World Bank Policy Research Working Paper No. 4116.*

Adams Jr, R. H. (2006). International remittances and the household: Analysis and review of global evidence. *Journal of African Economies*, *15*(suppl_2), 396–425.

Adams Jr, R. H., & Cuecuecha, A. (2010). Remittances, household expenditure and investment in guatemala. *World Development*, *38*(11), 1626–1641.

Adams Jr, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, *33*(10), 1645–1669.

Adenutsi, D. E. (2010). Do international remittances promote human development in poor countries? Empirical evidence from Sub Saharan Africa. *University Library of Munich: München, Germany*.

Aggarwal, R., Demirgüç-Kunt, A., & Pería, M. S. M. (2011). Do remittances promote financial development? *Journal of Development Economics*, *96*(2), 255–264.

Ambler, K., Aycinena, D., & Yang, D. (2015). Channeling remittances to education: A field experiment among migrants from El Salvador. *American Economic Journal: Applied Economics*, *7*(2), 207–32.

Amuedo-Dorantes, C., & Pozo, S. (2011). New evidence on the role of remittances on healthcare expenditures by mexican households. *Review of Economics of the Household*, *9*, 69–98.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277–297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, *68*(1), 29–51.

Azizi, S. (2018). The impacts of workers' remittances on human capital and labor supply in developing countries. *Economic Modelling*, *75*, 377–396.

Bahar, D., Rapoport, H., & Turati, R. (2020). Birthplace diversity and econoimc complexity: Cross-country evidence. *Research Policy*, 103991.

Barajas, A., Chami, R., Fullenkamp, C., Gapen, M., & Montiel, P. J. (2009). Do workers' remittances promote economic growth? *IMF Working Papers*, 1–22.

Bell, M., Pavitt, K., et al. (1995). The development of technological capabilities. *Trade, technology and international competitiveness*, *22*(4831), 69–101.

Bjuggren, P.-O., & Dzansi, J. (2008). Remittances and investment. In *55th Annual Meetings of the North American Regional Science Association International, New York, November 2008.*

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115–143.

Brinkerhoff, J. M. (2006). Diasporas, skills transfer, and remittances: Evolving perceptions and potential, converting migration drains into gains: Harnessing the resources of overseas professionals. *Asian Development Bank Manila*, 1–32.

Chami, R., Fullenkamp, C., & Jahjah, S. (2005). Are immigrant remittance flows a source of capital for development? *IMF Staff Papers*, *52*(1), 55–81.

Chu, L. K., & Hoang, D. P. (2020). How does economic complexity influence income inequality? new evidence from international data. *Economic Analysis and Policy*, *68*, 44–57.

Edwards, A. C., & Ureta, M. (2003). International migration, remittances, and schooling: evidence from El Salvador. *Journal of Development Economics*, *72*(2), 429–461.

Elbadawi, I. A., & Rocha, R. R. (1992). *Determinants of expatriate workers' remittances in North Africa and Europe* (No. 1038). Country Economics Department, World Bank.

Felipe, J., Kumar, U., Abdon, A., & Bacate, M. (2012). Product complexity and economic development. *Structural Change and Economic Dynamics*, *23*(1), 36–68.

Ferrarini, B., & Scaramozzino, P. (2013). Complexity, specialization, and growth. *Asian Development Bank Economics Working Paper Series*(344).

Ferrarini, B., & Scaramozzino, P. (2016). Production complexity, adaptability and economic growth. *Structural Change and Economic Dynamics*, *37*, 52–61.

Ferraz, D., Falguera, F. P., Mariano, E. B., & Hartmann, D. (2021). Linking economic complexity, diversification, and industrial policy with sustainable development: A structured literature review. *Sustainability*, *13*(3), 1265.

Frenken, K., Van Oort, F., & Verburg, T. (2007). Related variety, unrelated variety and regional economic growth. *Regional Studies*, *41*(5), 685–697.

Fromentin, V. (2017). The long-run and short-run impacts of remittances on financial development in developing countries. *The Quarterly Review of Economics and Finance*, *66*, 192–201.

Garson, J.-P. (1994). The implications for the Maghreb countries of financial transfers from emigrants. *Migration and Development: New Partnerships for Co-operation*, 275–285.

Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, *90*(1), 144–152.

Glytsos, N. P. (2002). The role of migrant remittances in development: Evidence from mediterranean countries. *International Migration*, *40*(1), 5–26.

Hartmann, D., Guevara, M. R., Jara-Figueroa, C., Aristarán, M., & Hidalgo, C. A. (2017). Linking economic complexity, institutions, and income inequality. *World Development*, *93*, 75–93.

Hausmann, R., Hidalgo, C. A., Bustos, S., Coscia, M., & Simoes, A. (2014). *The atlas of economic complexity: Mapping paths to prosperity*. Mit Press.

Hausmann, R., & Rodrik, D. (2003). Economic development as self-discovery. *Journal of Development Economics*, *72*(2), 603–633.

Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the National Academy of Sciences*, *106*(26), 10570–10575.

Hidalgo, C. A., Klinger, B., Barabási, A.-L., & Hausmann, R. (2007). The product space conditions the development of nations. *Science*, *317*(5837), 482–487.

Imai, K. S., Gaiha, R., Ali, A., & Kaicker, N. (2014). Remittances, growth and poverty: New evidence from Asian countries. *Journal of Policy Modeling*, *36*(3), 524–538.

IOM. (2006). *World migration 2005 costs and benefits of international migration* (Vol. 3). Geneva, Switzerland.

Irdam, D. (2012). The impact of remittances on human development: A quantitative analysis and policy implications. *Sociology*, *5*(1), 74–95.

Kaldor, N. (1967). Strategic factors in economic development. *New York State School of Industrial and Labor Relations*.

King, R., Lulle, A., & Buzinska, L. (2016). Beyond remittances: knowledge transfer among highly educated Latvian youth abroad. *Sociology of Development*, *2*(2), 183–203.

Kremer, M. (1993). The o-ring theory of economic development. *The Quarterly Journal of Economics*, *108*(3), 551–575.

Lapatinas, A. (2019). The effect of the internet on economic sophistication: An empirical analysis. *Economics Letters*, *174*, 35–38.

Le, T. (2011). Remittances for economic development: The investment perspective. *Economic Modelling*, *28*(6), 2409–2415.

Le Caous, E. S., & Huarng, F. (2021). Economic complexity and human development: Moderated by logistics and international migration. *Sustainability*, *13*(4), 1867.

Letsoalo, T. E., & Ncanywa, T. (2020). Do remittances influence trade in South Africa? *African Journal of Business and Economic Research*, *15*(3), 71–90.

Levitt, P. (1998). Social remittances: Migration driven local-level forms of cultural diffusion. *International Migration Review*, *32*(4), 926–948.

Lewis, W. A. (1955). The theory of economic growth. *Homewood, Illinois: Richard D. Irwin , Homewood, IL*.

Lokshin, M., Bontch-Osmolovski, M., & Glinskaya, E. (2010). Work-related migration and poverty reduction in nepal. *Review of Development Economics*, *14*(2), 323–332.

Lucas, R. E., & Stark, O. (1985). Motivations to remit: Evidence from botswana. *Journal of Political Economy*, *93*(5), 901–918.

Massey, D. S., & Parrado, E. (1994). Migradollars: The remittances and savings of Mexican migrants to the USA. *Population Research and Policy Review*, *13*(1), 3–30.

Mlambo, C., & Kapingura, F. (2020). Remittances and economic development: Evidence from SADC countries. *Eurasian Journal of Economics and Finance*, *8*(4), 261–273.

Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society*, 1417–1426.

Orozco, M. (2013). *Migrant remittances and development in the global economy*. Lynne Rienner Publishers Boulder, CO.

Ourens, G. (2012). Can the method of reflections help predict future growth? *Documento de Trabajo/FCS-DE; 17/12*.

Plaza, S., & Ratha, D. (2011). Harnessing diaspora resources for africa. *Diaspora for development in Africa*, 1–54.

Quinn, M. A. (2009). Estimating the impact of migration and remittances on agricultural technology. *The Journal of Developing Areas*, 199–216.

Richter, S. M. (2008). *The insurance role of remittances on household credit demand (no. 382-2016-22463)* (Tech. Rep.).

Rodrik, D. (2004). *Industrial policy for the twenty-first century*. Princeton University Press.

Rodrik, D. (2005). Policies for economic diversification. *Cepal Review*.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system gmm in stata. *The Stata Journal*, *9*(1), 86–136.

Rostow, W. W. (1959). The stages of economic growth. *The Economic History Review*, *12*(1), 1–16.

Rozelle, S., Taylor, J. E., & DeBrauw, A. (1999). Migration, remittances, and agricultural productivity in China. *American Economic Review*, *89*(2), 287–291.

Saviotti, P. P., & Pyka, A. (2004). Economic development by the creation of new sectors. *Journal of Evolutionary Economics*, *14*(1), 1–35.

Saviotti, P. P., Pyka, A., & Jun, B. (2016). Education, structural change and economic development. *Structural Change and Economic Dynamics*, *38*, 55–68.

Singer, H. (1950). Gains and losses from trade and investment in under developed countries. *American Economic Review*, *40*(2), 473–85.

Taborga, C. (2008). Remittances, migration, gender and development: Future directions for research and policy. In *SSRC Migration & Development Conference Paper* (Vol. 18).

Tacchella, A., Cristelli, M., Caldarelli, G., Gabrielli, A., & Pietronero, L. (2013). Economic complexity: conceptual grounding of a new metrics for global competitiveness. *Journal of Economic Dynamics and Control*, *37*(8), 1683–1691.

Taylor, J. E., Mora, J., Adams, R., & Lopez-Feldman, A. (2008). Remittances, inequality and poverty: Evidence from rural mexico. *Migration and Development within and across Borders: Research and policy perspectives on internal and international migration*, 101–130.

Ul Haq, M. (1990). *Human development report 1990, concept and measurement of human development.* NY, USA: United Nations Development Program.

Woodruff, C., & Zenteno, R. (2007). Migration networks and microenterprises in mexico. *Journal of Development Economics*, *82*(2), 509–528.

Wouterse, F. (2010). Migration and technical efficiency in cereal production: Evidence from Burkina Faso. *Agricultural Economics*, *41*(5), 385–395.

Zahonogo, P. (2011). Migration and agricultural production in Burkina Faso. *African Journal of Agricultural Research*, *6*(7), 1844–1852.

Chapter 4

Does Sectoral Foreign Direct Investment(FDI) improve Economic growth? Evidence from Greenfield FDI data

Abstract

Greenfield FDI plays a crucial role in overall economic development. It contributes to the growth of different sectors, generates employment opportunities, and facilitates technology transfer, thereby enhancing economic productivity and competitiveness. Keeping in mind the importance of FDI, in this study, we examine the impact of sectoral FDI on economic growth by utilizing greenfield FDI data in a sample of 124 countries from 2003 to 2020. Using 2SLS regression analysis, we find that the overall impact of greenfield FDI on economic growth is positive and statistically significant. Moreover, at the sector level, the manufacturing sector is the main driver in stimulating the economy. The impact of the manufacturing sector greenfield FDI on economic growth is statistically significant and positive. In the case of extractive and services sectors, the link between economic growth and greenfield FDI is unclear. Our results indicate that FDI inflows into the manufacturing sector can positively impact economic growth. Our empirical findings are robust after making changes in the sample. To achieve sustainable economic growth and development, policymakers should prioritize attracting FDI to industries that positively impact the economy.

Keywords: Economic growth, Economic Development, FDI, Greenfield FDI, 2SLS
JEL: F21 F23 F36 C36 O10, O11 O40 O47

4.1 Introduction

International investment flows are essential for long-term development in the world's least developed regions (UNCTAD, 2021). Globalization and improved global communication have made it easier to transfer money and capital across borders, resulting in increased attention to FDI (Lasbrey et al., 2018). FDI is considered a desirable form of capital, contributes directly to host economies' capital stock, and helps provide managerial and technological know-how (Kose et al., 2010). Similarly, FDI brings physical and intangible assets in the form of technology (M. Wang & Wong, 2009). FDI can boost economic growth directly and indirectly through different channels and spillovers (Almfraji & Almsafir, 2014; De Mello, 1999). Development economists such as Adeniyi et al. (2015); Nwaogu and Ryan (2015); Chowdhury (2016); Soleimani et al. (2016); Pradhan et al. (2020); Simionescu et al. (2016); Faisal et al. (2016); Alzaidy et al. (2017); Begum et al. (2018); Caesar et al. (2018) consider FDI as an engine of growth. While creating linkages with local firms, FDI can also be a source of technology transfer and technical know-how (Alfaro, 2003).

FDI can be categorized as either vertical (occurring between different industries) or horizontal (within the same industry). Vertical FDI involves forward and backward linkages, while horizontal spillovers characterize horizontal FDI (Lasbrey et al., 2018). FDI primarily comes through multinational enterprises (MNEs). These MNEs, through the transmission of capital, knowledge, sharing ideas, and value addition in the system, are excellent sources of linking rich and poor economies (K. Meyer & Nguyen, 2005). According to R. E. Lipsey (2001), one of the primary motivations to investigate productivity spillovers from foreign to locally owned businesses is to comprehend how inward FDI affects the economic growth of the host nation. There may be no effects on total output or growth if foreign enterprises with lower productivity than domestic firms gain higher productivity. There will be no spillover effect in such cases, but the growth effect can be realized only through the operational activities of foreign businesses (R. E. Lipsey, 2001).

In addition, if FDI resulted in spillovers, they would likely be vertical rather than horizontal. This is because multinational companies seek to limit technology leaks to competitors while enhancing the efficiency of their suppliers by sharing knowledge and expertise (Alfaro, 2003). According to Rodriguez-Clare (1996)'s theoretical work on linkages has demonstrated how multinational corporations' extensive use of intermediate commodities increases the productivity of host economies. In line with this concept, increasing input demand benefits other producers since it enables a wider range of options to be accessible (Alfaro, 2003).

There are several modes of entry for FDI. Companies choose a particular entry

mode depending on the nature of their business and the level of risk they are willing to undertake. The most common modes of entry for FDI are greenfield FDI, brownfield FDI[1], and mergers and acquisitions (M&As)[2]. The greenfield FDI is building a new facility in a foreign country from the ground up. This mode of entry involves establishing a new business in the host country, which can provide complete control over the investment, but may also involve higher risks and costs. The inflow of greenfield FDI into an economy can significantly impact the host country's economic growth, employment, and development. However, these impacts can vary depending on factors such as the sector of investment, the economic situation of the host economy, the degree of technology transfer, and the regulatory environment.

In this respect, Hirschman (1958) described in his seminal book on economic development that FDI's potential to create linkages to domestic firms might also vary across sectors. Hirschman (1958) stressed that every industry has not the same capacity to adopt foreign technology or establish connections with the rest of the economy. He noted, for example, "linkages are weak in agriculture and mining." He cautioned that foreign investments might not have much of an impact on an economy's growth without links[3]. Similarly, Findlay (1978) and J.-Y. Wang and Blomström (1992) have developed theoretical models that emphasize the importance of FDI as means of transferring technology, particularly in manufacturing or service sectors, rather than in the primary sector (such as agriculture or mining). Findlay (1978) has observed that the benefits frequently associated with FDI, such as technology transfers, the introduction of new processes, and training, are often more relevant to the manufacturing sector than to the agriculture or mining sectors. In other words, FDI is more likely to bring technological advancements and improve productivity in manufacturing, while its impact on agriculture or mining may be relatively limited. The beneficial effects of foreign direct investment (FDI) on a host economy may depend on the sector where the investment is made and the local conditions and laws (Alfaro, 2003). In other words, various factors can influence FDI in the host country's econ-

[1] A Brownfield investment is a type of FDI where a company acquires or invests in an existing facility or business in a foreign country. This facility may be an abandoned or underutilized plant, building, or other infrastructure.

[2] In a merger or acquisition, a company acquires or merges with an existing company in the host country. This entry mode provides quick access to existing operations and established markets but may also involve high costs and risks.

[3] "The grudge against what has become known as the 'enclave' type of development," he wrote, "is due to this ability of primary products from mines, wells, and plantations to slip out of a country without leaving much of a trace in the rest of the economy." Regarding the effects of possible linkages on the disparities between manufacturing and agricultural Hirschman (1958)[110] wrote, "the absence of direct linkage effects of primary production lends these views (enclaves) a plausibility that they do not have in the case of foreign investment in manufacturing."

omy. One of the key factors is the sector in which the investment is made. Some sectors, such as high-tech industries, may have tremendous potential for generating spillover effects, such as knowledge transfer, innovation, and productivity gains. In contrast, investments in low-tech or resource-based industries may generate fewer spillover effects. Furthermore, the effects of FDI can also be contingent on the local conditions and laws in the host country. For instance, if the host country has poor infrastructure, weak institutions, or unfavorable business regulations, the benefits of FDI may be limited. Conversely, if the host country has a well-developed infrastructure, strong institutions, and a favorable business environment, then FDI can impact positively.

According to UNCTAD (2021), greenfield investment is more critical for developing countries. This is because greenfield FDI can introduce novel technologies, skills, and knowledge to the host country, enhancing productivity and competitiveness. Additionally, greenfield FDI has the ability to generate new employment prospects, boost economic growth, and facilitate the exchange of superior methods and norms. Additionally, a company brings its capabilities to work abroad when it engages in greenfield FDI (Nocke & Yeaple, 2007). In developing countries, where greenfield FDI is the primary form of FDI, productivity enhancements resulting from FDI will probably be more pronounced (Ashraf et al., 2016). Likewise, M. Wang and Wong (2009) investigate the impact of different FDI modes on economic growth in the host country, focusing on two major components of FDI: greenfield investment and cross-border mergers and acquisitions (M&As) and suggest that greenfield FDI positively affects economic growth, whereas M&As are linked with a negative impact on the host country's economic growth.

By examining the effects of greenfield FDI on economic growth, this study contributes to the existing literature by providing a more detailed understanding of this mode of FDI's impacts on economic growth. This is because the effects of greenfield on growth are potentially heterogeneous, meaning that greenfield FDI may impact sectors or industries differently within the host country. In the literature on economic growth, many studies[4] have been conducted to investigate the effects of FDI on economic growth, both at the aggregate and sector-specific or disaggregated levels. However, to the best of our knowledge, no research has been done on using greenfield FDI data at the sectoral level. In our analysis, we use the data of greenfield FDI at the country level. Furthermore, we incorporate the sector-level greenfield FDI into our study in order to check their impact on economic growth.

[4]There are several studies on the impact of economic growth at aggregated FDI level (Balasubramanyam et al., 1996; Borensztein et al., 1998; Alfaro et al., 2004, 2008) as well as at disaggregated or sector level FDI (Alfaro, 2003; Dar et al., 2016; Chaudhury et al., 2020).

The paper proceeds as follows. Section 4.2 examines some crucial stylized facts related to greenfield FDI, including its primary sources, destinations, and industries. Section 4.3 is dedicated to a literature review on FDI, while section 4.4 details the econometric model and data. Section 4.5 covers regression analysis, and section 4.6 provides some robustness checks. Section 4.7 concludes the chapter.

4.2 Stylized Facts

This section presents some key stylized facts about greenfield FDI. The COVID-19 pandemic caused a dramatic drop in global FDI in 2020[5]. Greenfield investment in industrial and infrastructure projects has suffered dramatically due to the health crisis. This means that international production, a driving force behind global economic growth and development, has been severely affected (UNCTAD, 2021). The evidence shows that the overall inflow of greenfield investment drastically fell in 2020 (UNCTAD, 2021). Similarly, FDI flows to Africa fell by 16% in 2020, to $40 billion, a level last seen 15 years ago, as the pandemic continued to have a persistent and multifaceted negative impact on global and regional cross-border investment. Greenfield project announcements, which are critical to the region's industrialization prospects, fell 62% to $29 billion, while international project finance fell 74% to $32 billion (UNCTAD, 2021).

According to UNCTAD (2021), FDI flows to Latin America and the Caribbean fell by 45% to $88 billion, only slightly higher than the amount recorded in the aftermath of the global financial crisis in 2009. FDI flows to developed economies fell 58% to $312 billion, the lowest level since 2003. In a similar way, The number of greenfield project announcements and international project finance deals both decreased. The value of the announced greenfield projects fell by 16% in the same year. Likewise, the pandemic disrupted the 32 landlocked developing countries' (LLDCs) economic activities and severely harmed their FDI inflows, which fell by 31% to $15 billion (UNCTAD, 2021).

Despite the dismal picture presented above, FDI is still one of the major sources of external financial inflows across the globe. FDI has emerged during the past three decades as the primary funding source for industrialized and developing nations. Either brownfield investments or greenfield investments make up FDI (Qiu & Wang, 2011). Figure 4.2.1 depicts the greenfield FDI inflow from 2009 to 2020. According to the data, the total inflow of greenfield FDI in 2009 was 953 billion US dollars. However, in 2015, the inflow decreased to 757 billion US dollars, a noticeable drop. Fortunately,

[5]See World Investment Report, 2021 for further details

in 2018, the inflow increased again, reaching 982 billion US dollars, even higher than in 2009. Nonetheless, the data show that the inflow of greenfield FDI declined again in 2020, with a total inflow of 575 billion US dollars. These numbers indicate that there have been fluctuations in the inflow of greenfield FDI over the years, which may be influenced by factors, for example, the global economic situation, political stability, investment opportunities in different countries, and most importantly, the recent Coronavirus pandemic.

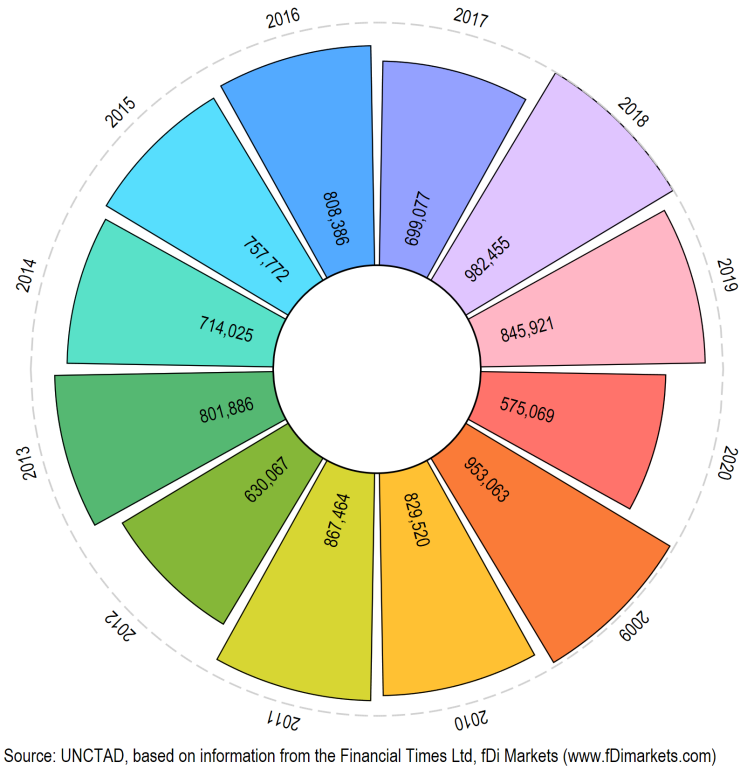
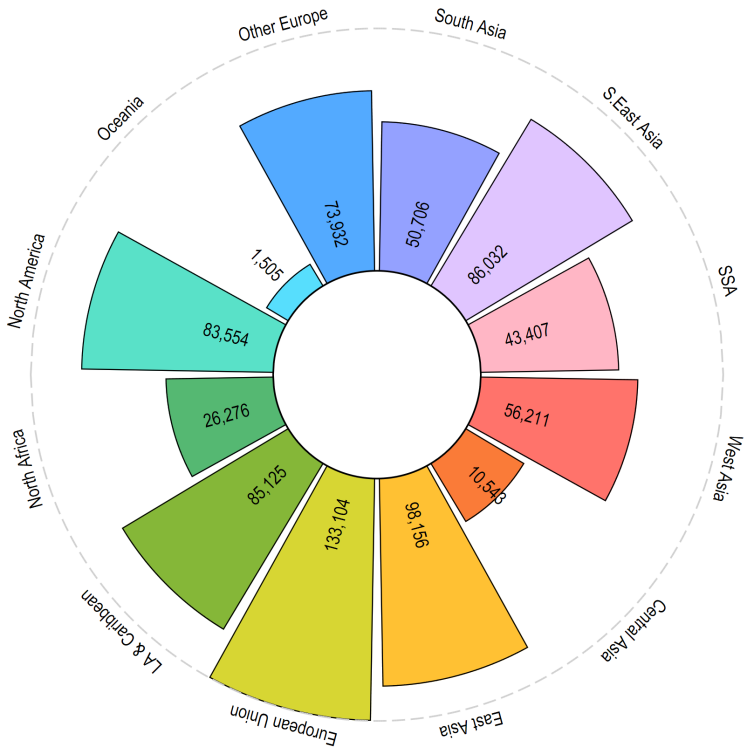


Figure 4.2.1: Greenfield FDI in the World from 2009-2020 (in US$ Millions)

Furthermore, Figure 4.2.2 displays the greenfield FDI inflow across different regions. According to the data, the European Union (EU) has received the highest greenfield FDI inflow of 133 billion US dollars. East Asia follows closely behind with 98 billion US dollars. North America received 83 billion US dollars, while South Asia and Sub-Saharan Africa (SSA) received 51 billion US dollars and 43 billion US dollars, respectively. The data shows that the EU remains a top choice for greenfield FDI because of its stable economic environment and various investment opportunities. East Asia, which includes countries like China and Japan, is also attracting significant

amounts of greenfield FDI due to its rapidly growing economy and large consumer base. Although South Asia and SSA received lower amounts of greenfield FDI inflow, they can attract more investment by improving their economic and political stability and offering incentives to potential investors.



Source: UNCTAD, based on information from the Financial Times Ltd, fDi Markets (www.fDimarkets.com)

Figure 4.2.2: Greenfield FDI across Regions (in US$ Millions)

Moreover, Figure 4.2.3 highlights the inflow of greenfield FDI across different top greenfield FDI-receiving countries. According to the data in Figure 4.2.3, China tops the list with an inflow of 87 billion US dollars, followed by the United States of America (USA) with 65 billion US dollars. India comes in third with 38 billion US dollars, while Mexico and Germany received 22 billion US dollars and 17 billion US dollars, respectively. Spain received 15 billion US dollars. The data show that these countries are attractive destinations for foreign investors due to their stable political and economic environments and potential for growth and profitability. China receives the highest amount of FDI due to its large consumer base, skilled labor force, and economic reforms. Germany and Spain in Europe continue attracting greenfield FDI due

to their skilled workforce, technological advancements, and stable business environments. Similarly, the USA remains an attractive destination for greenfield FDI due to its stable economy and favorable business environment. India's rapidly growing economy and large market make it an attractive destination for greenfield FDI. Likewise, Mexico's proximity to the USA and access to other markets in Latin America contribute to its attractiveness.

Source: UNCTAD, based on information from the Financial Times Ltd, fDi Markets (www.fDimarkets.com)

Figure 4.2.3: Top recipients countries of Greenfield Investment (in US$ Millions)

Similarly, Figure 4.2.4 displays the greenfield FDI inflows across various sectors. The data in Figure 4.2.4 reveals that the energy and gas supply sector received the highest amount of greenfield FDI, totaling 85 billion US dollars, followed by the automobile sector with 67 billion US dollars and extractive industries with 66 billion US dollars. The construction sector received 65 billion US dollars, while infrastructure and communication received 55 US dollars. Petroleum received 54 billion US dollars, and electronics and the electric sector received 52 billion US dollars. The chemical sector received 50 billion US dollars, while the transport and storage sector received 42 billion US dollars. The finance and insurance sector received 33 billion US dollars,

metal products received 31 billion US dollars, and hospitality received 28 billion US dollars. The data suggest that the energy and gas supply sector significantly attracts greenfield FDI. However, other sectors, such as automobiles, extractive industries, and construction, are also prominent in attracting greenfield FDI.

Figure 4.2.4: Greenfield Investment in Major sectors/Industries (US$ in Millions)

4.3 Literature Review

According to conventional growth theories, capital accumulation and technological innovation are the main drivers of economic growth. One of the most influential early growth theories is the Solow-Swan model, which emphasizes the role of capital accumulation in economic growth. The model suggests that, in the long run, the economic growth rate depends on the rate of technological progress and the rate of capital accumulation (Solow, 1956; Swan, 1956). Another prominent growth theory is endogenous growth theory, which emphasizes the role of technological innovation in driving economic growth (Romer, 1990; Lucas Jr, 1988; Grossman & Helpman, 1991).

Endogenous growth models posit that technological progress is endogenously determined by factors such as human capital accumulation, knowledge spillovers, and research and development, meaning that technological progress is not just a random event but can be influenced by policy and institutional factors.

In theory, FDI directly influences growth through capital accumulation and incorporating new inputs and foreign technologies into the host country's production function. In order to test empirically, Neoclassical and endogenous growth models have been widely used. However, the outcomes vary. As a result, this has led to a large body of literature on the impact of FDI on growth (M. Wang & Wong, 2009). Numerous studies have tried to identify the effect of FDI on growth, such as (Borensztein et al., 1998; Alfaro et al., 2004; Carkovic & Levine, 2005; B. Blonigen & Wang, 2004; Lensink & Morrissey, 2006; Aizenman et al., 2013). However, no consensus has emerged to date on whether the expected positive influence can actually be found in the data (Harms & Méon, 2018). The reasons include sample selection (e.g., developed versus developing countries), the selected estimation techniques (e.g., OLS, Granger Causality, Cointegration, Error correction models), the selected period and types of data (i.e.time, series versus cross section) (Almfraji & Almsafir, 2014).

In addition, how the impact of FDI on host countries is perceived to be influenced by the particular conceptual framework or contextual setting employed in individual research projects (Kedia et al., 2012). Similarly, the impact of FDI on host countries can have varying outcomes, ranging from positive to negative and even insignificant. Despite these inconsistencies, there has been significant progress in comprehending the host country determinants of FDI, such as regulatory, political, economic, and institutions, that can stimulate its influx.

FDI has been shown to enhance economic growth, capital accumulation, the introduction of new inputs and technologies, and subsequent productivity and efficiency gains for domestic firms (Lasbrey et al., 2018). For example, Findlay (1978) finds the role of FDI as a carrier of foreign technology, claiming that it could increase economic growth. Likewise, Choe (2003) and Mullen and Williams (2005) conclude that FDI positively affects economic growth. According to Borensztein et al. (1998), Alfaro et al. (2004) and Alfaro et al. (2008) that FDI promotes economic growth only when certain economic conditions are met in the host country, such as a threshold level of human capital. Likewise, Ruxanda et al. (2010) give evidence of a self-reinforcing circular relationship between FDI and economic growth, implying that incoming FDI stimulates economic growth, which attracts new FDI. Similarly, Anwar and Nguyen (2011) find similar results.

Many researchers have investigated the factors that influence FDI, which vary from country to country. Additionally, several studies have established links between

FDI and growth through different channels (Thiam, 2006; Alam et al., 2013; Majumder & Nag, 2015) where the presence of FDI inflows increase income and total factor productivity (TFP) growth in a country because FDI is thought to be a source of technological diffusion, which leads to economic growth and a higher standard of living. Furthermore, research on the macroeconomic effects of inward FDI suggests that FDI-induced productivity increases in the host country primarily depend on technology spillovers from foreign to local firms and the latter's ability to absorb superior foreign knowledge (Saggi, 2002; Görg & Greenaway, 2004). In view of Paul and Feliciano-Cestero (2021), better quality FDI includes investments in technology or research and development (R&D) that can result in knowledge spillovers to other firms in FDI-receiving locations.

In contrast, Mencinger (2003) finds that inward FDI is negatively related to economic growth. Furthermore, Adams (2009) shows that the link between economic growth and FDI is negative in a sample of African countries. While studying the impact of external debt and FDI on economic growth in Tanzania, Jilenga et al. (2016) show that FDI negatively impacts economic growth. In a similar way, Saqib et al. (2013) study of the impact of FDI on economic growth in Pakistan clearly shows that the impact of FDI on economic growth is negative. Furthermore, Carkovic and Levine (2005) argue that FDI does not significantly impact economic growth in the host countries. Likewise, Jyun-Yi et al. (2008) show that the impact of FDI on economic growth is unclear. These negative impacts of FDI on economic growth may differ depending on various factors, such as the industry in which the investment is made, the standard of institutions, the level of human capital, and the economic and political climate of the host nation. In specific cases, such as when FDI is invested in already highly developed sectors or when the institutions in the host country are weak, FDI may have limited or adverse effects on economic growth. Similarly, in some cases, FDI may lead to crowding out of domestic investment as domestic firms face increased competition for resources. Additionally, the entry of foreign firms into the market may lead to the displacement of domestic firms, particularly in industries where foreign firms have a competitive advantage. Furthermore, there are concerns that FDI may exacerbate income inequality, mainly if the benefits of FDI are not evenly distributed across the population.

At the firm level, the impact of FDI is knowledge spillovers based on demonstration effects and labor movement (K. Meyer & Nguyen, 2005). Employee movement is the second source of spillovers[6]. In the context of spillover, Piperopoulos et al. (2018)

[6]MNEs invest in local human capital by training local employees, but these highly skilled individuals may move to locally owned firms or start their entrepreneurial ventures (K. Meyer & Nguyen, 2005). K. Meyer and Nguyen (2005) even rank and file employees in MNEs gain skills, attitudes, and ideas on the job due to exposure to modern organizational

suggest that spillovers can improve learning and innovation in affiliates of emerging market enterprises. Similarly, Lee and Rugman (2012) investigate two types of firm-specific advantages: innovation capabilities as measured by R&D intensity and marketing capabilities as measured by selling, general, and administrative intensity. Sánchez-Sellero et al. (2013) investigate the determinants of FDI spillover absorptive capacity. Some empirical studies suggest that absorptive capacity is crucial for local firms to benefit. For example, Liu et al. (2000) find for the UK that foreign presence in a sector positively affects the labor productivity of domestic firms. Likewise, Kathuria (2000) finds that spillovers in India depend mainly on local firms' investment in learning and R&D.

Moreover, FDI has been widely recognized as an important factor in driving economic growth, and its role becomes more crucial when it interacts with human capital. In this context, Borensztein et al. (1998) in a cross-country regression framework for 69 less-developed countries from 1970 to 1989, find that inward FDI positively affects growth through its interaction with human capital. Similarly, in a panel data framework covering a sample of 18 Latin American countries from 1970 to 1999, Bengoa and Sanchez-Robles (2003) state that in order for FDI to have a positive impact, the country must have adequate economic stability, liberalized capital markets, and human capital. Additionally, Li and Liu (2005) in a panel data analysis of 84 countries from 1970 to 1999 show that FDI, directly and indirectly, affects growth through its interaction with human capital.

Additionally, the quality of institutions is likely to be one of the essential determinants of FDI activity, particularly in less-developed countries. In this regard, inadequate asset protection increases the likelihood of asset expropriation, making investment less likely. For example, corruption raises the cost of doing business and, as a result, reduces FDI activity (B. A. Blonigen, 2005). In addition, poor institutions result in poor infrastructure (i.e., public goods), and expected profitability falls, as does FDI into an economy (B. A. Blonigen, 2005). Alfaro et al. (2008) relate economic development with foreign capital inflows and institutional quality. Likewise, Neumayer and Spess (2005) emphasize the quality of the domestic institution and the rule of law in having more bilateral investment treaties in developing countries for higher FDI inflows.

FDI has been a subject of ongoing debate in economic literature due to its varying effects on economic growth in different income groups. In this respect, using samples of OECD and non-OECD countries from 1970 to 1990, De Mello (1999) concludes that long-term growth in host countries is determined by technology and knowledge spillovers from investing countries. Its extent is determined by the complementary

forms and international quality standards.

and substitution between FDI and domestic investment. In the non-OECD sample, he finds no causal relationship between FDI and growth and a negative short-run impact of FDI on GDP. Similarly, B. M. Lipsey and Zegan (1994) in a cross-country analysis of 78 developing countries show that FDI positively affected growth rates in higher-income developing countries but not in lower-income developing countries. Additionally, in the context of trade, Balasubramanyam et al. (1996), show that the growth effect of FDI is positive in export-promoting countries but negative in import-substituting countries. Hence, the role of FDI on economic growth varies across different income groups, highlighting the importance of analyzing this relationship more carefully.

In the context of sectoral FDI, the benefits associated with FDI may vary across primary, manufacturing, and service sectors. The literature suggests that the sectoral level FDI can have varying effects on economic growth depending on the nature of the investment and the absorptive capacity of the host country, which can drive economic growth (M. Wang, 2009; Chakraborty & Nunnenkamp, 2008). According to UNCTAD (2001), “In the primary sector, the scope for linkages between foreign affiliates and local suppliers is often limited.... In the tertiary sector, the scope for dividing production into discrete stages and subcontracting large parts to independent domestic firms is also limited." According to Alfaro (2003), the manufacturing sector has a wide variety of linkage-intensive activities. Similarly, Alfaro (2003) finds that FDI in the manufacturing sector leads to higher growth. However, not all sectors benefit equally from FDI inflows. Some studies have found that FDI inflows can negatively affect specific sectors, such as agriculture and small-scale industries, due to increased competition from foreign firms. Hence, sectoral-level FDI can significantly impact economic growth, with the specific sector receiving the investment playing a critical role in determining its overall impact.

The role of greenfield investments in economic growth is significant as they contribute to expanding productive capacity, increasing employment opportunities, and stimulating the economy. In this respect, greenfield investment enables international companies to keep their technological advantage from eroding (Ethier & Markusen, 1996; Saggi, 1999; Markusen, 2001). Similarly, in terms of the well-being of the host nation, greenfield FDI brings competition (Mattoo et al., 2004). Moreover, greenfield FDI is perceived to create new capital assets and additional production capacity (Ashraf et al., 2016). Additionally, Mattoo et al. (2004) argue that the effect of greenfield FDI on competition is clearly greater than that of M&As. Raff et al. (2012) argue that greenfield FDI is the preferred mode of entry when wage costs in the host country are relatively low. Although it is widely assumed that the most efficient firms prefer greenfield FDI (e.g., Raff et al. (2012) and Stepanok (2015)) and the potential for knowledge

diffusion appears to be exceptionally high for this mode of FDI (Ashraf et al., 2016).

Moreover, greenfield projects are generally thought to have positive spillovers. Greenfield projects create new businesses, resulting in a direct positive impact on employment and domestic value added. They also increase competitive pressures on local competitors, which may lead them to improve their efficiency (K. Meyer & Nguyen, 2005). Empirical evidence suggests that foreign ownership has improved productivity and profitability in Central and Eastern Europe in the early years after privatization (Djankov & Murrell, 2002; Estrin, 2002). The study by M. Wang and Wong (2009) find that greenfield investment and M&As impact economic growth differently. Greenfield investment promotes economic growth, while M&As are negatively associated with the host country's economic growth (M. Wang & Wong, 2009). K. E. Meyer et al. (2018) analyze equity stake decisions that drive MNEs to choose between greenfield and acquisition establishment modes. In short, greenfield FDI is vital in promoting economic growth by expanding productive capacity, increasing employment opportunities, and stimulating economic activities in the host economies.

Despite the considerable attention given to the role of FDI in promoting economic growth, there needs to be more empirical research that specifically examines the link between greenfield FDI and economic growth, particularly at the sector level. Hence, keeping this research gap in mind, this study examines the link between economic growth and greenfield FDI both at the overall and sector levels. The empirical findings of this study will contribute to understanding the specific impacts of greenfield FDI on economic growth and provide insights into the mechanisms that drive this relationship. Furthermore, the study's findings will have significant policy implications for countries seeking to attract greenfield FDI to promote economic growth and development.

4.4 Econometric Model and Data

This empirical analysis focuses on examining the effect of sector-level greenfield FDI on economic growth using a panel dataset. Section 4.4.1 presents the basic empirical model, and various econometric issues related to the model are discussed. This discussion aims to ensure that the model is well-specified and appropriate for data analysis. Additionally, section 4.4.2 provides an overview of the data used in the study. It is important to have this information to understand the data's characteristics and identify any potential biases that could affect the analysis results.

4.4.1 Model Estimation

Following Alfaro (2003) and M. Wang and Wong (2009), we examine the effects of foreign direct investment (FDI) on economic growth in 124 countries from 2003-2020 using greenfield FDI data. In order to answer research questions, we use the IV instrumental panel data model to account for the impact of FDI on economic growth and to mitigate the problems associated with omitted variables and serial correlation. Using a panel data set rather than a purely cross-sectional structure has the significant advantage of potentially controlling for unobserved heterogeneity (Barro et al., 1991). We use 5-year averages, as is standard practice in growth regressions. According to Islam (1995) and Caselli et al. (1996), a 5-year average structure allows for the absorption of business-cycle shocks and thus the study of long-run growth effects. The general form of the baseline specification is as follows:

$$\text{GROWTH}_{it} = \beta_0 + \beta_1 \text{ INITIAL GDP}_{it} + \beta_2 \text{ FDI}_{it} + \beta_3 \text{ FDI}^{j}_{it} + \beta_4 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (4.1)$$

Where $i = 1, 2, \ldots, N$ is the country index, $t = 1, 2, \ldots, T$ is the time index. $Growth_{it}$ represents per capita growth, whereas, $InitialGDP_{it}$ is the initial level of GDP as a regressor to control for convergence effects (Barro et al., 1991). FDI stands for total greenfield FDI. While FDI^{j} represents three different sector-level FDI variables. The first variable is greenfield FDI in the manufacturing sector, the second FDI variable is greenfield FDI in the extraction sector, and the third variable is greenfield FDI in the services sector. Our study's primary variables of interest are greenfield FDI in different sectors.

Additionally, X_{it} is the usual vector of control variables. In the baseline model, we control the basic determinants of economic growth. In this regard, we use average years of schooling as a proxy for education, inflation, government consumption expenditures as a percentage of GDP, a proxy for distortions caused by unproductive government expenditures (Barro, 1996; Fuentes & Morales, 2011), gross fixed capital formation as a proxy for investment and trade as a proxy for openness. We also include the total population in the set of control variables. The choice of these variables is based on the existing literature on economic growth (Alfaro, 2003; Alfaro et al., 2004; M. Wang & Wong, 2009). Following standard practice in panel data analysis, time and country fixed effects are included in the analysis[7].

When working with panel data, regressor endogeneity is critical. The possibility

[7]Time-fixed effects and country-fixed effects are commonly used in panel data analysis to control for unobserved heterogeneity that may be present in the data. Time-fixed effects account for time-invariant factors that affect the outcome variable. On the other hand, country-fixed effects control for unobserved differences across countries that are constant over time.

exists that estimates will be skewed due to the endogeneity problem. FDI into various sectors may respond to higher economic growth rates. If FDI is attracted in each sector as a result of the growth rate, but the sector is not the driving force behind the economy's overall growth, the problem may be less severe (Alfaro, 2003). Similarly, there is a potential endogeneity problem related to FDI. FDI may flow to wealthy countries with high productivity, which could explain the positive relationship between FDI and GDP (Ashraf et al., 2016). Alternatively, if international factor price differences drive FDI, FDI may flow to developing countries with low productivity and wages, resulting in a negative correlation between FDI (Ashraf et al., 2016) and growth. It can also be noted that endogeneity could also result from omitted variable bias.

In this regard, we introduce IV regression in the analysis to avoid the problem of endogeneity. We use the two-stage least squares (2SLS) estimation approach to deal with endogeneity bias due to omitted variables, simultaneity issues, and measurement errors. In this respect, the 2SLS method uses instrumental variables (IVs) to estimate the relationship between the variables. As precise instruments for FDI and sectorial FDI inflows are lacking (Alfaro, 2003), lagged FDI is used[8]. In addition, we use market proximity as another instrumental variable. The market proximity [9] is the sum of real GDP (in million US $) for all countries $j \neq i$ weighted by the distance in kilometers between countries j[10] and i. In the case of greenfield FDI, market proximity can be a relevant determinant because firms may choose to invest in countries close to their home markets, where they already have established relationships and knowledge of the local business environment. Therefore, market proximity can capture unobserved factors influencing the decision to invest in a particular country, such as knowledge of the local business environment and existing relationships with customers and suppliers. In this case, using market proximity as an instrumental variable can help to address the potential endogeneity issue by providing a source of exogenous variation that affects greenfield FDI decisions but is not directly related to economic growth. In IV regression estimation, the Hansen test is a common choice to test whether the instruments are exogenous to assess the validity of instrumental variables in estimation and ensure that the analysis results are not biased by endogeneity issues.

[8] In the case of (Alfaro, 2003), the authors use lagged FDI as an instrumental variable to examine the impact of sectoral FDI on economic growth.

[9] To find out more about the method used to calculate market proximity, please consult (R. B. Davies & Voy, 2009)

[10] We use some of the top OECD countries

$$\sum_{j \neq i} \left(\frac{\text{GDP}_j}{\text{distance}_{ij}} \right) \tag{4.2}$$

According to R. Davies et al. (2015), greenfield FDI is far more sensitive to long-run factors, targeting more low-tax locations and relying more on home technological development, quality of institutions, and the degree of comparative advantage. To account for changes in the quality of institutions, we include corruption as a direct proxy for institutional quality in the analysis. Since institutions are likely to affect both economic growth and the inflow of FDI in the economic decisions, their omission would cause an upward bias in the estimate of the impact of greenfield FDI (Ashraf et al., 2016) and on economic growth.

In this regard, we extend our model by including institutional variables such as corruption, indicators of political rights, and civil liberties. It is evident that better institutions lower transaction costs by reducing uncertainty and facilitating interactions through increased stability and reliability, thus promoting efficient resource allocation and knowledge diffusion (Ashraf et al., 2016). In equations 4.3 and 4.4, along with sectoral greenfield FDI, some institutional variables are also included to check their impact on growth. In Equation 4.3, we include corruption in the analysis. The Equation is as follows:

$$\begin{aligned} \text{GROWTH}_{it} = & \beta_0 + \beta_1 \text{ INITIAL GDP}_{it} + \beta_2 \text{ FDI}_{it} + \beta_3 \text{ FDI}_{it}^{j} + \beta_4 X_{it} + \beta_5 \text{corruption}_{it} \\ & + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \tag{4.3}$$

In this respect, corruption is a very complicated social behavior. This phenomenon has been viewed as either a political or economic structural problem or as a cultural and individual moral problem[11] (Andvig et al., 2000; Luo, 2005). According to theoretical arguments, there is a connection between the level of corruption and economic growth or development (Husted, 1999). Corruption, according to popular belief, is harmful to economic growth. Mauro (1995) discovers that corruption reduces investment and, as a result, economic growth[12].

Moreover, in Equation 4.4, we include some important political rights and civil

[11] According to the estimated findings of studies, not only economic factors like economic development, economic freedom, inflation, and income distribution but also political, social, and cultural factors like democracy, political stability, gender, and ethnolinguistic diversity, have a significant impact on corruption (Ata & Arvas, 2011).

[12] Klitgaard (1988) suggests that when political power is corruptly translated into economic gains, corruption redistributes resources from the poor to the rich while encouraging misconduct and rent-seeking.

liberties indicators from the freedom house database. The equation is as follows:

$$\begin{aligned}\text{GROWTH}_{it} = &\beta_0 + \beta_1 \text{ INITIAL GDP}_{it} + \beta_2 \text{ FDI}_{it} + \beta_3 \text{ FDI}_{it}^{j} + \beta_4 X_{it} + \beta_5 \text{Free}_{it} + \beta_6 \text{Partially Free}_{it} \\ &+ \beta_7 \text{Not Free}_{it} + \mu_i + \lambda_t + \varepsilon_{it}\end{aligned} \tag{4.4}$$

In addition, to check the robustness of our results, we use some additional tools to check the robustness of our estimates. In this respect, some important top recipients of greenfield FDI countries are excluded from the analysis.

4.4.2 Data Description

Our study covers data from 124 countries between 2003 and 2020. A complete list of these countries can be found in Table 4.8.1, while detailed definitions of the variables used are presented in Table 4.4.1. To minimize the impact of the business cycle, we divided our data into 5-year non-overlapping averages from 2003 to 2020 in an unbalanced data set from 124 countries. The greenfield FDI is sourced from the FDI market database. FDI Intelligence, a division of the Financial Times, compiles greenfield FDI data from the FDI markets database. This data provides information on FDI inflows in various countries and sectors. Unfortunately, the database has a limitation in that it only covers a specific time period, and not all countries have data available for greenfield FDI.

Apart from the above, several other macroeconomic variables are also used in the analysis. We use average years of schooling to cater to human resource capital. Along with this, we also use inflation as a proxy for economic stability in an economy. Similarly, trade openness is used to check international trade's impact on economic growth. Trade openness is crucial in realizing economic growth. Furthermore, to take into account the size of the government, we include total government expenditure as a proxy for the size of the government. We also use total population in our regression to check for the role of population in economic growth. In the literature on economic growth, population is an important determinant of economic growth. Additionally, we also include gross fixed capital formation as a proxy for investment, as it is evident that investment is necessary for economic growth. The literature on economic growth emphasizes the importance of investment in promoting economic growth.

Table 4.4.1: Definition and Description of the Variables and Sources

Variable Name	Definition of Variables	Source
GDP Per Capita Growth	GDP per capita growth (annual %)	World Development Indicators
Initial GDP	The Gross Domestic Product at the start of the time period of the data sample	World Development Indicators
Average Years of Schooling (Log)	The average years of secondary schooling	World Development Indicators
Inflation(Log)	Percentage changes in the GDP deflator	World Development Indicators
Trade(Log)	Trade Openness is defined as the average of exports and imports as a percentage of GDP	World Development Indicators
Government Expenditure(Log)	General government final consumption expenditure as a percentage of GDP	World Development Indicators
Gross Fixed Capital Formation(Log)	Gross fixed capital formation as a percentage of GDP	World Development Indicators
Total Population(Log)	Population is the total population which values shown are midyear estimates	World Development Indicators
Total FDI	The total greenfield FDI(% as a percentage of the total global greenfield FDI)	FDI markets database of Financial Times
FDI in Manufacturing	Total greenfield FDI in Manufacturing sector (% total global greenfield FDI)	FDI markets database of Financial Times
FDI in Extraction	Total greenfield FDI in extractive (% total global greenfield FDI)	FDI markets database of Financial Times
FDI in Services	Total greenfield FDI in the services sector (% total global greenfield FDI)	FDI markets database of Financial Times
Corruption	Corruption Variable is the dummy variable which takes the values of 1 if there is no or less corruption and 0 otherwise	International Country Risk Guide(ICRG) database
Fully Free	Fully Free is the dummy variable, which takes the value of 1 if the aggregated score of the Political Rights and Civil Liberties is 3 and 0 otherwise	Freedom House database
Partially Free	Partially Free is the dummy variable, which takes the value of 1 if the aggregated score of the Political Rights and Civil Liberties is 2 and 0 otherwise	Freedom House database
Controlled	Controlled is the dummy variable which takes the value of 1 if the aggregated score of the Political Rights and Civil Liberties is 1 and 0 otherwise	Freedom House database

Additionally, several institutional and governance indicators are used to proxy for institutional stability and strength of the institutional framework in the development of economies. In this respect, we employ a corruption indicator that comes from the ICRG database. Apart from the above, we also use some indicators of freedom from the freedom house database. Based on the data from freedom house, we split the sample into three subgroups, free, partially free, and controlled economies, on the basis of political rights and civil liberties status.

Before diving into the main findings, looking at the spread of greenfield FDI across countries in our sample is essential. In this respect, Figure 4.4.1 shows the inflow of greenfield FDI in the year 2003, the first year when the data on greenfield FDI was started to compile by the FDI markets. Looking at Figure 4.4.1 indicates that most of the greenfield FDI is concentrated in Europe and North America. Individually, China is the country that received most of the greenfield FDI in the year 2003. At the same time, the African region received the least greenfield FDI in 2003.

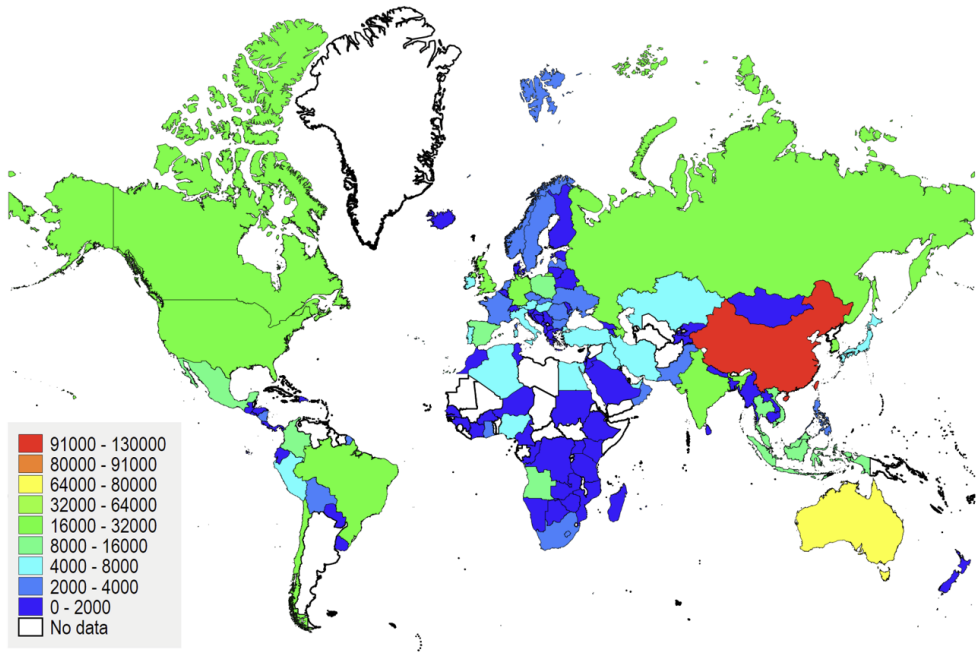


Figure 4.4.1: Greenfield FDI in the Year 2003 (Million US $)

Similarly, Figure 4.4.2 shows the inflow of greenfield FDI across countries in the year 2020. Figure 4.4.2 shows that greenfield FDI is mostly diverted toward developed and more advanced countries. In the year 2020, the overall FDI inflows fell due to one of the major health crises of the Coronavirus pandemic. Nevertheless, Europe and North America are still the significant recipients of greenfield FDI whereas Africa is the least. At the individual country level, the USA was the major greenfield recipient

in that year.

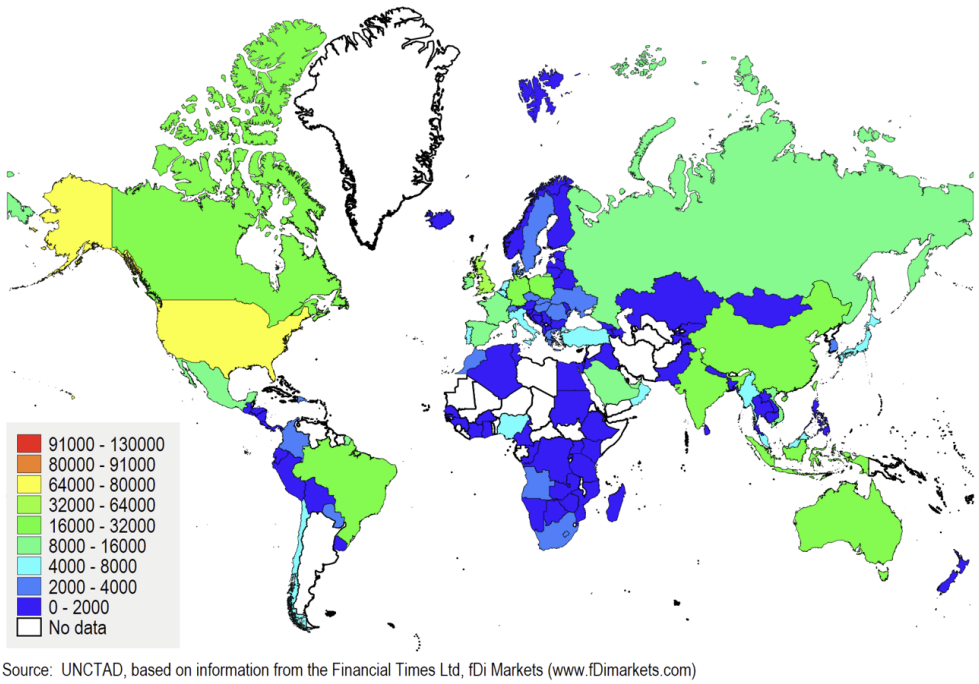


Figure 4.4.2: Greenfield FDI in the Year 2020 (Million US $)

4.5 Results and Discussion

In this section, we will discuss the empirical findings of the study. Before discussing the empirical findings, we first describe summary statistics in Table 4.5.1. We use total greenfield FDI along with greenfield FDI in different sectors to ascertain each sector's contribution to economic growth. The mean GDP per capita growth is 1.99, which suggests that, on average, the countries in the sample experienced positive economic growth. However, there is a high degree of variability in the economic growth rates across the countries in the sample, as indicated by the standard deviation of 3.11. The minimum GDP per capita growth is -10.17, which suggests that some countries in the sample experienced negative economic growth in terms of GDP per capita. While some countries experienced negative economic growth in terms of GDP per capita, with a minimum GDP per capita growth of -10.17, others experienced very high economic growth rates, with a maximum GDP per capita growth of 20.19. The mean of total greenfield FDI is 0.84, which suggests that, on average, the countries or regions in the sample received 0.84% of the total global greenfield FDI. In contrast, the standard deviation is 1.95, indicating a considerable variation in the portion of global greenfield FDI received by different countries included in the sample. The maximum

is 23.41, which suggests that some countries in the sample received a very high share of global greenfield FDI.

Table 4.5.1: Summary Statistics

	Mean	SD	Min	Max	N
GDP Per Capita Growth	1.99	3.11	-10.17	20.19	496
Initial GDP	24.85	1.85	21.76	30.31	496
Average Years of Schooling(Log)	1.86	0.14	1.39	2.20	496
Inflation(Log)	1.50	0.80	-1.33	5.62	491
Trade(Log)	4.34	0.57	0.09	6.00	493
Government Expenditure(Log)	2.70	0.35	1.53	3.46	489
Gross Fixed Capital Formation(Log)	3.12	0.27	1.15	4.10	492
Total Population(Log)	16.48	1.54	12.61	21.06	496
Total FDI	0.84	1.95	0.00	23.41	496
FDI in Manufacturing	0.31	0.84	0.00	8.31	493
FDI in Extraction	0.09	0.19	0.00	2.07	496
FDI in Services	0.56	1.16	0.00	14.98	494
Corruption	0.65	0.48	0.00	1.00	496
Fully Free	0.43	0.50	0.00	1.00	496
Partially Free	0.26	0.44	0.00	1.00	496
Controlled	0.30	0.46	0.00	1.00	496
Market Proximity	9348.22	8060.16	0.00	39733.39	496

To establish a baseline, we analyze the effect of greenfield FDI and other sector-specific inflows of greenfield FDI using OLS and 2SLS regression analysis. The results are presented in Table 4.5.2. The first part of Table 4.5.2 shows regression outputs using OLS. In this respect, in Column 1, total greenfield and primary determinants of economic growth are used in the regression. We find that the total greenfield FDI is positively linked with economic growth. Similarly, in Column 2, we present the result of the manufacturing sector on economic growth. The link between economic growth and manufacturing greenfield FDI is positive and statistically significant. Column 3 presents the results of greenfield FDI in the extractive sector on economic growth. The empirical results show no link between economic growth and greenfield FDI in the extraction sector. Column 4 presents the results of economic growth in the services sector. The results show a positive and significant link between economic growth and greenfield FDI in the services sector.

Table 4.5.2: Baseline Results with OLS and 2SLS

	Pooled OLS				IV Regression			
	(1) Total FDI	(2) Manufacturing	(3) Extraction	(4) Services	(5) Total FDI	(6) Manufacturing	(7) Extraction	(8) Services
Initial GDP	−0.323***	−0.324***	−0.256**	−0.304***	−0.554***	−0.557***	−0.379***	−0.538***
	(0.109)	(0.102)	(0.110)	(0.109)	(0.130)	(0.120)	(0.143)	(0.138)
Average Years of Schooling(Log)	1.749**	1.806**	1.816**	1.798**	1.199*	1.233*	0.902	1.243*
	(0.836)	(0.830)	(0.849)	(0.839)	(0.703)	(0.686)	(0.767)	(0.713)
Inflation(Log)	0.437*	0.425*	0.384	0.433*	−0.418*	−0.431*	−0.260	−0.426*
	(0.254)	(0.254)	(0.257)	(0.255)	(0.219)	(0.220)	(0.265)	(0.222)
Trade(Log)	0.864***	0.864***	0.916***	0.879***	0.611**	0.634***	0.522*	0.604**
	(0.303)	(0.301)	(0.310)	(0.307)	(0.235)	(0.227)	(0.279)	(0.235)
Government Expenditure(Log)	−1.760***	−1.778***	−1.689***	−1.732***	−1.717***	−1.737***	−1.936***	−1.692***
	(0.433)	(0.431)	(0.440)	(0.437)	(0.445)	(0.439)	(0.489)	(0.452)
Gross Fixed Capital Formation(Log)	2.252***	2.163***	2.427***	2.367***	1.468**	1.391**	1.450**	1.528**
	(0.658)	(0.670)	(0.679)	(0.661)	(0.580)	(0.564)	(0.604)	(0.617)
Total Population(Log)	0.241	0.201	0.334**	0.279*	0.587***	0.579***	0.611***	0.616***
	(0.158)	(0.159)	(0.164)	(0.159)	(0.160)	(0.162)	(0.183)	(0.164)
Total FDI	0.225**				0.195*			
	(0.095)				(0.113)			
FDI in Manufacturing		0.620***				0.516*		
		(0.199)				(0.268)		
FDI in Extraction			0.813				−3.676	
			(0.781)				(2.404)	
FDI in Services				0.269**				0.241
				(0.121)				(0.169)
Observations	484	481	484	482	367	364	367	365
R-Square	0.187	0.200	0.176	0.183	0.393	0.401	0.373	0.389
Wald (F-stat)					627.051	345.039	8.118	92.129
P-value (J-Stat)					0.195	0.129	0.242	0.249

Note: Robust standard errors in parentheses. Dependent variable: GDP per capita growth.*** p<0.01, ** p<0.05, * p<0.10. All regressions include a constant term and are estimated by OLS and 2SLS. The 2SLS specifications are estimated with time and country fixed effects. The Initial GDP variable is the log of the real GDP at the beginning of the period. The Schooling variable is the log of years of secondary schooling. Inflation is the log of inflation. Government spending is a log of the share of government spending/GDP. The total population is the log of the total population. Gross fixed capital formation is the log of gross fixed capital formation/GDP. Total FDI is the total greenfield FDI. FDI in manufacturing is the greenfield FDI in the manufacturing sector. FDI in extraction is the greenfield FDI in the extraction sector. FDI in Services is the greenfield FDI in Services.

As discussed in detail in the previous section, regressor endogeneity is critical when working with panel data. The possibility exists that estimates will be skewed due to the endogeneity problem. FDI into various sectors may respond to higher economic growth rates. If FDI is attracted in each sector due to the growth rate, but the sector is not the driving force behind the economy's overall growth, the problem may be less severe (Alfaro, 2003). In order to avoid the problem of endogeneity, we use 2SLS regression analysis in the remaining empirical analysis. In this respect, in the second part of Table 4.5.2, we perform regression analysis using the IV regress 2SLS methodology. The result from Column 5 suggests that the total greenfield FDI positively impacts economic growth, which is statistically significant. In other words, the more greenfield FDI a country receives, the more likely it is to experience economic growth. The coefficient of 0.195 for total greenfield FDI suggests that an increase in the share of total greenfield FDI is associated with a positive change in GDP per capita growth. The coefficient is statistically significant at the 10% level. This coefficient suggests that increasing the share of greenfield FDI in a country's overall FDI inflows may contribute to higher GDP per capita growth.

Additionally, in Columns 6-8, we utilize greenfield FDI data at the sectoral level. Specifically, Column 6 of Table 4.5.2 employs greenfield FDI in the manufacturing sector to analyze its impact on economic growth. We find a strong and statistically significant link between manufacturing FDI and economic growth. The result from Column 6 suggests a strong and statistically significant link between greenfield FDI in the manufacturing sector and economic growth. The coefficient of 0.516 indicates that a one percentage point increase in greenfield FDI in the manufacturing sector is associated with a 0.516 percentage point increase in GDP per capita growth, ceteris paribus. The finding indicates that greenfield FDI in the manufacturing sector brings in new technology, capital, and expertise, leading to higher productivity, employment creation, and export growth. Moreover, the positive relationship between greenfield FDI in manufacturing and economic growth may be due to the spillover effects that foreign investment can create through knowledge transfers, skill upgrading, and technological innovation.

In addition to our variables of interest, we use initial GDP to check for convergence among countries. The coefficient for initial GDP across all the specifications is not only negative but also statistically significant. More specifically, in Column 5 of Table 4.5.2, the coefficient for initial GDP is -0.554 and significant at the one percent level suggesting a negative relationship between the initial level of GDP and economic growth which means that as the initial level of GDP increases, the economic growth rate decreases. This result implies that countries with low initial levels of GDP have the potential for higher GDP per capita growth rates compared to those with high ini-

tial levels of GDP. In this respect, the convergence occurs (Barro & Sala-i Martin, 1992; Barro et al., 1991).

Apart from the above, we also use some of the most used determinants of economic growth in the literature (Barro et al., 1991; Alfaro et al., 2004). In this regard, we use the average year of secondary schooling as a proxy for education and human capital. Education is considered a channel for economic growth since it constitutes an intrinsic mechanism for knowledge absorption (Marquez-Ramos & Mourelle, 2019). Education is a crucial determinant of economic well-being and increases the human capital inherent in a country's labor force (Hanushek & Woessmann, 2010). Our results suggest a positive relationship between education and economic growth. Specifically, it suggests that as levels of education increase, so does economic growth. Higher levels of education can lead to increased productivity, innovation, and technological progress, all of which can contribute to economic growth. Previous research has shown a clear connection between education and economic growth, and these findings support that conclusion.

Additionally, we also include trade openness, which is an essential determinant of economic growth. It is viewed that trade openness is essentially crucial in improving economic growth. Similar to previous studies on economic growth and trade openness, our research indicates a clear association between economic growth and trade openness in all examined scenarios. Specifically, in Column 5 of Table 4.5.2, the coefficient for trade openness is 0.611, which means that a one percentage point increase in trade openness is associated with a 0.611 percentage point increase in GDP per capita growth. In Column 6, the coefficient for trade openness is slightly higher at 0.634, suggesting that the relationship between trade openness and GDP per capita growth is slightly stronger in this specification. Finally, in Column 8, the coefficient for trade openness is even higher at 0.644, indicating that the relationship between trade openness and GDP per capita growth is strongest in this specification. More specifically, trade is thought to promote efficient resource allocation, allowing a country to realize economies of scale, facilitate knowledge diffusion, foster technological progress, and encourage competition in both domestic and international markets, which leads to the optimization of production processes and the development of new products (Busse & Königer, 2012). The empirical findings on the relationship between trade and economic growth frequently suggest that, in the long run, trade openness leads to higher economic growth (Frankel & Romer, 1999; Alcalá & Ciccone, 2004).

In addition, we consider government expenditure and observe a negative association between economic growth and government spending. In all the specifications, the coefficient for government expenditure is negative and statistically significant. Specifically, in Column 5 of Table 4.5.2, the magnitude of the coefficient for govern-

ment expenditure is -1.717 and strongly significant at the one percent level. In other words, the coefficient for government expenditure of -1.717 means that a one percentage point increase in government expenditure is associated with a decrease in GDP per capita growth by 1.717 percentage points, all else being equal. The coefficient for government expenditure of -1.737 in Column 6 of Table 4.5.2 means that a one percentage point increase in government expenditure is associated with a decrease in GDP per capita growth by 1.737 percentage points, ceteris paribus. In Column 7, the coefficient for government expenditure of -1.936 means that a one percentage point increase in government expenditure is associated with a decrease in GDP per capita growth by 1.936 percentage points, all else being equal. In Column 8, The coefficient for government expenditure of -1.692 means that a one percentage point increase in government expenditure is associated with a decrease in GDP per capita growth by 1.692 percentage points, all else being equal. Most importantly, these results are not necessarily surprising, as it is consistent with empirical findings of previous research paper on economic growth (Barro, 1991; Chen et al., 2017; Kouton, 2018; Chen et al., 2017; Nketiah-Amponsah, 2009; Kouton, 2018).

Moreover, gross fixed capital formation is also included in the set of control variables as a proxy for investment. Our findings show a strong and statistically significant positive link with economic growth. Gross fixed capital formation (as a percentage of GDP) has a positive coefficient of 1.468 in Column 5. This means that a one percentage point increase in gross fixed capital formation is associated with a 1.468 percentage point increase in GDP per capita growth, all else being equal. Similarly, gross fixed capital formation has a positive coefficient of 1.391 in Column 6. Specifically, a one percentage point increase in gross fixed capital formation is associated with a 1.391 percentage point increase in GDP per capita growth, all else being equal. In Column 7, the coefficient is 1.450 and has a positive sign. More precisely, a one percentage point increase in gross fixed capital formation is associated with a 1.450 percentage point increase in GDP per capita growth when in Column 7, all else being equal. Moreover, gross fixed capital formation has a positive coefficient of 1.450 in Column 8. This means that a one percentage point increase in gross fixed capital formation is associated with a 1.450 percentage point increase in GDP per capita growth, all else being equal. Likewise, when greenfield FDI in services has added to the specification, the gross fixed capital formation coefficient is 1.528, meaning that a one percentage point increase in gross fixed capital formation is associated with a 1.528 percentage point increase in GDP per capita growth, all else being equal. Empirical research has found a strong positive relationship between investment and economic growth (Levine & Renelt, 1992; Mankiw et al., 1992; De Long et al., 1992; D. F. Meyer & Sanusi, 2019; Summers & Heston, 1991).

Furthermore, we use total population in the set of control variables as it is considered one of the main determinants of economic growth. In our empirical findings, the relationship between economic growth and the population[13] is positive and strongly significant in the 2SLS part of the regression. There are several reasons why the population is positively linked with economic growth. Such as, in developed economies, increased population density and urbanization promote specialization, greater investment in human capital, and faster accumulation of new knowledge. These "increasing returns" from specialization and knowledge accumulation would raise per capita incomes as the population grows and would be far more critical than diminishing returns in resource-constrained sectors (Becker et al., 1999). Although some believe that a larger population in developed economies results in lower per capita income and restricts economic growth, there is a lack of empirical evidence to support this claim. Instead, larger populations can lead to more specialized industries and increased investment in knowledge, particularly in larger, more significant cities. This suggests that population growth can be beneficial for economic development. As a result, the net relationship between increased population and per capita income depends on whether the inducements to human capital and knowledge expansion outweigh the diminishing returns to natural resources (Becker et al., 1999). Similarly, Sethy and Sahoo (2015) and Tumwebaze and Ijjo (2015) find that population growth positively impacts per capita economic growth in India and the Eastern and Southern African region, respectively[14].

Furthermore, we split our sample into two sub-samples to examine the differential effects of greenfield FDI on economic growth in OECD and non-OECD countries. In this regard, Table 4.5.3 presents the results for each sub-sample separately, allowing us to analyze the variation in the relationship between the greenfield FDI and economic growth across these two distinct groups. One of the major differences from the findings in Table 4.5.2 is that coefficient for greenfield FDI is positive and statistically significant across all specifications in the OECD sample. However, the findings from the non-OECD sample are similar to what we have in our baseline results. These results indicate that greenfield FDI, both at the total and sectoral levels, plays a positive role in promoting economic growth. The situation is different in the non-OECD sample. Here, both the total greenfield FDI and greenfield FDI, specifically in the manufacturing sector, can have a positive impact on economic growth. However, in the

[13]The neoclassical growth by Solow (1956) provides a theoretical explanation for a negative relationship between population growth and growth. For example, Mankiw et al. (1992) add human capital accumulation, which enhances the quality of the labor force to Solow's model, and finds that empirical evidence is consistent with the theoretical result that higher population growth rates lead to lower steady-state economic growth.

[14]Yao et al. (2013) and Banerjee (2012) conclude that there is a negative relationship between population and per capita GDP growth in China and Australia.

case of the extraction and services sectors, the relationship with economic growth is not apparent.

Institutions play a crucial role in shaping the economic growth of a country, as they provide a framework for efficient resource allocation, facilitate trade and investment, and promote innovation and entrepreneurship. In this respect, economies that benefit the most from economic integration with the global economy have domestic institutions that manage and contain the conflicts that economic interdependence causes (Rodrik, 1997). Another perspective is that the leading cause of a country's poor economic growth is due to inadequate institutions. Table 4.5.4 includes some of the potential institutional variables in the regression analysis. First, we include corruption in columns 2-4 and find statistically significant and negative relations across all models. These findings are in line with the literature on corruption and economic growth. The findings regarding greenfield FDI are similar to the baseline results in Table 4.5.2. There are plausible arguments that lower economic growth may lead to more significant corruption or that greater corruption may lead to lower growth rates (Ali & Isse, 2002).

Additionally, we use some indicators of freedom from the freedom house database. It is a well-known fact in the literature on institutions and economic growth that government instability and political violence often negatively affect growth[15] (Londregan & Poole, 1990; Barro, 1991; Barro & Lee, 1993; Easterly et al., 1993, 1994; Persson & Tabellini, 2006). Politically and socially free economies provide more opportunities for economic growth, leading to higher living standards and greater prosperity. In this regard, we split the sample into three subgroups, free, partially free, and controlled economies, based on their political rights and civil liberties status. Our results clearly indicate that countries that enjoy political and social freedoms positively impact economic growth. In contrast, partially free countries have a negative link with economic growth. While in the case of controlled economies, we do not find any link with economic growth.

[15] A country's economic freedom level can significantly impact its economic development and growth. Free countries prioritizing individual liberty and free-market principles tend to experience faster economic growth than those with controlled economies. Free countries provide an enabling environment that fosters innovation, entrepreneurship, and competition. In a free economy, businesses can respond to market demands, invest in research and development, and create new products and services. In contrast, controlled economies limit private enterprises and rely on state-owned enterprises to drive economic growth. This can hinder innovation and entrepreneurship and limit the potential for economic growth.

Table 4.5.3: Regression Results with 2SLS by Splitting Sample into OECD and Non-OECD countries

	OECD				Non-OECD			
	(1) Total FDI	(2) Manufacturing	(3) Extraction	(4) Services	(5) Total FDI	(6) Manufacturing	(7) Extraction	(8) Services
Initial GDP	−1.007***	−0.919***	−0.867***	−1.023***	−0.554***	−0.557***	−0.379***	−0.538***
	(0.244)	(0.237)	(0.231)	(0.257)	(0.130)	(0.120)	(0.143)	(0.138)
Average Years of Schooling(Log)	−0.375	−0.378	−0.481	−0.371	1.199*	1.233*	0.902	1.243*
	(1.251)	(1.307)	(1.303)	(1.238)	(0.703)	(0.686)	(0.767)	(0.713)
Inflation(Log)	−0.678*	−0.595*	−0.581	−0.684*	−0.418*	−0.431*	−0.260	−0.426*
	(0.337)	(0.316)	(0.347)	(0.349)	(0.219)	(0.220)	(0.265)	(0.222)
Trade(Log)	0.832*	0.757	0.967**	0.826**	0.611**	0.634***	0.522*	0.604**
	(0.412)	(0.467)	(0.444)	(0.402)	(0.235)	(0.227)	(0.279)	(0.235)
Government Expenditure(Log)	−0.508	−0.567	−0.666	−0.546	−1.717***	−1.737***	−1.936***	−1.692***
	(0.947)	(0.957)	(1.012)	(0.949)	(0.445)	(0.439)	(0.489)	(0.452)
Gross Fixed Capital Formation(Log)	4.002***	3.788***	3.676***	4.095***	1.468**	1.391**	1.450**	1.528**
	(1.049)	(1.056)	(1.045)	(1.086)	(0.580)	(0.564)	(0.604)	(0.617)
Total Population(Log)	0.866***	0.792**	0.836***	0.872***	0.587***	0.579***	0.611***	0.616***
	(0.269)	(0.294)	(0.290)	(0.267)	(0.160)	(0.162)	(0.183)	(0.164)
Total FDI	0.137***				0.195*			
	(0.048)				(0.113)			
FDI in Manufacturing		0.294***				0.516*		
		(0.103)				(0.268)		
FDI in Extraction			2.007*				−3.676	
			(1.123)				(2.404)	
FDI in Services				0.223**				0.241
				(0.097)				(0.169)
Observations	111	110	111	111	367	364	367	365
Wald (F-stat)	60.877	286.731	27.099	28.011	627.051	345.039	8.118	92.129
P-value (J-Stat)	0.339	0.583	0.371	0.240	0.195	0.129	0.242	0.249

Note: Standard errors in parentheses are clustered at the country level. Dependent variable: GDP per capita growth. *** p<0.01, ** p<0.05, * p<0.10. All regressions include a constant term and 2SLS estimate with time and country fixed effects. The Initial GDP variable is the log of the real GDP at the beginning of the period. The Schooling variable is the log of years of secondary schooling. Inflation is the log of inflation. Government spending is a log of the share of government spending/GDP. The total population is the log of the total population. Gross fixed capital formation is the log of Gross fixed capital formation/GDP. Total FDI is the total greenfield FDI. FDI in manufacturing is the greenfield FDI in the manufacturing sector. FDI in Extraction is the greenfield FDI in the extraction sector. FDI in Services is the greenfield FDI in Services.

Table 4.5.4: Inclusion of Institutional Variables in the Regressions

	Corruption			Free			Partially Free			Contolled		
	(1) Manufacturing	(2) Extraction	(3) Services	(4) Manufacturing	(5) Extraction	(6) Services	(7) Manufacturing	(8) Extraction	(9) Services	(10) Manufacturing	(11) Extraction	(12) Services
Initial GDP	−0.668***	−0.501***	−0.639***	−0.776***	−0.598***	−0.745***	−0.600***	−0.423***	−0.584***	−0.589***	−0.419***	−0.560***
	(0.136)	(0.156)	(0.144)	(0.133)	(0.151)	(0.144)	(0.124)	(0.142)	(0.136)	(0.135)	(0.153)	(0.156)
Average Years of Schooling(Log)	1.353*	1.035	1.350*	1.115	0.769	1.124	1.271*	0.972	1.287*	1.200*	0.832	1.216*
	(0.705)	(0.779)	(0.728)	(0.679)	(0.750)	(0.706)	(0.666)	(0.752)	(0.691)	(0.699)	(0.783)	(0.721)
Inflation(Log)	−0.387*	−0.218	−0.384*	−0.424*	−0.246	−0.422*	−0.406*	−0.262	−0.401*	−0.441*	−0.260	−0.434*
	(0.214)	(0.250)	(0.217)	(0.217)	(0.265)	(0.219)	(0.220)	(0.259)	(0.222)	(0.223)	(0.270)	(0.225)
Trade(Log)	0.637***	0.529*	0.609***	0.694***	0.581**	0.664***	0.643***	0.545**	0.615***	0.632***	0.510*	0.602**
	(0.224)	(0.274)	(0.232)	(0.205)	(0.247)	(0.211)	(0.224)	(0.262)	(0.230)	(0.227)	(0.288)	(0.236)
Government Expenditure(Log)	−1.694***	−1.886***	−1.652***	−2.034***	−2.251***	−1.982***	−1.762***	−1.930***	−1.710***	−1.778***	−2.011***	−1.724***
	(0.448)	(0.501)	(0.460)	(0.430)	(0.475)	(0.451)	(0.438)	(0.481)	(0.453)	(0.436)	(0.495)	(0.445)
Gross Fixed Capital Formation(Log)	1.330**	1.382**	1.462**	1.523***	1.587***	1.664***	1.495***	1.575***	1.646***	1.380**	1.418**	1.519**
	(0.547)	(0.588)	(0.611)	(0.539)	(0.599)	(0.600)	(0.533)	(0.588)	(0.586)	(0.562)	(0.590)	(0.610)
Total Population(Log)	0.732***	0.771***	0.777***	0.801***	0.841***	0.839***	0.628***	0.664***	0.672***	0.607***	0.646***	0.637***
	(0.182)	(0.201)	(0.181)	(0.169)	(0.190)	(0.167)	(0.162)	(0.181)	(0.162)	(0.174)	(0.192)	(0.178)
FDI in Manufacturing	0.499*			0.534*			0.550*			0.509*		
	(0.293)			(0.296)			(0.299)			(0.266)		
FDI in Extraction		−3.583			−3.861			−3.198			−3.972	
		(2.240)			(2.435)			(2.338)			(2.533)	
FDI in Services			0.192			0.224			0.259			0.233
			(0.178)			(0.179)			(0.179)			(0.167)
Fully Free				1.198***	1.229***	1.169***						
				(0.294)	(0.319)	(0.309)						
Partially Free							−0.664*	−0.584	−0.692*			
							(0.354)	(0.386)	(0.383)			
Controlled										−0.244	−0.348	−0.183
										(0.330)	(0.362)	(0.344)
Observations	364	367	365	364	367	365	364	367	365	364	367	365
Wald (F-stat)	349.773	7.446	93.728	335.680	8.516	92.137	321.387	6.729	98.528	340.779	7.196	99.402
P-value (J-Stat)	0.308	0.534	0.496	0.416	0.718	0.655	0.234	0.382	0.439	0.124	0.235	0.238

Note: Standard errors in parentheses are clustered at the country level. Dependent variable: GDP per capita growth.*** p<0.01, ** p<0.05, * p<0.10. All regressions include a constant term estimated by 2SLS with time and country fixed effects. The Initial GDP variable is the log of the real GDP at the beginning of the period. The Schooling variable is the log of years of secondary schooling. Inflation is the log of inflation. Government spending is the log of the share of government spending/GDP. The total population is the log of the total population. Gross fixed capital formation is the log of gross fixed capital formation/GDP. Total FDI is the total greenfield FDI. FDI in manufacturing is the greenfield FDI in the manufacturing sector. FDI in Extraction is the greenfield FDI in the extraction sector. FDI in Services is the greenfield FDI in Services. Corruption is the dummy variable which takes the value of 1 if there is corruption but 0 otherwise. Free is the dummy variable which takes the value of 1 if a country is free but 0 otherwise. Partially Free is the dummy variable, which takes the value of 1 if a country is partially free and 0 otherwise. Controlled is the dummy variable, which takes a value of 1 if the country is not free and 0 otherwise.

4.6 Robustness Checks

This section is dedicated to performing some robustness checks on the impact of sectoral greenfield FDI on economic growth. To check the reliability and validity of our findings, we conduct some robustness checks to test the robustness of our results under different assumptions and specifications. In this respect, we excluded the top ten greenfield FDI-receiving economies from our sample. We want to check whether these major contributors influence the above-stated findings. Table 4.6.1 excludes the top ten FDI-receiving economies from the analysis while keeping all the specifications the same. We find that there are no significant changes in the sign of the coefficients. Our findings show that even after excluding these top ten greenfield FDI observations, the direction of the coefficient remained the same regardless of whether we included or excluded the top ten greenfield FDI-receiving economies.

Furthermore, no significant differences in the coefficient's magnitude suggest that excluding the top ten greenfield FDI-receiving economies does not significantly impact the results of our study. Specifically, in Columns 1-3 of Table 4.6.1, along with other variables, we use corruption in the specifications. The findings indicate that all greenfield FDI variables carry the same sign and no significant changes in the magnitude of the coefficients. Likewise, from Columns 4-13, we use indicators from the freedom-house database, categorizing countries into free, partially free, and controlled. In these cases, the sign of the coefficients for all variables remains the same despite excluding the top ten greenfield-receiving countries from the sample. In short, our empirical findings are robust after controlling for some of the prominent actors of overall greenfield FDI. We can conclude that our results are robust to changes by excluding the top ten greenfield FDI-receiving countries.

Table 4.6.1: Exclusion of Top Ten Greenfield FDI Receiving Countries

	Corruption			Free			Partially Free			Contolled		
	(1) Manufacturing	(2) Extraction	(3) Services	(4) Manufacturing	(5) Extraction	(6) Services	(7) Manufacturing	(8) Extraction	(9) Services	(10) Manufacturing	(11) Extraction	(12) Services
Initial GDP	−0.668***	−0.501***	−0.639***	−0.776***	−0.598***	−0.745***	−0.600***	−0.423***	−0.584***	−0.589***	−0.419***	−0.560***
	(0.136)	(0.156)	(0.144)	(0.133)	(0.151)	(0.144)	(0.124)	(0.142)	(0.136)	(0.135)	(0.153)	(0.156)
Average Years of Schooling(Log)	1.353*	1.035	1.350*	1.115	0.769	1.124	1.271*	0.972	1.287*	1.200*	0.832	1.216*
	(0.705)	(0.779)	(0.728)	(0.679)	(0.750)	(0.706)	(0.666)	(0.752)	(0.691)	(0.699)	(0.783)	(0.721)
Inflation(Log)	−0.387*	−0.218	−0.384*	−0.424*	−0.246	−0.422*	−0.406*	−0.262	−0.401*	−0.441*	−0.260	−0.434*
	(0.214)	(0.250)	(0.217)	(0.217)	(0.265)	(0.219)	(0.220)	(0.259)	(0.222)	(0.223)	(0.270)	(0.225)
Trade(Log)	0.637***	0.529*	0.609***	0.694***	0.581**	0.664***	0.643***	0.545**	0.615***	0.632***	0.510*	0.602**
	(0.224)	(0.274)	(0.232)	(0.205)	(0.247)	(0.211)	(0.224)	(0.262)	(0.230)	(0.227)	(0.288)	(0.236)
Government Expenditure(Log)	−1.694***	−1.886***	−1.652***	−2.034***	−2.251***	−1.982***	−1.762***	−1.930***	−1.710***	−1.778***	−2.011***	−1.724***
	(0.448)	(0.501)	(0.460)	(0.430)	(0.475)	(0.451)	(0.438)	(0.481)	(0.453)	(0.436)	(0.495)	(0.445)
Gross Fixed Capital Formation(Log)	1.330**	1.382**	1.462**	1.523***	1.587***	1.664***	1.495***	1.575***	1.646***	1.380**	1.418**	1.519**
	(0.547)	(0.588)	(0.611)	(0.539)	(0.599)	(0.600)	(0.533)	(0.588)	(0.586)	(0.562)	(0.590)	(0.610)
Total Population(Log)	0.732***	0.771***	0.777***	0.801***	0.841***	0.839***	0.628***	0.664***	0.672***	0.607***	0.646***	0.637***
	(0.182)	(0.201)	(0.181)	(0.169)	(0.190)	(0.167)	(0.162)	(0.181)	(0.162)	(0.174)	(0.192)	(0.178)
FDI in Manufacturing	0.499*			0.534*			0.550*			0.509*		
	(0.293)			(0.296)			(0.299)			(0.266)		
FDI in Extraction		−3.583			−3.861			−3.198			−3.972	
		(2.240)			(2.435)			(2.338)			(2.533)	
FDI in Services			0.192			0.224			0.259			0.233
			(0.178)			(0.179)			(0.179)			(0.167)
Fully Free				1.198***	1.229***	1.169***						
				(0.294)	(0.319)	(0.309)						
Partially Free							−0.664*	−0.584	−0.692*			
							(0.354)	(0.386)	(0.383)			
Controlled										−0.244	−0.348	−0.183
										(0.330)	(0.362)	(0.344)
Observations	364	367	365	364	367	365	364	367	365	364	367	365
Wald (F-stat)	349.773	7.446	93.728	335.680	8.516	92.137	321.387	6.729	98.528	340.779	7.196	99.402
P-value (J-Stat)	0.308	0.534	0.496	0.416	0.718	0.655	0.234	0.382	0.439	0.124	0.235	0.238

Note: Standard errors in parentheses are clustered at the country level. Dependent variable: GDP per capita growth.*** p<0.01, ** p<0.05, * p<0.10. All regressions include a constant term estimated by 2SLS with time and country fixed effects. The Initial GDP variable is the log of the real GDP at the beginning of the period. The Schooling variable is the log of years of secondary schooling. Inflation is the log of inflation. Government spending is a log of the share of government spending/GDP. The total population is the log of the total population. Gross fixed capital formation is the log of gross fixed capital formation/GDP. Total FDI is the total greenfield FDI. FDI in manufacturing is the greenfield FDI in the manufacturing sector. FDI in extraction is the greenfield FDI in the extraction sector. FDI in services is the greenfield FDI in the services sector. Corruption is the dummy variable which takes a value of 1 if there is corruption but 0 otherwise. Free is the dummy variable which takes the value of 1 if a country is free but 0 otherwise. Partially Free is the dummy variable, which takes the value of 1 if a country is partially free and 0 otherwise. Controlled is the dummy variable, which takes a value of 1 if the country is not free and 0 otherwise.

4.7 Conclusion

FDI has the potential to positively impact economic growth by increasing capital, technology, job opportunities, and productivity in the host country, as well as improving competitiveness in domestic industries. However, the extent of FDI's contribution to economic growth varies depending on the circumstances in the recipient country (Harms & Méon, 2018; Alfaro, 2003). In recent decades, FDI inflows have increased significantly, increasing interest in its role in economic growth and overall development across countries. One mode of FDI that can promote economic growth is greenfield FDI, which can facilitate technology transfer, competition, job creation, and productivity. Nevertheless, sector-level greenfield FDI's impact on economic growth differs across different sectors. It may be influenced by factors such as institutional quality, human capital, and absorptive capacity.

This paper studied the link between FDI and economic growth using total and sector levels of greenfield FDI data from 2003 to 2020. We found that total greenfield FDI is positively linked with economic growth. Furthermore, we also found a positive association between greenfield FDI and economic growth in the manufacturing sector. The positive impact of greenfield FDI on the manufacturing sector can be attributed to various factors, such as the transfer of technology, increased competition, job creation, and increased productivity. These factors can help to spur innovation, enhance efficiency, and ultimately increase output in the manufacturing sector. In contrast, we found no association between the mining/ extractive industries and services sectors with economic growth. According to Hirschman (1958), the ability of primary products from mines, wells, and plantations to slip out of a country without leaving much of a trace in the rest of the economy is known as the "enclave" type of development. This may be the case why extraction has a negative association with economic growth. Moreover, we also used some institutional indicators, which showed that countries with strong institutional frameworks help improve the impact of FDI on economic growth.

Our research findings have important policy implications, particularly regarding greenfield FDI directed toward the manufacturing sector. We found that such investment is more effective in promoting economic development and increasing overall welfare. However, it is crucial to note that a favorable political and social environment is necessary for productive investment. Additionally, a well-developed institutional framework and enabling environment are required to fully reap any FDI's benefits. Our research demonstrates that greenfield FDI is just as valuable as any other type of FDI, such as M&As. Furthermore, our results indicate that, like other types of FDI, greenfield FDI has a similar impact across different sectors. Overall, these find-

ings highlight the importance of directing greenfield FDI towards the manufacturing sector and emphasize the need for a conducive investment climate to fully realize the benefits of FDI.

To summarize, our research findings indicate that greenfield FDI positively impacts economic growth, but its impact can be even more substantial in manufacturing. For countries seeking to attract greenfield FDI and promote economic growth, it is crucial to implement policies and initiatives that specifically target the manufacturing sector, which may involve investing in infrastructure to support manufacturing activities, promoting innovation and technology transfer, and enhancing the local workforce's skills to meet the needs of the manufacturing industry. Countries can realize significant economic benefits from greenfield FDI by prioritizing the manufacturing sector in their investment strategies.

4.8 Appendix

Table 4.8.1: List of Countries

	Country List
East Asia & Pacific	Australia Malaysia Brunei Darussalam Mongolia Cambodia Myanmar China New Zealand Hong Kong Indonesia Philippines Japan Singapore Thailand Korea, Rep. Vietnam Lao PDR
Europe and Central Asia	Albania Hungary Romania Armenia Iceland Russian Federation Austria Ireland Serbia Azerbaijan Italy Slovak Republic Belarus Kazakhstan Slovenia Belgium Kyrgyz Republic Spain Bosnia & Herzegovina Latvia Sweden Bulgaria Lithuania Switzerland Luxembourg Tajikistan Czech Republic, Moldova Turkey Denmark Montenegro Ukraine Estonia, Netherlands, United Kingdom Finland North Macedonia France Norway Georgia Poland Germany Portugal Greece Croatia Malta
Latin America & Caribbean	Bolivia Brazil Uruguay Peru Paraguay Panama Chile Nicaragua Honduras El Salvador Ecuador Dominican Republic Costa Rica Colombia Guatemala Mexico
North Africa & Middle East	Algeria Bahrain Egypt, Arab Rep. Iran, Islamic Rep. Iraq Israel Jordan Lebanon Morocco, Oman, Saudi Arabia Tunisia, United Arab Emirates
South Asia	Bangladesh India Nepal Pakistan Sri Lanka
Sub Saharan Africa	Angola Namibia Botswana Niger Burkina Faso Nigeria Cameroon, Rwanda, Congo, Dem. Rep. Senegal, Congo, Rep. South Africa, Cote d'Ivoire, Sudan Ethiopia Tanzania Ghana Uganda Guinea Zambia Kenya Zimbabwe Madagascar Mauritius Mozambique
North America	Canada United States

References

Adams, S. (2009). Foreign direct investment, domestic investment, and economic growth in Sub Saharan Africa. *Journal of Policy Modeling*, *31*(6), 939–949.

Adeniyi, O., Oyinlola, A., Omisakin, O., & Egwaikhide, F. O. (2015). Financial development and economic growth in Nigeria:: Evidence from threshold modelling. *Economic Analysis and Policy*, *47*, 11–21.

Aizenman, J., Jinjarak, Y., & Park, D. (2013). Capital flows and economic growth in the era of financial integration and crisis, 1990–2010. *Open Economies Review*, *24*(3), 371–396.

Alam, A., Arshad, M. U., & Rajput, W. (2013). Relationship of labor productivity, foreign direct investment and economic growth: Evidence from OECD countries. *Journal of Business and Management Sciences*, *1*(6), 133–138.

Alcalá, F., & Ciccone, A. (2004). Trade and productivity. *The Quarterly Journal of Economics*, *119*(2), 613–646.

Alfaro, L. (2003). Foreign direct investment and growth: Does the sector matter. *Harvard Business School*, *2003*, 1–31.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). FDI and economic growth: the role of local financial markets. *Journal of International Economics*, *64*(1), 89–112.

Alfaro, L., Kalemli-Ozcan, S., & Volosovych, V. (2008). Why doesn't capital flow from rich to poor countries? an empirical investigation. *The review of Economics and Statistics*, *90*(2), 347–368.

Ali, A. M., & Isse, H. S. (2002). Determinants of economic corruption: A cross-country comparison. *Cato J.*, *22*, 449.

Almfraji, M. A., & Almsafir, M. K. (2014). Foreign direct investment and economic growth literature review from 1994 to 2012. *Procedia-Social and Behavioral Sciences*, *129*, 206–213.

Alzaidy, G., Ahmad, M. N. B. N., & Lacheheb, Z. (2017). The impact of foreign-direct investment on economic growth in Malaysia: The role of financial development. *International Journal of Economics and Financial Issues*, *7*(3), 382–388.

Andvig, J. C., Fjeldstad, O.-H., Amundsen, I., Sissener, T., & Søreide, T. (2000). Research on corruption: A policy oriented survey. *Commissioned by NORAD, Final Report, December, Oslo*.

Anwar, S., & Nguyen, L. P. (2011). Foreign direct investment and export spillovers: Evidence from Vietnam. *International Business Review*, *20*(2), 177–193.

Ashraf, A., Herzer, D., & Nunnenkamp, P. (2016). The effects of greenfield fdi and cross-border M&As on total factor productivity. *The World Economy*, *39*(11), 1728–1755.

Ata, A. Y., & Arvas, M. A. (2011). Determinants of economic corruption: a cross-country data analysis. *International Journal of Business and Social Science*, *2*(13), 161–169.

Balasubramanyam, V. N., Salisu, M., & Sapsford, D. (1996). Foreign direct investment and growth in EP and IS countries. *The Economic Journal*, *106*(434), 92–105.

Banerjee, R. (2012). Population growth and endogenous technological change: Australian economic growth in the long run. *Economic Record*, *88*(281), 214–228.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, *106*(2), 407–443.

Barro, R. J. (1996). *Determinants of economic growth: A cross-country empirical study.* National Bureau of Economic Research Cambridge, Mass., USA.

Barro, R. J., & Lee, J.-W. (1993). Losers and winners in economic growth. *The World Bank Economic Review*, *7*(suppl_1), 267–298.

Barro, R. J., & Sala-i Martin, X. (1992). Convergence. *Journal of Political Economy*, *100*(2), 223–251.

Barro, R. J., Sala-i Martin, X., Blanchard, O. J., & Hall, R. E. (1991). Convergence across states and regions. *Brookings Papers on Economic Activity,*, 107–182.

Becker, G. S., Glaeser, E. L., & Murphy, K. M. (1999). Population and economic growth. *American Economic Review*, *89*(2), 145–149.

Begum, M., Salahuddin, M., Chowdhury, M., & Wahid, A. N. (2018). Foreign direct investment-growth nexus revisited: New evidence from Bangladesh. *International Journal of Economics and Financial Issues*, *8*(3), 168.

Bengoa, M., & Sanchez-Robles, B. (2003). Foreign direct investment, economic freedom and growth: new evidence from Latin America. *European Journal of Political Economy*, *19*(3), 529–545.

Blonigen, B., & Wang, M. (2004). *Inappropriate pooling of wealthy and poor countries in empirical FDI studies.* National Bureau of Economic Research Cambridge, Mass., USA.

Blonigen, B. A. (2005). A review of the empirical literature on FDI determinants. *Atlantic Economic Journal*, *33*(4), 383–403.

Borensztein, E., De Gregorio, J., & Lee, J.-W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, *45*(1), 115–135.

Busse, M., & Königer, J. (2012). Trade and economic growth: A re-examination of the empirical evidence. *HWWI Research Paper No. 123. Hamburg*.

Caesar, A. E., Chen, H., Udimal, T. B., & Osei, A. (2018). Foreign direct investment, growth of output indicators and economic growth in China: Empirical evidence on causal links. *International Journal of Economics and Financial Issues*, *8*(3), 315.

Carkovic, M., & Levine, R. (2005). Does foreign direct investment accelerate economic growth. *Does foreign direct investment promote development*, 195–220.

Caselli, F., Esquivel, G., & Lefort, F. (1996). Reopening the convergence debate: A new look at cross-country growth empirics. *Journal of Economic Growth*, *1*(3), 363–389.

Chakraborty, C., & Nunnenkamp, P. (2008). Economic reforms, FDI, and economic growth in India: A sector level analysis. *World Development*, *36*(7), 1192–1212.

Chaudhury, S., Nanda, N., & Tyagi, B. (2020). Impact of FDI on economic growth in South Asia: Does nature of FDI matters? *Review of Market Integration*, *12*(1-2), 51–69.

Chen, C., Yao, S., Hu, P., & Lin, Y. (2017). Optimal government investment and public debt in an economic growth model. *China Economic Review*, *45*, 257–278.

Choe, J. I. (2003). Do foreign direct investment and gross domestic investment promote economic growth? *Review of Development Economics*, *7*(1), 44–57.

Chowdhury, M. (2016). Financial development, remittances and economic growth: Evidence using a dynamic panel estimation. *Margin: The Journal of Applied Economic Research*, *10*(1), 35–54.

Dar, A. A., Bhatti, H. M. A., & Muhammad, T. (2016). Fdi and economic growth in pakistan: A sector wise multivariate cointegration analysis. *The Pakistan Development Review*, 67–88.

Davies, R., Desbordes, R., & Ray, A. (2015). Greenfield versus merger & acquisition FDI: Same wine, different bottles? *Working Paper 201503, School of Economics, University College Dublin*.

Davies, R. B., & Voy, A. (2009). The effect of fdi on child labor. *Journal of Development Economics*, *88*(1), 59–66.

De Long, J. B., Summers, L. H., & Abel, A. B. (1992). Equipment investment and economic growth: how strong is the nexus? *Brookings Papers on Economic Activity,*, *1992*(2), 157–211.

De Mello, L. R. (1999). Foreign direct investment-led growth: evidence from time series and panel data. *Oxford Economic Papers*, *51*(1), 133–151.

Djankov, S., & Murrell, P. (2002). Enterprise restructuring in transition: A quantitative survey. *Journal of Economic Literature*, *40*(3), 739–792.

Easterly, W., Kremer, M., Pritchett, L., & Summers, L. H. (1993). Good policy or good luck? *Journal of Monetary Economics*, *32*(3), 459–483.

Easterly, W., Rebelo, S., et al. (1994). *Fiscal policy and economic growth: an empirical investigation* (Tech. Rep.). CEPR Discussion Papers.

Estrin, S. (2002). Competition and corporate governance in transition. *Journal of Economic Perspectives*, *16*(1), 101–124.

Ethier, W. J., & Markusen, J. R. (1996). Multinational firms, technology diffusion and trade. *Journal of International Economics*, *41*(1-2), 1–28.

Faisal, F., Muhammad, P. M., & Tursoy, T. (2016). Impact of economic growth, foreign direct investment and financial development on stock prices in China: Empirical evidence from time series analysis. *International Journal of Economics and Financial Issues*, *6*(4), 1998–2006.

Findlay, R. (1978). Relative backwardness, direct foreign investment, and the transfer of technology: a simple dynamic model. *The Quarterly Journal of Economics*, *92*(1), 1–16.

Frankel, J. A., & Romer, D. (1999). Does trade cause growth? *American Economic Review*, *89*(3), 379–399.

Fuentes, J. R., & Morales, M. (2011). On the measurement of total factor productivity: A latent variable approach. *Macroeconomic Dynamics*, *15*(2), 145–159.

Görg, H., & Greenaway, D. (2004). Much ado about nothing? do domestic firms really benefit from foreign direct investment? *The World Bank Research Observer*, *19*(2), 171–197.

Grossman, G. M., & Helpman, E. (1991). *Innovation and growth in the global economy*. MIT press.

Hanushek, E. A., & Woessmann, L. (2010). Education and economic growth. *Economics of Education*, *60*, 67.

Harms, P., & Méon, P.-G. (2018). Good and useless fdi: The growth effects of greenfield investment and mergers and acquisitions. *Review of International Economics*, *26*(1), 37–59.

Hirschman, A. O. (1958). Interdependence and industrialization. *The strategy of Economic Development*, 98–119.

Husted, B. W. (1999). Wealth, culture, and corruption. *Journal of International Business Studies*, *30*(2), 339–359.

Islam, N. (1995). Growth empirics: a panel data approach. *The Quarterly Journal of Economics*, *110*(4), 1127–1170.

Jilenga, M. T., Xu, H., Gondje-Dacka, I.-M., et al. (2016). The impact of external debt and foreign direct investment on economic growth: Empirical evidence from tanzania. *International Journal of Financial Research*, *7*(2), 154–162.

Jyun-Yi, W., Chih-Chiang, H., et al. (2008). Does foreign direct investment promote economic growth? evidence from a threshold regression analysis. *Economics Bulletin*, *15*(12), 1–10.

Kathuria, V. (2000). Productivity spillovers from technology transfer to Indian manufacturing firms. *Journal of International Development*, *12*(3), 343–369.

Kedia, B., Gaffney, N., & Clampit, J. (2012). Emnes and knowledge-seeking FDI. *Management International Review*, *52*(2), 155–173.

Klitgaard, R. (1988). *Controlling corruption*. Univ of California Press.

Kose, M. A., Prasad, E., Rogoff, K., & Wei, S.-J. (2010). Financial globalization and economic policies. In *Handbook of development economics* (Vol. 5, pp. 4283–4359). Elsevier.

Kouton, J. (2018). Education expenditure and economic growth: Some empirical evidence from Côte d'Ivoire. *Journal of Economics and Sustainable Development*, *9*, 22–34.

Lasbrey, A., Enyoghasim, M., Tobechi, A., Uwajumogu, N., Chukwu, B., & Kennedy, O. (2018). Foreign direct investment and economic growth: Literature from 1980 to 2018. *International Journal of Economics and Financial Issues*, *8*(5), 309–318.

Lee, I. H., & Rugman, A. M. (2012). Firm-specific advantages, inward FDI origins, and performance of multinational enterprises. *Journal of International Management*, *18*(2), 132–146.

Lensink, R., & Morrissey, O. (2006). Foreign direct investment: Flows, volatility, and the impact on growth. *Review of International Economics*, *14*(3), 478–493.

Levine, R., & Renelt, D. (1992). A sensitivity analysis of cross-country growth regressions. *The American Economic Review*, 942–963.

Li, X., & Liu, X. (2005). Foreign direct investment and economic growth: an increasingly endogenous relationship. *World Development*, *33*(3), 393–407.

Lipsey, B. M., & Zegan, M. (1994). What explains developing country growth. *NBER Working Paper. National Bureau for Economic Research, Cambridge, Massachusetts*, *4132*.

Lipsey, R. E. (2001). *Foreign direct investors in three financial crises.* National Bureau of Economic Research Cambridge, Mass., USA.

Liu, X., Siler, P., Wang, C., & Wei, Y. (2000). Productivity spillovers from foreign direct investment: Evidence from UK industry level panel data. *Journal of International Business Studies*, *31*(3), 407–425.

Londregan, J. B., & Poole, K. T. (1990). Poverty, the coup trap, and the seizure of executive power. *World Politics*, *42*(2), 151–183.

Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, *22*(1), 3–42.

Luo, Y. (2005). An organizational perspective of corruption1. *Management and Organization Review*, *1*(1), 119–154.

Majumder, S. B., & Nag, R. N. (2015). Capital flow in India: facts, features, and analysis. *Decision*, *42*(1), 19–31.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics*, *107*(2), 407–437.

Markusen, J. R. (2001). Contracts, intellectual property rights, and multinational investment in developing countries. *Journal of International Economics*, *53*(1), 189–204.

Marquez-Ramos, L., & Mourelle, E. (2019). Education and economic growth: An empirical analysis of nonlinearities. *Applied Economic Analysis*.

Mattoo, A., Olarreaga, M., & Saggi, K. (2004). Mode of foreign entry, technology transfer, and FDI policy. *Journal of Development Economics*, *75*(1), 95–111.

Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics*, *110*(3), 681–712.

Mencinger, J. (2003). Does foreign direct investment always enhance economic growth? *Kyklos*, *56*(4), 491–508.

Meyer, D. F., & Sanusi, K. A. (2019). A causality analysis of the relationships between gross fixed capital formation, economic growth and employment in South Africa. *Studia Universitatis Babes-Bolyai Oeconomica*, *64*(1), 33–44.

Meyer, K., & Nguyen, H. V. (2005). Foreign investment strategies and sub-national institutions in emerging markets: Evidence from Vietnam. *Journal of Management Studies*, *42*(1), 63–93.

Meyer, K. E., Ding, Y., Li, J., & Zhang, H. (2018). Overcoming distrust: How state-owned enterprises adapt their foreign entries to institutional pressures abroad. *State-Owned Multinationals: Governments in Global Business*, 211–251.

Mullen, J. K., & Williams, M. (2005). Foreign direct investment and regional economic performance. *Kyklos*, *58*(2), 265–282.

Neumayer, E., & Spess, L. (2005). Do bilateral investment treaties increase foreign direct investment to developing countries? *World Development*, *33*(10), 1567–1585.

Nketiah-Amponsah, E. (2009). Public spending and economic growth: evidence from Ghana (1970–2004). *Development Southern Africa*, *26*(3), 477–497.

Nocke, V., & Yeaple, S. (2007). Cross-border mergers and acquisitions vs. greenfield foreign direct investment: The role of firm heterogeneity. *Journal of International Economics*, *72*(2), 336–365.

Nwaogu, U. G., & Ryan, M. J. (2015). FDI, foreign aid, remittance and economic growth in developing countries. *Review of Development Economics*, *19*(1), 100–115.

Paul, J., & Feliciano-Cestero, M. M. (2021). Five decades of research on foreign direct investment by MNEs: An overview and research agenda. *Journal of Business Research*, *124*, 800–812.

Persson, T., & Tabellini, G. (2006). Democracy and development: The devil in the details. *American Economic Review*, *96*(2), 319–324.

Piperopoulos, P., Wu, J., & Wang, C. (2018). Outward fdi, location choices and innovation performance of emerging market enterprises. *Research Policy*, *47*(1), 232–240.

Pradhan, R. P., Arvin, M. B., Nair, M., & Bennett, S. E. (2020). The dynamics among entrepreneurship, innovation, and economic growth in the Eurozone countries. *Journal of Policy Modeling*, *42*(5), 1106–1122.

Qiu, L. D., & Wang, S. (2011). FDI policy, greenfield investment and cross-border mergers. *Review of International Economics*, *19*(5), 836–851.

Raff, H., Ryan, M., & Stähler, F. (2012). Firm productivity and the foreign-market entry decision. *Journal of Economics & Management Strategy*, *21*(3), 849–871.

Rodriguez-Clare, A. (1996). Multinationals, linkages, and economic development. *The American Economic Review*, *84*(4), 852–873.

Rodrik, D. (1997). Globalization, social conflict and economic growth. In *Conferencia de raúl prebisch. ginebra. versión revisada (en inglés) disponible en http://www. ksg. harvard. edu/rodrik/global. pdf* (Vol. 24).

Romer, P. (1990). Endogenous technological change. *Journal of Political Economy*, *98*(5), S71–102.

Ruxanda, G., Muraru, A., et al. (2010). Fdi and economic growth. evidence from simultaneous equation models. *Romanian Journal of Economic Forecasting*, *1*(2010), 45–58.

Saggi, K. (1999). Foreign direct investment, licensing, and incentives for innovation. *Review of International Economics*, *7*(4), 699–714.

Saggi, K. (2002). Trade, foreign direct investment, and international technology transfer: A survey. *The World Bank Research Observer*, *17*(2), 191–235.

Sánchez-Sellero, P., Rosell-Martínez, J., & García-Vázquez, J. M. (2013). Innovation as a driver of absorptive capacity from foreign direct investment in Spanish manufacturing firms. *Procedia-Social and Behavioral Sciences*, *75*, 236–245.

Saqib, N., Masnoon, M., & Rafique, N. (2013). Impact of foreign direct investment on economic growth of Pakistan. *Advances in Management & Applied Economics*, *3*(1), 35–45.

Sethy, S. K., & Sahoo, H. (2015). Investigating the relationship between population and economic growth: An analytical study of India. *Indian Journal of Economics & Business*.

Simionescu, M., et al. (2016). The impact of BREXIT on the foreign direct investment in the United Kingdom. *Bulgarian Economic Papers*(7), 2–17.

Soleimani, D., Maitah, M., Malec, K., & Kotásková, S. K. (2016). Foreign direct investments and gross domestic product development in USA, European Union and China (1995-2014). *International Journal of Economics and Financial Issues*, *6*(3), 978–984.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, *70*(1), 65–94.

Stepanok, I. (2015). Cross-border mergers and greenfield foreign direct investment. *Review of International Economics*, *23*(1), 111–136.

Summers, R., & Heston, A. (1991). The penn world table: An expanded set of international comparisons, 1950–1988. *The Quarterly Journal of Economics*, *106*(2), 327–368.

Swan, T. W. (1956). Economic growth and capital accumulation. *Economic Record*, *32*(2), 334–361.

Thiam, H. N. (2006). *Foreign direct investment and productivity: Evidence from the East Asian economies. UNIDO* (Tech. Rep.). Staff Working Paper.

Tumwebaze, H. K., & Ijjo, A. T. (2015). Regional economic integration and economic growth in the COMESA region, 1980–2010. *African Development Review*, *27*(1), 67–77.

UNCTAD. (2001). *World investment report 2001: Promoting linkages*. United Nations New York and Geneva.

UNCTAD. (2021). *World investment report 2021. Investing in sustainable recovery.* United Nations New York and Geneva.

Wang, J.-Y., & Blomström, M. (1992). Foreign investment and technology transfer: A simple model. *European Economic Review*, *36*(1), 137–155.

Wang, M. (2009). Manufacturing FDI and economic growth: Evidence from Asian economies. *Applied Economics*, *41*(8), 991–1002.

Wang, M., & Wong, S. M. C. (2009). What drives economic growth? The case of cross-border M&A and greenfield fdi activities. *Kyklos*, *62*(2), 316–330.

Yao, W., Kinugasa, T., & Hamori, S. (2013). An empirical analysis of the relationship between economic development and population growth in China. *Applied Economics*, *45*(33), 4651–4661.

Chapter 5

General Conclusions

5.1 Summary

The thesis presented here makes a valuable contribution to the ongoing discourse on the impact of external financial inflows in advancing economic growth and development. This study encompasses well-structured three chapters that delve deeply into the distinct effects of two primary external financing sources - FDI and migrant remittances - on economic growth and development. The findings offer insightful perspectives into the influence of these financial inflows on overall economic progress and the specific factors that facilitate or hinder growth. By thoroughly analyzing the complex relationships between external financial inflows and economic growth, this thesis offers a comprehensive framework for policymakers and scholars to make informed decisions and develop evidence-based strategies to promote sustainable economic growth.

External financial inflows, such as FDI and remittances, are important to economic growth and development. The effectiveness of external financial inflows in promoting economic development depends on a range of factors, including the institutional and regulatory environment, governance quality, and economic diversification. The empirical findings showed a positive link between economic growth and FDI, which means that FDI is positively associated with economic growth but no significant link in the case of migrant remittances, which indicates that the relationship between migrant remittances and growth is not statistically significant. This could be because remittances are not intended primarily for investment purposes [1]. In addition, we introduced the interaction of FDI and migrant remittances to check the combined effect of FDI and migrant remittances on economic growth. However, we found that this interaction term was not statistically significant, meaning that the combination of FDI and migrant remittances did not significantly impact economic growth beyond their individual effects.

We further investigated the indirect impact of FDI and migrant remittances, and we used TFP as a transmission channel through which FDI and migrant remittances might impact economic growth. For this purpose, we used TFP as a dependent variable, the interaction of FDI and migrant remittances, and other control variables as explanatory variables. We found that TFP is negatively associated with FDI. Several plausible reasons in the literature showed why the link between FDI and TFP was negative. Theoretically, FDI could transfer technology and knowledge from the foreign firm to the host country by enhancing TFP. However, if the technology transfer

[1] Explained by Samir Jahjah, Ralph Chami, and Fullenkamp, Connel "Are Immigrant Remittance Flows a Source of Capital for Development?" and Do workers' remittances promote economic growth? by Michael T. Gapen, Mr. Ralph Chami, Mr Peter Montiel, Mr Adolfo Barajas, and Fullenkamp, Connel

is incomplete, or the host country needs the necessary complementary factors, such as skilled labor or infrastructure. In such cases, the benefits of FDI might not be fully realized, and the TFP might not be increased. In some cases, transferring outdated or inappropriate technology might lead to lower TFP. Moreover, FDI could also lead to increase competition in the host country's market, which can drive down prices and reduce profit margins for domestic firms, which could cause a shift away from high-productivity firms, as they might be the ones most affected by the increased competition. In addition, FDI could also lead to the crowding out of domestic resources, such as labor and capital, and possibly occur when the foreign firm uses resources that could have been used by domestic firms, leading to a reduction in domestic investment and innovation.

In addition, we introduced the interaction of FDI and remittances in the TFP equation. We found that the coefficient for the interaction was not only positive but also statistically significant. The results showed strong complementarity between FDI and remittances in promoting productivity-led growth. The presence of both FDI and remittances in an economy could synergistically enhance the economy's overall productivity. This synergy could lead to long-term economic growth and development, as it provides access to new technologies, expertise, and financial resources that can be used to boost productivity in different sectors of the economy. The study's conclusion underscores the importance of policies encouraging both FDI and remittance inflows into developing countries to promote productivity and economic growth. By leveraging the complementarity between FDI and remittances, policymakers can design strategies that foster a conducive environment for foreign investment and encourage diaspora contributions to their home countries.

The third chapter has explored the impact of migrant remittances on economic complexity, which is an essential determinant of a country's long-term economic growth and development. Through an empirical analysis of data, we have shown that remittances can be negatively linked to economic complexity, meaning that countries that receive a higher proportion of remittance inflows tend to have lower levels of economic complexity. However, the study has also highlighted the critical role of education in moderating the impact of remittances on economic complexity, with the interaction between remittances and education having a positive sign and being statistically significant. In this respect, there are several ways through which remittances may impact ECI. Firstly, as mentioned in the literature, remittances help in productive investment, ultimately leading to production capabilities and improving overall economic development. Secondly, remittances are used for increasing physical and human capital. This improvement in human capital not only increases skilled labor but also helps in improving the overall structural composition of the economy. Thirdly,

migrants, along with bringing monetary remittances, also bring social remittances[2]. In this regard, these social remittances are sufficient to bring overall economic sophistication to an economy. Fourthly, remittances are also an important instrument in the eradication of poverty. So reducing poverty will impact the overall economic activities of the economy and ultimately bring some positive structural changes in the composition and structure of the economy, consequently leading to economic sophistication.

Finally, we found that the relationship between economic complexity and migrant remittances is complicated, and policymakers should adopt a holistic and varied approach to managing these complex economic phenomena. In order to improve economic complexity and effectively address the diverse social, cultural, and economic factors that shape migration patterns and remittance flows, policymakers in developing countries should prioritize education and skill-development initiatives. This policy approach will enable them to benefit from development and promote structural change. In short, productive capabilities result in higher economic sophistication combined with other socioeconomic indicators to improve overall economic development and economic well-being of the people across countries.

The fourth chapter has studied the link between FDI and economic growth using total and sector levels of greenfield FDI data from 2003 to 2020. We found that, overall, greenfield investment is positively linked with economic growth. Furthermore, we also found a positive association between greenfield FDI and economic growth in the manufacturing sector. The positive impact of greenfield FDI on the manufacturing sector can be attributed to various factors, such as the transfer of technology, increased competition, job creation, and increased productivity. These factors can help to spur innovation, enhance efficiency, and ultimately increase output in the manufacturing sector. In contrast, we found no association between the mining/ extractive industries and services sectors with economic growth. A key policy implication of our findings is that greenfield FDI directed towards the manufacturing sector is more helpful in bringing economic development and increasing overall welfare. Although, a favorable political and social environment is required for productive investment. In this respect, a well-developed institutional framework and enabling environment are necessary to ripe the benefits of any FDI. In short, these findings indicate that greenfield FDI is just as important as any type of FDI, such as M&A. Similarly, at the sectoral level, like overall FDI, greenfield investment has a similar impact across sectors.

[2]see Levitt 1998 on Social Remittances

5.2 Key Takeaways

The findings from this thesis show that external financial inflows such as FDI and migrant remittances are crucial external financing sources. These findings suggest that the presence of both FDI and remittances in an economy can synergistically enhance the economy's overall productivity. This synergy can lead to long-term economic growth and development, as it provides access to new technologies, expertise, and financial resources that can be used to boost productivity in different sectors of the economy. The study's conclusion underscores the importance of policies encouraging both FDI and remittance inflows into developing countries to promote productivity and economic growth. By leveraging the complementarity between FDI and remittances, policymakers can design strategies that foster a conducive environment for foreign investment and encourage diaspora contributions to their home countries.

In addition, these findings offer new perspectives on the role of migrant remittances on economic transformation in recipient economies. Moreover, our findings suggest that the relationship between economic complexity and migrant remittance is complex. Policymakers, particularly in developing countries, formulate and implement policies that encourage migrants to remit more so that these remittances can be utilized to address economic and social problems in their home countries. Furthermore, policymakers also prioritize education and skills development to bring structural transformation and achieve development goals. in short, strong production capabilities increase economic sophistication and other socioeconomic indicators that can improve overall economic development and well-being across countries.

Another important lesson from the findings of this thesis is that greenfield FDI directed toward the manufacturing sector is more helpful in bringing economic development and increasing overall welfare. Although, a favorable political and social environment is required for productive investment. In this respect, a well-developed institutional framework and enabling environment are necessary to ripe the benefits of any FDI. In short, these findings indicate that greenfield FDI is just as important as any type of FDI, such as M&A. Similarly, at the sectoral level, like overall FDI, greenfield investment has a similar impact across sectors.

In conclusion, external financial inflows can promote economic growth, especially in developing countries. At the same time, such inflows can come with potential risks, including losing control over economic policies and increased vulnerability to external shocks. Policymakers should prioritize domestic resource mobiliza-

tion and create a favorable environment for private-sector investment in achieving sustainable and inclusive growth. Additionally, efforts should be made to diversify the sources of external inflows and develop policies that promote absorption and effective use. It is also essential to monitor the potential risks associated with external financial inflows and establish effective regulatory frameworks to mitigate them. By implementing these policy recommendations, countries can harness the potential benefits of external financial inflows while mitigating the associated risks and promoting sustainable economic growth.