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Macroeconomic impact of Remittances in Developing Economies

by

Alqaas Chaudhry

Doctoral thesis

Submitted in partial fulfillment of the requirements

for the award of

Doctor of Philosophy of Loughborough University

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Abstract

This thesis examines the macroeconomic impact of remittances in developing economies, using data from 1990 to 2016. Despite poverty-reducing and welfare-enhancing characteristics for recipient households, remittances remain to inhibit macroeconomic policy in developing economies; by producing Dutch Disease effects, by creating an indeterminate effect on long run economic growth, and by reducing the quality of financial institutions. This thesis explores these key issues surrounding remittances along with a overall theme on fiscal policy, financial development and monetary policy. The significant contributions of my thesis are as follows: it provides insight into the effects of remittance inflows on fiscal cyclicity in developing economies; it provides new understanding into the relationship between remittances, financial development and economic growth; it provides a newly constructed measure of the financial development index across the panel dataset; and it shows the effects of remittance inflows on monetary policy by incorporating dynamics.

The use of different empirical techniques enable the thesis to investigate the effects of remittances on key macroeconomic aggregates across several different continents. It first uses empirical techniques to examine how remittances affect fiscal policy over the business cycle. The empirical analysis consists of developing countries that are split up into six datasets: Africa, Middle East and North Africa (MENA), Asia, Latin America, Europe and the full dataset which combines the countries from all regions into one dataset.

The thesis examines the potential for remittance inflows to influence fiscal policy over the fiscal cycle. The empirical evidence confirms that remittance inflows have a direct impact on the fiscal cycle. Moreover, the full dataset confirms that remittance inflows contribute for fiscal policy to be procyclical over the fiscal cycle. The Remittances-Output gap interaction term shows a positive coefficient which could be explained by the negative

impact of remittances on labour supply. Similar to previous literature, Justino and Shemyakina (2012) find that the amount of remittances received by a household has an overall negative impact on labour force participation. The main finding here is that Asia, MENA, Europe and the Latin America regions corroborate the full dataset results but the effect of remittance inflows on the cyclicity of fiscal policy is countercyclical for Africa.

This thesis further investigates how the level of financial development can influence the relationship between remittances and economic growth. By incorporating how remittances can influence the financial sector with the use of cross country panel data analysis this thesis aims to bridge the gap in the existing literature in remittances and financial development. Moreover, the creation of the financial development index is intended to capture financial sector development by bringing together several existing measures of financial development. The outcomes for the full sample indicate that there is a positive impact of remittances on economic growth with those countries that are less financially developed. The results in this regard differ for the regional datasets.

Does monetary policy in developing countries influence remittance inflows? This is what Chapter five explores. It investigates how developing countries can effectively understand how monetary policy responds to remittances in the short and long run. The chapter provides analysis into the dynamics of remittances and monetary policy, whilst controlling for country specific effects. The use of impulse response analysis enables the study to capture the impact of shocks from each system variable. This chapter finds a complex web of relationships between remittances, monetary policy and economic growth. The results indicate that a depreciation in the domestic currency causes an increase in the level of remittances for the full dataset and for the other regional datasets with the exception of MENA.

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Chapter 1

Introduction

1.1 Macroeconomic Effects of Remittances

Remittances and the potential impact of these flows have attracted the attention of global policymakers and researchers considerably in recent years. The three most prominent features of remittances that provide impetus for studying the macroeconomic effects of remittances: are the size of these flows relative to the GDP of remittance recipient countries, the likelihood that these flows will continue uninterrupted in the long term through globalisation trends, and the fact that these flows are separate from official aid flows and private capital flows which are greatly discussed in the literature. These features suggest that the macroeconomic effects of remittances are likely to be substantial and significant over time. Consequently, this could have unique implications for policymakers in these countries.

First, regarding the size of remittances, the literature addresses the increasing size of these flows during recent years. International financial flows in many countries during the past decade have been influenced by money that migrants send back home (Singer (2010)). These private money transfers from migrants to their family members they leave behind, add up to billions of dollars annually. Moreover, because remittances flow from high income to developing countries, the figures often reported tend to understate the relative importance to the economies that receive them. In the context of numbers: net private capital flows to developing countries reached \$1.12tn in 2013 (including FDI, private debt and portfolio equity). In 2013 workers' remittances to developing countries were £435bn, an increase of 5% over 2012. Remittances, represent a staggering 38% of total net private capital flows to developing countries which is large fraction of total capital inflows into these economies.¹ This increase may be in part due to the reduced average transfer cost as a result of the rapid growth of money transfer institutions.

The number of migrant workers who send money home is increasing and can go some

¹Data is obtained from the World Bank database online at: <http://econ.worldbank.org> World Bank (2018)

way in tackling global inequality. Furthermore, it could be seen as a positive demonstration of globalisation through the movement of labour. According to the World Bank, after two consecutive years of decline, remittance inflows to Low and Middle-Income countries (LMICs) in 2017 increased by 8.5%, rising to \$466 billion. Globally, this figure reached \$613 billion where the rebound was driven primarily by economic growth in the European Union (EU), the Russian Federation, and the United States (World Bank (2018)). Furthermore, the increase in remittances could be explained by the increase in oil prices along with the strengthening of the Euro and the Ruble against the U.S dollar. However, long term risks remain as in many remittance source countries, anti immigration sentiments are on the rise along with stricter immigration policies. Figure 1.1 shows the top remittance receiving countries in 2017 in dollar terms are predominantly from the Asian region. The figure shows that India and China are the top two receivers and belong to Asia. Furthermore, the Philippines, Pakistan, Vietnam, Bangladesh and Indonesia feature in the top 10 and belong to the Asian region. Nigeria is the top remittance receiver in Africa, Mexico is the top remittance receiver in Latin America, and Egypt is the top remittance receiver in the MENA region. It is evident from the countries in the top 10 that Asia is an important and popular remittance receiving destination.

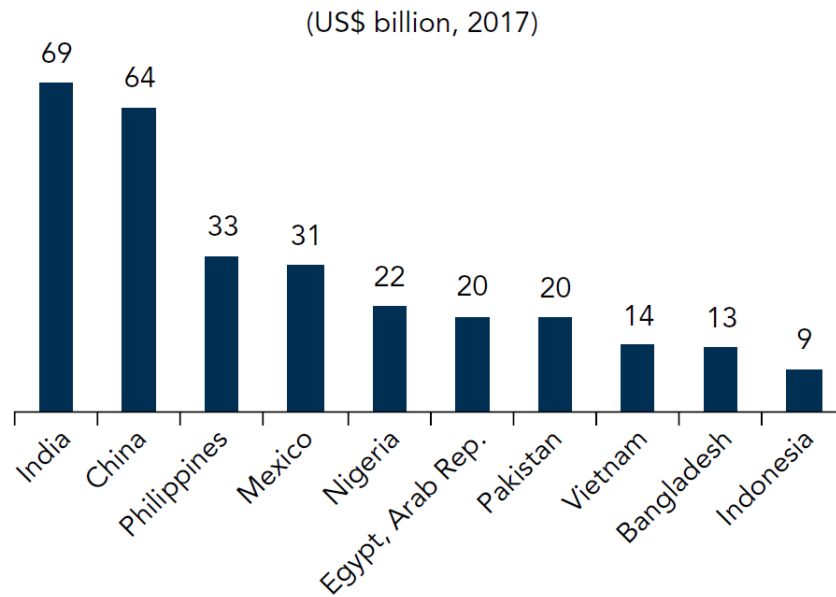


Figure 1.1: Top Remittance receivers in 2017. Source: World Bank (2018), World Bank staff estimates, World Development Indicators

Given the large size of remittance inflows, they are expected to have a significant effect on the countries that receive them. Remittances have been identified as a potential source of enhancing economic development. Thus, the main issues of interest facing policymakers in these countries is how to manage the macroeconomic effects of remittances and how to harness the development potential of remittances. This thesis provides an insight to the issues mentioned through a global study which examines the influence of remittances on economies that receive these flows. The ultimate purpose of this thesis is to explore how remittances can affect policy decisions in developing economies and to draw policy implications for countries that receive a significant amount.

For many developing countries, the inflow of remittances received is equal to or exceeds that of foreign direct investment, official development assistance or portfolio flows from financial markets. Since remittance inflows are large in number, they affect many households in developing economies to cause affects at the macro level, influencing firms, households, financial intermediaries, market prices and the government. Moreover, the continued growth of remittances is not subsiding as many

countries have employed policies designed to liberalise their economic systems. During this period policymakers have focused their efforts on understanding the effects of globalisation, economic growth, foreign direct investment, trade openness, and the magnitude and direction of capital flows. There are key features which show key distinctions between remittances and official aid flows, and while it may be convenient to view remittances in a similar view to official aid and private capital flows, there still remains a difference which sees remittances behave differently and to have different economic impacts. The crucial difference between remittances and official aid and private capital flows is the presence of familial relationships within remittances. This element emphasises the uniqueness of remittance behaviour as family members are largely involved in these economic issues. This is demonstrated by Becker (1974) who explores the economics of the family which underlies much of the research today on the microeconomic implications of remittances. Subsequently the relationship between the remitter and his or her family can be explained by two ways. The first is in terms of altruism where remittances are driven by poor economic performance at home or by exchange, and the second is determined by a steady stream of remittance inflows that are received irrespective of the recipient country's economic performance.

The importance of remittance receiving is not only restricted from the size of the remittance inflows but also to its potential effects on society and on policy decisions by the government. Arguably, the inflows of remittances to developing countries can alter the dynamics of the macroeconomic policy interactions which are essential in enhancing sustainable economic development within their regions. Higher remittances are positively correlated with better outcomes in labour markets as Orrenius and Zavodny (2010) found in their study. Studies on high migration states such as Mexico have found conclusive evidence that employment and wages rise while the unemployment rate falls. This suppresses the wage effects of remittances perhaps due to remittances responding poorly to the home country's economic conditions. Imai et al. (2014) overcome the endogeneity concerns with a study of the effects of remittances on the growth of GDP per capita using annual panel data for a set of 24

Asian and Pacific countries. Their results confirm that remittance flows have been beneficial but at the expense of being the primary source of output shocks. In this scenario, the volatility of remittances can be harmful to economic growth but can be eliminated. This can be achieved if remittances are targeted directly by the government for physical and human capital investments which can support economic development within the region.

It is important for governments in the developing world to analyse the impact on the economy in a macroeconomic viewpoint to seek how they can achieve the best possible fiscal and monetary policy combinations from remittance inflows. The tendency of fiscal policies in many emerging markets and developing countries is to be pro-cyclical rather countercyclical in nature which in the literature is known as part of the Keynesian or neo-classical theory. The theoretical rationale behind this is that in developing countries, government spending as a share of GDP increases during boom periods and falls during recession periods. The growing literature in this area has been developed in particular by Gavin and Perotti (1997) (Latin American countries) who have identified possible causes for this result, namely policies which are sub-optimal such as social unrest, institutional flaws and boom-bust cycles in international credit markets. However, empirical studies, such as those of Woo (2009) and Alesina et al. (2008), come to drastically different conclusions with very few explanatory variables in common.

Given the growth of remittance inflows and monetary amounts of remittances recently, and especially in the last decade, it is argued that the impact of remittance fluctuations on the macroeconomic policy decisions are critical to promote positive and sustainable economic growth in developing countries. The existing research has focused primarily on microeconomic issues such as income distribution, poverty and household consumption to name a few. Sharma (2010) highlights the importance of the role of remittance inflows in smoothing household consumption through adverse shocks relating to natural disasters, crop failure, job loss and health crises. Amuedo-Dorantes (2006) highlight the key microeconomic issues by analysing the remitting patterns of migrants to the U.S. who are from the Dominican Republic,

Costa Rica, Haiti, Mexico, Nicaragua, and Peru. In particular this study evaluates the impact of remittances on various spheres of economic development as in the case of education, employment, health care investments, and business ownership in two Latin American and the Caribbean (LAC) countries. The findings of the study underline the importance of remittances as a resource for the accumulation of human capital in both health and education. Melkonyan and Grigorian (2012) focus on developing an overlapping generations' model of household behaviour that seeks to explain remittance transfers through the elements of altruism and self interest. More specifically they model the dynamic strategic interactions between the migrant and the remittance receiving households. The analysis departs from the traditional Nash Bargaining approach adopted in the literature, whereby a scenario is adopted in which the two parties can implement a self-enforcing agreement to ensure their choices maximise their total surplus. Furthermore, their empirical results suggest that there is a role for policy measures in influencing remittance flows and their subsequent impact on the behaviour of households. For example, the households' rate of time preference can be influenced by policy (Epstein and Hynes, 1983) but there is scope to reduce the disincentive to work, whilst the decision to consume or invest is influenced by interest rates. This too can be controlled by government policy measures aimed favourably towards greater remittance inflows. Therefore, the literature on the microeconomic impacts of remittances is extensive, however there needs to be research which focuses on the macroeconomic impacts of remittance inflows. The economic effects of remittance inflows has both macroeconomic and microeconomic effects. It is sometimes argued that remittances may increase inequality, because it is the rich who benefit from the process of migration and sending back remittances, making recipient households even richer. The developmental impact on households and the question of inequality remain central to the economic issues surrounding developing economies. This thesis aims to shed further light on these issues in terms of macroeconomic policy and the relationship between financial development and remittances.

1.2 Research Aims and Objectives

This research examines the role of remittances and its macroeconomic effects in developing economies. This thesis aims to explore key themes related in macroeconomic policy in developing economies with an added emphasis on the benefits or costs of remittance inflows. The primary objective of Chapter 3 is to analyse the relationship between fiscal policy and remittance inflows and to determine whether the cyclical policy of fiscal policy is affected. By employing panel data methods Chapter 3 is able to provide cross country level analysis on this issue. The notion that remittances could affect fiscal policy may at first be surprising, since governments are not directly involved in remittance transfers. The fact that remittances enter the recipient economy and influence the recipient-receiving households activities, primarily through their saving patterns and consumption decisions. This fact, distinguished remittances from natural resources, which governments may derive their revenue from. Moreover, public aid transfers and natural resources enter the government budget constraint directly. Moreover, remittance inflows contribute to higher consumption of imported and domestic goods, which may affect the government revenues thorough trade-based and consumption taxation. Furthermore, remittances may increase the level of private saving if the marginal propensity to consume is less than unity. Additionally, remittances could increase bank deposits in the banking system. Both of these factors are channels through which remittances can influence fiscal policy through credit market activity.

Furthermore, Chapter 4 aims to explore the role of the financial sector and the impact of remittances on monetary policy efficiency. Chapter 4 evaluates if remittance inflows affect the breadth, depth and the efficiency of the financial sector within developing economies. Chapter 4 determines whether financial development enhances the effects of remittances on economic growth. This chapter will seek cross regional analysis to determine if the heterogeneity in financial development across countries is a significant factor in affecting the relationship between remittances and economic growth. The current literature explores the financial development and remittances theme in regard

to a regional analysis study. Ramirez and Sharma (2013) use a fully modified OLS technique on a sample of Latin American and Caribbean countries, and finds that remittances exert a greater positive impact in lower income countries in the region. Chami et al. (2008) claim that a remittance-receiving country's state of financial development may cause remittances to positively impact domestic investment. The argument is centered on a poorly developed domestic financial system within a developing country. In this scenario a large number of households are rationed out of formal credit markets, because the cost of providing credit them is sufficiently too high. Such households are therefore unable to finance potentially highly productive investment opportunities. The inflows of remittances allows these households to undertake these projects and thus increase the level of investment and economic growth. This thesis will explore the key themes of remittances, financial development and economic growth to test these underlying theories.

Chapter 5 aims to explain the relationship between remittances, economic growth and monetary policy. In addition, this chapter aims to give insight into the relationship between monetary policy and remittances and seeks to understand how monetary policy responds to remittance inflows and vice versa. With the use of monetary policy indicators such as the nominal exchange rate this chapter will explore the differences in how developing countries react to these flows. An important issue pertaining to developing countries is that these countries face challenges to monetary policy on various issues. Moreover, many of these countries experiencing these challenges to their monetary policy are also remittance-recipient countries. The natural question that arises is whether these remittance inflows can influence or play a role in monetary policy. This in turn could impact the monetary policy transmission mechanism which could have serious implications for these countries to maintain an effective and credible monetary policy. This thesis will explore the effects of the monetary policy rate on remittance inflows and vice versa. The thesis will for consistency purposes use the same country list for each empirical chapter. The 51 developing countries under consideration for this panel data research has been selected according to remittances

data availability and is presented in Table 1.1.

Table 1.1: Developing Countries Covered by the Study

Europe	MENA	Africa	Latin America	Asia
Bulgaria	Algeria	Cameroon	Argentina	Azerbaijan
Hungary	Egypt	Côte d'Ivoire	Brazil	Bangladesh
Kosovo	Jordan	Ghana	Chile	India
Latvia	Kuwait	Kenya	Colombia	Indonesia
Lithuania	Lebanon	Nigeria	Ecuador	Pakistan
Macedonia	Oman	Senegal	Honduras	Philippines
Malta	Sudan	South Africa	Mexico	Sri Lanka
Moldova	Syria	Tanzania	Panama	Tajikistan
Poland	Yemen	Uganda	Peru	Thailand
Serbia			Venezuela	Vietnam
Slovakia				
Slovenia				
Turkey				

1.3 Research Contributions

The aim of this thesis is to provide an empirical investigation of the macroeconomic impact of remittances in developing economies since the beginning of the 1990s. Three main issues are investigated:

1. Following the work of Gavin and Perotti (1997), Chapter 3 tests the hypothesis of the influence of remittances on the cyclicity of fiscal policy using a dynamic panel data framework. Through the use of cross-regional analysis the dataset is split up into five regions including the full sample. To the best of my knowledge, no existing empirical literature addresses the impact of remittances on fiscal cyclicity. The analysis conducted utilises fixed effects, Difference GMM (D-GMM), and System GMM (S-GMM) models to measure the influence of remittance inflows on the business cycle. Chapter 3 builds on the work by Alesina et al. (2008) in terms of the empirical framework and provides an insight into the relationship of remittances and fiscal policy with the use of the Remittance-Output gap interaction variable.

2. The second theme investigates the relationship between remittances, financial development and economic growth. The thesis, using a D-GMM model investigates if the level of financial development in a country can hinder the benefits of remittance inflows. The aim here is to see if remittances and financial sector development are complementary with each other or otherwise. The current literature uses proxies of financial development that encapsulate narrow measures such as financial depth (Beck et al., 2000). This thesis adapts the approach by Sahay et al. (2015) by modifying the construction of the financial development index to include a comprehensive measure including financial institutional efficiency, the size of the financial system, and financial institutional depth.
3. The impact of remittances on monetary policy has eluded empirical researchers, which has resulted in a limited understanding of the relationship between these two variables (Vacaflares, 2012). As limited as the research is in the field, the evidence has proven the results to be contradictory. Ruiz and Vargas-Silva (2010) investigate the relationship in Mexico and find no link between domestic monetary policy and remittances while Adenutsi and Ahoritor (2008) find significant results between domestic monetary policy variables and remittances in Ghana. This chapter, employs Panel Vector Autoregression (PVAR) to overcome endogeneity problems, and to establish short term and long term results between remittances, monetary policy and economic growth. The use of Cholesky decomposition enables the chapter to demonstrate robustness in the results by comparing two ordering systems. The chapter explores the dynamic effects of these variables through the implementation of the PVAR. By focusing on the long term effects this benefits long-term policy solutions for these developing economies. Furthermore, the chapter provides scenario analysis by simulating the response of remittance inflows and economic growth to expansionary and contractionary monetary policy scenarios.

1.4 Thesis Outline

The ultimate aim of the thesis is to shed further light on the potential uses of remittances and to draw summary policy implications which rely on remittance inflows. This thesis is organised as follows. Chapter 2 surveys the remittances and macroeconomic policy literature while providing the gaps in the literature and how this thesis fits in. Chapter 3 shows the effects of remittance inflows on fiscal cyclicity in developing economies. Furthermore, Chapter 4 examines the relationship between remittances and financial development whilst Chapter 5 presents the effects of remittances on monetary policy. Chapter 6 concludes the thesis by providing summaries and the main contributions of the empirical chapters. Chapter 6 also provides potential policy implications from the research which could benefit policymakers across developing countries.

Chapter 2

Literature Review

2.1 Introduction

This chapter reviews the relevant literature surrounding this research in relation to fiscal and monetary policy in developing economies, the macroeconomic policy implications of remittances and how remittances influence the labour market in developing economies. The expanding literature investigates various aspects of the macroeconomic consequences of remittance inflows. Chami et al. (2008), first surveyed these issues by examining the impact of remittance inflows on exchange rates, fiscal policy, on institutions and governance, monetary policy, and long term economic growth. On exchange rates, Barajas et al. (2011), Hassan and Holmes (2013), and Makhoul and Mughal (2011) show how the persistent flows of remittances contribute to an upward pressure on the long-run real exchange rate. This results in the decline of the recipient countries' tradable sectors also known as the 'Dutch Disease' effect. The remainder of this chapter will analyse these issues in further detail and show how this research fits within the current literature on remittances.

Furthermore, the key macroeconomic effects of remittances in the economics literature are explored in detail. This review, focuses on various studies which provide an insight into the role of fiscal and monetary policy on remittances. Moreover, the established studies in the literature including Chami et al. (2008) and Jansen et al. (2012) have provided key insight into the negative effects of remittances on economic growth. This thesis addresses an important theme in investigating how the financial sector can play a pivotal role in ensuring remittance receiving households benefit from these flows.

The rest of the chapter is organised as follows: Section 2.2 details the main literature on remittances; Section 2.3 outlines fiscal policy in developing economies; Section 2.4 outlines the monetary policy institutions and framework in developing economies;

Section 2.5 documents the theoretical literature on macroeconomic policy and remittances; Section 2.6 investigates the relationship between political budget cycles and remittances; Section 2.7 examines how remittance inflows can influence the labour market; and the last section (Section 2.8) outlines the relationship between remittances, financial development and monetary policy.

2.2 Remittances in Developing Economies

Remittance income is an important source of income for countries that are dependent on remittance inflows. This income source can help bring families out of poverty, and its beneficiaries can abstain from energy and time dependent activities to engage in pursuits that collectively stimulate economic growth in the receiving country. More specifically, the safety net also known as the ‘consumption smoothing’ effect of remittances allows households to engage in high risk but more profitable activities that reduce poverty, without the presence of migration would be difficult to achieve. Studies of the growth effects of remittances are split up into two strands of literature. One focuses on the development impact of remittances, whilst the other type focuses on the determinants of remittances and how financial infrastructure influences the households propensity to remit.

The literature on remittances has primarily focused on the microeconomic issues in terms of household welfare rather than the macroeconomic policy issues of both the sending and the receiving countries of remittances. Of these microeconomic models, migration is an informal family arrangement, that only benefits the support of intergenerational financing of investments and risk diversion.² Remittances form a key component of such a contract by combining different components, such as strategic decisions made by the households, insurance, investment, inheritance and altruism. Rapoport and Docquier (2006), find that migration and remittances have an overall positive effect on the receiving country’s long-term economic performance. However, they note the state policies employed by countries such as China, require mandatory

²see Rapoport and Docquier (2006)

transfers for the condition of exit permits. This policy has obvious drawbacks in terms of economic freedom and welfare due to the state having full control of the labour migration process.

Macroeconomic models on remittances are relatively limited with the focus of the literature exploring the macroeconomic effects of remittances and the real exchange rate movements in general equilibrium models. However, Agenor and Montiel (2008) explore various models related to exchange rate regimes and the effects of capital inflows in to economies. Additionally, another strand of literature uses IS-LM-BP (Mundell Fleming model) and real business cycles to analyse the possible implications of pro cyclical and counter cyclical policy for the stabilisation policy in relation to remittance inflows. In these models, remittances are viewed in terms of aggregate demand as positive or negative exogenous shocks. To model these effects, the dynamic stochastic general equilibrium model has widely been used by many studies. Acosta et al. (2009b) focus on the exchange rate effects with respect to remittances (usually represented in dollar form). Acosta et al. (2009b) find that remittance inflows can generate ‘Dutch Disease’ effects in the receiving countries. The ‘Dutch Disease’ effect originates when remittance inflows into the receiving country causes the domestic currency to appreciate, hence making foreign products cheaper than domestically produced products and thus reducing international competitiveness, subsequently resulting in a fall in domestically produced goods and services (Amuedo-Dorantes and Pozo, 2004; Acosta et al., 2009b).

However according to Barajas et al. (2011) this ‘Dutch Disease’ effect should be viewed with a sense of skepticism as this phenomenon could arise from specific modelling assumptions in theoretical models, but can be reversed or altered by a few modifications. Although the work of the study corroborates empirically, the main result in the study regarding the effects of remittances on the real exchange rate is that the ‘Dutch Disease’ effect is quantitatively very small. Proceeding on from this result, Acosta et al. (2009a) find that the effects of remittances diminishes as the degree of financial development increases. Mongardini and Rayner (2009) note that

this result would be entirely dependent upon non-tradable goods and tradable goods in the remittances context.

The data on remittances during the past five to ten years has remarkably improved which has contributed to the large amount of cross country studies researching the macroeconomic effects of remittances. Moreover, the recent and growing literature has attempted to seek the impact of remittances on economic growth. The first studies of such was by Chami et al. (2005) who focused on a cross country study of workers' remittances. The overall conclusion from the study shows that the remittances are altruistically motivated in order to compensate for the bad economic outcomes, which consequently create moral hazard problems. The moral hazard problems that originate from the remittances can reduce economic growth due to its severity in terms of stalling economic development. The study specifically uses a sample of 83 countries during the 1970-1998 period and panel regressions to regress the growth rate of real GDP per capita onto workers' remittances to GDP. Subsequently another regression uses the same dependent variable onto the change in workers' remittances to GDP as an explanatory variable, conditioned on the rate of inflation, the investment rate, regional dummy variables, and the ratio of net private capital flows to GDP.

The findings of both regressions concluded that the workers' remittances to GDP ratio was found either to be negatively related to growth or insignificant. However, private capital flows and domestic investment were found to be statistically significant and positively related to Real GDP growth. In addition the annual changes in the workers' remittances to GDP ratio were calculated and found to be negative and statistically significant on the growth in real GDP. To account for the possible endogeneity problems encountered in the study the authors conducted an instrumental variables estimation. The first stage method of regression analysis was used to model the workers' remittances to GDP ratio as a function of each country's real interest rate gap and income gap in line with the United States. As the predicted value of the workers' remittances to GDP ratio is an explanatory variable, the second stage estimation confirmed that Real GDP growth is negatively related to the changes in remittance inflows.

Another recent study by Giuliano and Ruiz-Arranz (2009) focuses on a panel data set of 73 developing countries. The study finds that countries with less developed financial systems benefit from remittances which provide a solution to counteract the effects of liquidity constraints. Remittances can also be seen as an alternative method to finance investment, by changing the effectiveness of monetary policy through the loosening of the credit constraint. The empirical analysis applied by the authors confirms that agents compensate for the lack of development of the local financial markets, by utilising remittances to help alleviate the liquidity constraints to ensure resources are channelled towards productive investments to help increase economic growth. To merit the validity of the proposition imposed by the authors they analyse the interactions of remittances and financial development using a large sample of countries. The analysis uses standard financial market indicators to study the impact of these variables with the interactions of remittances on economic growth by using growth regressions. The growth regression employed is the standard OLS and the System of Generalised Method of Moments regressions (SGMM). The OLS model suffers from a drawback in that the variables under consideration do not vary over time in a panel framework. Therefore, the authors address this endogeneity issue by employing SGMM regressions. The conclusive result from the study confirms that remittances can help alleviate the credit constraints imposed by becoming a substitute for the inefficient and inexistent credit markets. Furthermore, this results into the improvement to the allocation of capital to boost economic growth in the economy. The findings of the study suggest that remittances can promote economic growth through an investment channel where the credit needs of the population are not sufficiently provided by the financial sector.

The study by Makhoul and Mughal (2011) is another useful and recent study which studies the symptoms of the ‘Dutch Disease’ in the Pakistan economy which originates from international remittances. In the study the authors conclude that the presence of international remittances contributes to a less competitive economy which results in a slowdown in economic growth. The rise in remittances during recent years in developing

countries like Pakistan has made the government less reliant on other financial inflows for their respective foreign exchange requirements. Remittances are also viewed upon to be a stable source capital inflow compared to FDI and portfolio inflows, which can help countries tackle difficult economic conditions (Makhlouf and Mughal, 2011).

The study concludes that the Pakistani economy exhibits signs of the Dutch Disease effects as a result of the migrant remittance inflows. It is important to note that the remittance flows to Pakistan have improved the country in respect to lowering poverty levels, improving health amongst citizens and higher educational attainment amongst the rural recipient households (Mansuri, 2007). The implications of the remittance flows means that the country will have a greater educated and healthier workforce contributing to the improvement of the country's long-run international competitiveness. The authors state that there will be a lag for the beneficial impact of remittances to be realised through human capital accumulation, and through the monetary channel as subsequent negative effects will emerge. The main result from the migrant remittance inflows over the years, has been a resource allocation shift via the consumption of non-tradable goods. Consequently, in the foreign exchange markets, imports will be attractive for investors and exports are less competitive in international markets. The study finds another interesting result in that the detrimental effects of remittances on the country's international competitiveness is opposite to that of FDI inflows in which the authors find in their empirical analysis. This is because remittances in comparison to other foreign capital inflows have a larger appreciating effect on the real exchange rate as a result of these remittances containing a gradually developing social process (migration). This implies that sudden stops or reversals do not occur for these inflows. The main result states that fiscal and monetary measures can only partially deal with the real exchange rate and the competitiveness of the economy. Moreover, the loss in external competitiveness needs to be solved through improvements in internal competitiveness within the domestic economy.

Building on the general equilibrium modelling of remittance inflows is the study by

Baas and Maja Melzer (2012), focus on the sending country (Germany) and the role of remittance outflows and its impact on international competitiveness for this country. The authors develop an open-economy general equilibrium model with heterogeneous households. Moreover, the model stipulates that the flow of remittances is dependent upon the altruistic preferences of these households. Remittances in the model are endogenous because of the utility maximising households, whereby the authors integrate a microeconomic altruistic model in the general equilibrium framework similar to Hoddinott (1996). The conclusive result from the study states that stronger remittance outflows from Germany depreciate the real exchange rate. This enables the reallocation of goods from the non tradable sector to the tradable sector which translates in the opposite Dutch Disease phenomenon.

The limitation of Baas and Maja Melzer (2012), study is that the results are limited to the analysis of one country without considering other advanced economies that receive a substantial amount of migrant workers. One of the main aspects of this research is to provide a comprehensive analysis of the Dutch Disease effects and Balassa Samuelson effects for both the remittance receiving country and the remittance sending country. In particular there will be an emphasis on analysing the labour movements between the tradable and the non-tradable sectors.

2.3 Fiscal Policy in Developing Economies

In comparison to the empirical literature on the effects of monetary policy, fiscal policy has received very little attention until recently. The surge of attention was attracted from the arguments arising from the Balanced Budget Amendment in the US and the Growth and Stability Pact in the Economic and Monetary Union (EMU). This attention has been enhanced through independent institutions and countries regarding fiscal policy as a useful tool for stabilising business cycle fluctuations. However, for fiscal policy the bigger picture depicts a alternative view as the neoclassical and Neo-Keynesian theories predict different outcomes. A shock to government spending

on goods and services and other key variables such as private investment, private consumption and the real wage will have completely opposite results for these theories. The central issue regarding fiscal policy for the governments in developing countries is to investigate the degree of cyclicity in fiscal policy, and to determine if fiscal expansion or fiscal contraction policies in the business cycle are correctly timed. Gavin and Perotti (1997) were among the first to conclude that fiscal policy is procyclical within Latin American countries. In addition to this finding, Talvi and Végh (2005) claim that this finding is not restricted to the Latin American countries but extends to the rest of the developing world. Talvi and Végh (2005) study the causation between GDP and the cyclical component of government consumption which for each of the 36 developing countries is positive with an average of 0.53. In contrast to this finding, the average correlation for the G7 countries is zero. Many authors worldwide have now come to conclusion that procyclical fiscal policy is a prominent and existing feature within developing economies (Braun, 2001; Lane, 2003; Kaminsky et al., 2005; Alesina et al., 2008; Ilzetzki, 2011).

The majority of literature aimed at explaining the fiscal cyclicity puzzle is based on two strands of literature. The fiscal cyclicity puzzle explains why developing countries experience pro-cyclical fiscal policies whilst in developed economies fiscal policies are generally countercyclical. Firstly, literature based on imperfections in international credit markets inhibit developing countries from borrowing in bad times (Gavin and Perotti, 1997; Caballero and Krishnamurthy, 2004; Mendoza and Oviedo, 2010) and also literature based on political economy theories contribute to the fact that fiscal profligacy and rent-seeking activities are encouraged during the upturn of the economy (Talvi and Végh, 2005; Alesina et al., 2008; Ilzetzki, 2011).

As mentioned by Acemoglu and Robinson (2010) the understanding of why different countries get trapped in an unfavourable political equilibria situation which result in bad economic choices by the economic institutions is imperative. Acemoglu and Robinson (2010) take Africa as an example to show that if democracy is promoted with accountability, then this would almost definitely lead to better economic policies

and institutions. Acemoglu and Robinson (2010) counter argue their case in stating that governments should be careful in promoting good economic and political institutions as this does not always lead to greater accountability and hence better growth paths.

A typical reason for the sub-optimal policies are based around institutional weaknesses and social tensions to name a few examples. A common answer revolves around a bad supply of credit. Developing countries during economic downturns tend to borrow and can only do so at high interest rates, as a result they have to cut spending as they cannot afford to run larger budget deficits. Whereas in booms, they increase public spending as they can borrow more easily (Gavin and Perotti, 1997; Catao and Sutton, 2002; Kaminsky et al., 2005; Manasse, 2007). It is imperative, to view this proposition with caution as two fundamental questions are left unanswered. Firstly, given that countries face binding credit constraints during recessions countries should think about creating a buffer of reserves in good times. Secondly, even in a recession why would lenders not provide the sufficient funds to these countries, with the assurance that the borrowing would optimally smooth out the cycle (Alesina et al., 2008). The answer to these issues are based around the findings by Acemoglu and Robinson (2010) who state that reform is revolved around the political equilibria of each government worldwide and change can only occur when we understand the exact determinants of the political equilibria.

2.4 Monetary Policy Institutions and Framework in Developing Economies

The main distinction of monetary policy in developing countries from developed countries originates from the notion of credibility in monetary policy. It should be acknowledged that developed countries are not immune from this problem but it is a more prevalent problem in developing economies where corruption is more apparent. The general consensus regarding economic models with a monetary prospective are that they attempt to identify a reaction function for the central bank activities in developed countries. In contrast, developing countries receive much less attention,

persuading us to believe that central banks in these countries were created in the mindset of reducing the government deficit. The view from many industrialised countries stipulate that developing countries lack the suitable credibility in their monetary policy, and hence should follow a system where the currency is pegged to a major currency from a low inflationary country (for example the United States dollar), or have a currency board. The results from Huang and Wei (2006) reveal that developing countries that use pegged exchange rates or currency boards, whilst providing the motive of a lack of credibility in a developing country's government. Therefore, this has lead to below optimal outcomes typical to countries with high levels of corruption. Furthermore, Huang and Wei (2006) focus on modelling weak institutions in their analysis to represent the difficulty governments in these countries face when collecting tax revenue through formal tax channels. Under an inflation targeting framework the authors aim to study how weak institutions can affect the socially optimum level of the inflation target. Lastly the analysis examines the implications of several other monetary frameworks which focus on dollarisation, including a currency board, and evaluating a Rogoff-type conservative central banker, and then ranking them in terms of their impact towards social welfare.

Habermeier et al. (2009) provide comprehensive analyses on the monetary policy response by researching how 50 emerging and developing economies respond to rising inflation associated with food and oil price shocks. The main conclusions for their study acknowledge that both aggregate demand pressures with surging commodity prices contribute largely to rising inflation in these countries. Moreover, the study states that inflationary pressures are largely determined by tighter labour markets and growing capacity constraints. They conclude that many central banks in these regions have tried to combat these problems by tightening monetary policy thereby constraining aggregate demand to control inflation expectations. However, they note that the timing and speed of the monetary policy decisions are likely to be negated by the delayed actions in many countries caused by the lag effects in policy transmission.

2.5 Macroeconomic Policy and Remittances - Theoretical Foundations

The interdependence of fiscal and monetary policy is a recurrent theme in macroeconomics based on the traditional analyses of the optimal policy mix when both instruments are under control of a single policymaker who chooses policy targets that are mutually inconsistent. Most recently, the scope of theoretical literature on macroeconomic policy has changed in relation to independent central banks and fiscal authorities. This change has been instigated by the focus on the analyses of fiscal and monetary policy interactions which are dependent upon the differing objectives of the policymakers.

The general consensus on policy research is that fiscal and monetary policy in macroeconomic policy has been largely ignored. The focus is centered on how remittance inflows can influence government decision making Chami et al. (2008). In this respect, a number of studies have focused on monetary and fiscal policy interactions using the New Keynesian dynamic general equilibrium models or game theoretic models (Galí and Perotti, 2003) without modelling remittance inflows into the fully specified general equilibrium framework. In a simple flex-price closed economy model, Leeper (1991) demonstrated that equilibrium in an economy is only achieved by means of a mix between fiscal and monetary policy. In such a case an ‘active’ monetary policy (which satisfies the Taylor rule principle), must be supported with a ‘passive’ fiscal policy to enable the fiscal authorities to adjust tax revenues in order to stabilise the government’s liabilities. On the contrary, if fiscal authorities do not act in order to stabilise their debt stock, the active monetary policy will have to be abandoned by the monetary authorities.

For members of a monetary union, the compatibility between fiscal and monetary policy has been examined by Leith and Wren-Lewis (2006). However, analysing such issues under flexible exchange rates has been conducted in terms of flex-price models consisting of infinitely lived consumers (see Dupor 2000; Canzoneri et al. 2001). This inhibits the potential real effects of spillovers between fiscal and monetary policies. Leith and Wren-

Lewis (2006) build upon the initial model by including sticky prices and finitely lived agents in the model. A significant result is possible if there is a lack of fiscal feedback in one country which subsequently can have significant macroeconomic implications for its trading partners. The model employed by Leith and Wren-Lewis (2006) generates several interesting results, namely if one country's fiscal authority fails to stabilise their debt stock. To ensure the uniqueness of the perfect foresight equilibrium path there are two possible regimes which could be employed by the government. In the first case, a passive monetary policy can ensure equilibrium by ignoring the Taylor principle and by failing to raise real interest rates in response to excess inflation in that country. However, the inclusion of fiscal shocks is essential as we need to include global linkages within the economy. Fiscal shocks in this case will have significant real and nominal implications in both economies, even in the case where the second country is engaged in an active monetary policy (a monetary policy which satisfies the Taylor rule principle) accompanied by a sound fiscal policy. Secondly, the situation can arise by which a country operates with a lax fiscal policy which is 'active'. In this case, stability can still be achieved if the second country completely ignores the 'Taylor principle' as it needs to support the lax fiscal policy imposed by the first economy. This is a compatible policy because in the definition of consumer prices you can include the traded goods prices which is used to deflate nominal debt stocks in each economy.

However, in one of the simulations performed by the authors, they find that such a regime is unlikely to be optimal because it exacerbates the macroeconomic consequences of the original fiscal shocks. In order to generate these results Leith and Wren-Lewis (2006) follow a closed economy model outlined in Leith and Wren-Lewis (2006). The study combines forward looking consumers with Calvo contracts but not infinitely lived and policy operating through simple rules. In these Calvo contracts price changes are staggered exogenously, whereby a chosen fixed percentage of firms will change prices at a given time. The study shows that in this economy there were two policy regimes in which the price level was the dominant factor. The first regime, is a conventional regime whereby the fiscal authority actively adjusts taxes and spending to control its

debt and the monetary authority operates an active 'Taylor rule' which is consistent with the Taylor principle. The second regime consists of insufficient fiscal feedback from the debt, whereby the unstable debt dynamics of the economy effectively rules out the monetary authority to follow the Taylor principle.

Overall the results of Leith and Wren-Lewis (2006) suggest caution upon the macroeconomic implications of a lax fiscal policy (where the feedback from debt to spending or taxes is absent) are confined to the country with the relaxed fiscal policy. In the case of an accommodating (passive) monetary policy, the multiplicity and perfect foresight equilibrium paths cannot be avoided through such a policy in that country. The spillover effects to other countries from the exchange rate movements may be substantially large.

This study corroborates the results of the study by Leeper (1991) , but the presence of non-Ricardian consumers enables the degree of fiscal feedback required to support the active monetary policy to be increased as a result. The idea of a non-Ricardian consumer is that consumers are not rational. For example, these consumers cannot anticipate future tax increases or government spending cuts in the future. With the assumption of non-Ricardian consumers at the expense of the government it knows it can increase government borrowing. However, the government assumes that it will be able to conduct its fiscal policy smoothly without consumers anticipating an increase in taxes in the future. The more recent study by Davig and Leeper (2011) embeds a Markov regime switching model for U.S. monetary and fiscal policy into a calibrated Dynamic Stochastic General Equilibrium (DSGE) model. The DSGE model with nominal rigidities enables Davig and Leeper (2011) to deliver some empirical predictions regarding the impacts of government spending. The study states the economy depends upon current and expected monetary and fiscal policy behaviour and concludes that the estimated joint policy process is stipulated on a conventional new Keynesian model. The model states that government spending creates positive consumption multipliers in some policy regimes.

Much of the literature has focused on whether monetary and fiscal policy operate as

strategic substitutes or strategic complements. Dixit and Lambertini (2000) explore a model of the independence between the central bank and the fiscal authority, where the central bank only has partial control of inflation and it directly affects the stance of fiscal policy. In particular the study shows that both policies are complements when fiscal expansions have an effect on output and inflation in a non-Keynesian (contractionary) method. Buti et al. (2001) imply that this interdependence might be shock-dependent and should not necessarily be viewed in terms of conflict or cooperation. In their model the supply shocks drive the conflicting policies, whereas the opposite holds true for the demand shocks. Muscatelli et al. (2004) focus on a New Keynesian DSGE model which is used to see how fiscal and monetary policies interact in terms of policy analysis. In effect, the authors seek the implications for the degree of inertia (persistence) in the structural model and in the policy rules for both fiscal and monetary policies in regards to performance. Additionally, they find that the inertial government expenditure rules tend to be less efficient than those of the taxation rules. This is because there is a greater impact of the taxation rules on output compared to the government expenditure rules. Finally, their results corroborate those of Galí and Perotti (2003). Galí and Perotti (2003) state that the presence of the rule of thumb consumers creates greater instability in the model but this can be offset by the presence of automatic stabilisers which counteract the effects of the rule of thumb consumers as it is based on taxation. A rule of thumb consumer in this model is denoted by the proportion of households who follow a rule of thumb, and consume out of current disposable income in addition to supplying a constant amount of labour.

The study by Muscatelli et al. (2004) was one of the earliest to model monetary-fiscal interactions in a New Keynesian context. The model they use incorporates liquidity constrained consumers on US data. Therefore, by using the New Keynesian IS curve and the Philips Curve, the study is able to determine the effects of government spending and taxation by using these models. The key conclusion from the policy analysis found that the automatic stabilisers based on a policy of taxation seemed to combine more efficiently with the forward looking inertial monetary policy than those of the feedback

government spending rules. Muscatelli et al. (2004), simply take the monetary policy rule as data which is estimated from the post-1982 period, but in the perspective of fiscal policy the monetary authority will change its behaviour. Henceforth, one can specifically ask the question in terms of the optimising monetary playmakers, of how the different fiscal rules will perform in this environment? The difficulty in this approach results from the difficulty in assigning appropriate assumptions of the welfare function for the central bank originating from the complexity of the framework (Benigno and Woodford, 2003). Some earlier seminal works, Barro and Gordon (1983) and Kydland and Prescott (1977) conclude that in models with benevolent monetary authorities and nominal bonds, price commitment results in higher welfare for the consumers. These papers specifically deal with the time inconsistency problem of nominal debt in a Philips curve rather than focusing directly on the government's budget constraint.

A more recent line of research by Miller (2016) takes a different approach by investigating the interactions of fiscal and monetary policies. This study contributes to the literature through exploring the consequences of price commitment in a political economy model. This is achieved by pairing an independent monetary authority which issues nominal bonds with a fiscal authority whose endogenous spending decisions are politically distorted.

Miller (2016) study finds the opposite result to Barro and Gordon (1983) and Kydland and Prescott (1977) in that price commitment leads to lower welfare. As an alternative to the benevolent fiscal authority imposed in many economies, this study focuses on a micro founded political economy model. Fiscal decisions are made endogenous to the nominal bond and environment levels and if the monetary authority commits to a price level, the politically motivated fiscal authority will spend with no liability resulting in welfare losses for society. The study views price commitment as a dangerous policy for the monetary authorities. Specifically, discretionary monetary policy keeps fiscal policy in balance whereas monetary commitment gives the fiscal authority undue power to disregard monetary constraints. On the contrary, giving the monetary authority commitment dampens overall welfare from the lack of power it has

over the fiscal authority. The main conclusion from the study states that monetary policy in the model benefits from a distorted fiscal policy. Both monetary and fiscal authorities utility functions will differ, however, the overall result is more beneficial for the monetary authority's goal of maximising welfare compared to when both utility functions are identical in nature. The study concludes that the modern economy structure should focus on an efficient outcome where fiscal decisions are controlled by a political entity and monetary decisions are independent of government (non-political organisation) without price commitment and the inclusion of nominal bonds. In this case bonds need to be issued, but not to an extent to where it creates political distortion which distorts the optimal macroeconomic policy of the economy.

A large amount of recent empirical literature has focused on the interactions of fiscal and monetary policy rules for some emerging and developing countries. Cevik et al. (2014) most recently focus on some emerging European economies with the use of a Markov regime-switching model. The paper estimates a variant of the monetary policy rule by using the Taylor (1997) rule. Cevik et al. (2014) explore further by including the fiscal and monetary policy interactions in the framework provided by Davig and Leeper (2011). The empirical results suggest that six European economies including, Czech Republic, Estonia, Hungary, Poland, Slovenia and the Slovak Republic, followed both an active and passive monetary policy rules in the sample. The main result from Cevik et al. (2014) concluded that the majority of countries exhibited passive monetary policy regimes which were more persistent and have a higher duration than active monetary regimes except for Poland. With the exception of Slovenia and the Slovak Republics all countries displayed 'dove regimes', a phenomenon where output stabilisation takes a greater priority over inflation targets in the passive monetary policy regimes.

In general the policy interactions point to a diverse picture in their selected countries. In addition this study corroborates to many other studies which focus on other European countries. It is necessary to compare the developing countries with advanced countries to see how the policy regimes compare. Thams (2006) focus on an advanced country and conclude that Spain has an unsustainable policy combination mix. Additionally,

Semmler and Zhang (2012) show that the relationship between fiscal and monetary policy interactions is weak for both France and Germany. In more detail, the study reveals that the policies have been counterproductive rather than supportive to each other.

The recent study by Abdih et al. (2012) focuses on a panel data set covering the Middle East, North Africa and Central Asia. Their paper finds that the external remittance shocks to receiving countries influences private demand, which consequently affects tax revenues in these countries. Moreover, the study signifies that remittances affects imports and private consumption positively but domestic investment negatively and insignificantly. The analysis of the study has several important implications in relation to the operation of fiscal policy in these countries. Firstly, for the countries who are not resource rich, remittances can prove to increase fiscal space for these countries. Fiscal space relates to the room in a government's budget to provide resources for a desired purpose without jeopardising the stability of the economy. Consequently the remittance inflows not only improves household welfare but also leads to an increase in the tax base to improve the fiscal position of the government. On the other hand, studies by Chami et al. (2008) and Abdih et al. (2012) show that there is moral hazard on the governments side as a result from the increased fiscal space.

In other words, remittance income makes governments less accountable to households because corruption is less costly to bear in addition to purchasing public goods rather than relying on the government to provide it. A shortcoming of this study and a further avenue for this research is based upon the authors primarily focusing on the negative partial effect of remittance inflows on institutional quality. On the contrary, this research will be based on the model by Alesina et al. (2008) but with modifications regarding the explanatory variables. In more detail, there will be a remittances variable which will determine if there is any relationship between remittances and government expenditure in addition to see if there is a significant relationship between fiscal cyclicity and remittances. Therefore, this thesis will

explore the potential for analysing how remittances evolve over the fiscal cycle and the need for the government to acknowledge that they are not free riding the system. Of particular interest are the effects of remittances on monetary policy and in particular exchange rates and inflation. First of all, remittances can influence consumption in the recipient country, whether migrants are motivated to remit for self interest, altruistic reasons or simply as an investment (Lucas and Stark, 1985). Aside for the motivation, remittances can increase and stimulate the levels of economic activity within the receiving country, through investment directly and consumption indirectly, leading to increases in employment, production and hence disposable income (Durand et al., 1996; Widgren and Martin, 2002; Heilmann, 2006).

While the literature generally provides links to economic growth, there still remains a cloud over the positive effects of remittances (Keely and Tran, 1989; León-Ledesma and Piracha, 2004; De Haas, 2006). In particular, De Haas (2006) focuses on the extent to which migration and remittances are fully realised in terms of development. More specifically, De Haas (2006) postulates that there is no automatic mechanism which can confirm that migration and remittances leads to greater economic development. The authors postulates that the level of remittance inflows are essentially determined by key issues such as the levels of corruption, the trust in government institutions. Furthermore, remittances are also influenced by the poor access to key international markets which prevents migrants from taking the risk to invest their money in their country of origin which can lower the chances of them returning. In conclusion, the author emphasises that the general development of the sending region or country can only be fully realised through sensible immigration policies which do not deter migrants from circulating from the sending country to the receiving country. Under unfavourable economic conditions, migration and remittances may contribute to households effectively permanently settling in the destination country which for them represents ‘development’. De Haas (2006) empirically analyses these issues by focusing on a migrant-sending region located in southern Morocco by investigating investment patterns by local households.

León-Ledesma and Piracha (2004) focus on the effect of remittance inflows on

employment performance for Central and Eastern European (CEE) economies. The results show that remittances significantly contribute to the higher investment levels in the receiving country whilst the consumption effect is less strong compared to investment. Keely and Tran (1989) examines the effects of labour migration on remittance inflows in 50 countries consisting of developed and developing countries. An important observation by Keely and Tran (1989) is that “Remittances may have helped countries hold their own but have not narrowed the per capita income gap” (P.524). It is important to acknowledge that in order to understand the macroeconomic consequences of remittances we need to investigate how remittance receiving families spend their income in relation to household consumption or household savings.

The negative effects of remittances, are primarily documented in the literature as initially channelled through on to exchange rates, inflation, policy responsiveness and work effort. Heilmann (2006) shows that inflows of remittances can generate inflationary pressures within the economy, especially if internal demand for imports is stimulated via the inflow. Narayan et al. (2011) study largely corroborates these findings for a set of 54 developing countries for the period 1995-2004, signifying that remittances can generate inflationary pressures that are accentuated in the long run. Another study by Vacaflores and Kishan (2014) represent a similar result in that remittances give rise to an increase in inflation. The study focuses on Latin America and empirically explores the determinants of international reserves which shows that the accumulation of international reserves is significant and originates from the inflows of remittances. To redeem the foreign currency remittances, the central bank has to inject money into the economy, resulting in the money supply to increase if the flows are not fully sterilised.

Recent studies including Chami et al. (2008); Acosta et al. (2009a); Jansen et al. (2012) show that remittances can be counter effective to economic growth. This is because of the reduced incentives to work for the recipient households, henceforth putting downward pressures on output. While this effect is profound in the literature,

the behaviour of the receiving household is altered in addition to inhibiting the negative effects on leisure. This is based on the assumption of considering the migrant process as a household decision which eliminates the role of altruistic behaviour (Jansen et al., 2012). In a recent cross sectional study some interesting results occur where Cox-Edwards and Rodríguez-Oreggia (2009) empirically show that persistent remittances have a limited effect on labour force participation rates in Mexico. Funkhouser (2006) reinforces this outcome by finding no major effects of remittances on the labour force rates in Nicaragua with the use of longitudinal data, with only teenagers in the remittances' receiving households experiencing a decline in employment.

The effectiveness of monetary policy could be affected via the rise in the level of remittances by having an impact on policy responsiveness. This is accentuated in particular if the additional income is a significant portion of the household's income. In this respect, the ability of the central bank to stimulate household consumption through lower interest rates could be constrained if the level of remittances is already at a high rate otherwise they could be some inflationary consequences. The challenge for the remittance receiving government is to design policies that allow for the benefits to flow to the households and the economy without limiting the effectiveness of the effects and producing unwarranted side effects. It has been notably documented in this area that higher remittances enable households to offset the potential influences of government policy to some degree, without substantial fluctuations in work effort due to consumption smoothing actions by the households. This potential influence has been recently researched upon by some recent studies to examine the possible implications.

Chami et al. (2008) use a stochastic DSGE model which is based upon the responsiveness of government policies. They seek to understand how government policies react to the changes in remittance inflows which could affect both fiscal and monetary policy in the recipient country. The main result from the study is the optimal monetary policy will differ between the remittance dependent country and the

country with no remittance inflows. The general equilibrium framework employed finds positive and negative economic effects from the remittances mainly from the inflows of private capital. This study finds that remittances contribute to increased macroeconomic risk via higher business cycle volatility. This is because of the increased correlation between labour and output. Consequently, consumption increases through the consumption smoothing effect. This is seen to influence the functioning and cost of policy instruments. Additionally, economies who employ labour taxation, find that remittances hinder the ability of the policymakers to enable the Friedman rule. Subsequently this increases the incentives to use the inflation tax. The likelihood of increasing the negative externalities of remittances is related directly to the use of the inflation tax. Therefore, the important finding from the study concludes that policymakers need to make use of the correct instruments to achieve their objectives simultaneously. These objectives consequently may vary according to the correct set of instruments in the presence of remittances. Objectively, the study concludes that the policymakers need to make use of the correct set of policy instruments amongst simultaneously adjusting their policy preferences following the presence of remittances.

In a recent piece of research, Mandelman (2013) develops a DSGE model to analyse monetary policy in remittance receiving countries. The DSGE model consists with preferences of heterogeneous agents, market frictions and monopolistic competition in which positive remittance shocks exhibit inflation. However, the model proposes the government controls inflation through the contraction of the money supply which raises the interest rate. The study follows a format similar to the monetary policy rule proposed by Taylor (1997). This model is more representative of developed countries and is characterised with an automatic response to fluctuations in remittances. Jansen et al. (2012) focus on the same area with the use of a DSGE model, where they find that countries with differing degrees of sterilisation (policies aimed at countering the effects on the money supply caused by a balance of payments surplus or deficit) exhibit a differential effect of remittances shocks. In particular, as part of their robustness checks they show that the labour leisure trade-off is compounded because

of the indirect effects of money growth and inflation. Leeper (1991) demonstrated with the use of a flexible price closed economy model, equilibrium determinacy in the economy is only achieved with the mix of monetary and fiscal policy, such that ‘active’ monetary policy must be supported by a ‘passive’ fiscal policy. This result is based on the policy following an ‘active’ or ‘passive’ regime depending on its responsiveness to government debt shocks.

A recent study by Bahadir et al. (2018) uses the same open economy New Keynesian DSGE model. However, they concentrate on how remittance inflows can affect the response of the economy from the interactions between the distribution of remittances across households and their ownership of capital. Using data from El Salvador, the authors find that an increase in remittances applied to households with no capital ownership have a contractionary effect on the economy. Conversely, when households have capital ownership there is an expansionary effect on the economy. The conclusive finding from the study reveals that the result depends on the ability of remittances to smooth out the business cycle. This is reliant upon the remittances distribution across heterogeneous households. The main limitation in this study and the potential for analysis in this study is the endogeneity of remittance inflows and the effects of migration and human capital skills in the domestic labour market. Such an analysis would need a multi-country panel set up which models the costs of migration and the composition of human capital skills in the labour market.

The interactions of fiscal and monetary policies need to be researched further. This would help examine external factors such as the political effects in terms of election induced increased government spending and the effects of remittances to be included in the analysis. In particular, remittances play a huge role in developing nations in terms of GDP and the overall development of these emerging nations. Disentangling the effects of the remittances post the 2008 crisis is critical to determine the economic and social situations of these developing countries. The majority of the literature on remittances focuses on the microeconomic implications of the respective sender and receiver countries of remittances (Rapoport and Docquier, 2006; Sharma, 2010). However, economists have ignored the impact of potentially higher remittances in terms of their fiscal impact

and the implementation of monetary policy.

2.6 Remittances and the Political Budget Cycle

Before discussing how remittances can influence the political budget cycle it is important to understand the interactions between migrants and remittances and how the literature has evolved in finding a link to corruption within governments. The political influence of remittances is embodied within the political budget cycle theoretical framework. In order to understand the complex relationships between the political impact of remittances and macroeconomic policy it is useful to consider beforehand the theoretical underpinnings of the political business cycle literature.

There are two main schools of thought when investigating the notion of political intervention in economic policy. The first line of thought, initiated by Nordhaus (1975), the electoral political-business cycles theory characterises politicians as identical and opportunistic, meaning that their only preference is to remain in power. The new perspective on elections was pioneered by William D. Nordhaus, with his theoretical paper named ‘political business cycle’ in 1975. His argument originated from incumbents who aim to maximise votes during the election season. The electoral political-business cycles theory characterizes voters as myopic and naive (e.g., as having adaptive expectations and thus voting retrospectively) and prone to vote for incumbents when times are good prior to an election. Nordhaus claimed that when voters have limited information about party policies, they will seek to form expectations about incumbent parties by observing past performance. Subsequently, if the party seeking re-election fails to meet these expectations the voter will vote against the incumbent (Nordhaus 1975, p172). Nordhaus’s cycle also known as ‘the opportunistic cycle’ seeks to explain the Philipsian dilemma between inflation and unemployment.

The traditional model was criticised for characterising voters as myopic and naive. Hibbs (1977) introduced modifications to the original model known as the partisan political

business cycle which attacked the notion that politicians are characterised purely by opportunistic behaviour, at the expense of partisan preferences over policy outcomes. The argument proposed by Hibbs focuses on lower income and occupation status groups who are best served by low unemployment-high inflation macroeconomic outcomes. On the other hand, a combination of high unemployment and low inflation configuration is synonymous with the upper income and occupational status groups. The original partisan model of Hibbs (1977) is modified by Alesina and Tabellini (1990) to allow for fluctuations in unemployment and inflation to be driven by election outcomes combined with partisan differences.

The reliance on voters with the characteristic of being myopic voters with adaptive expectations is criticised by many studies. Based on the opportunistic political framework, Cukierman and Meltzer (1986); Alesina and Tabellini (1990); Rogoff and Sibert (1990); Persson and Tabellini (2003); Stein and Streb (1998); Lohmann (1998) revise the initial model to merge rational expectations among voters. Consequently, the dependence on asymmetric information between voters and politicians is a key assumption amongst these models. The level of competence is known to the politicians, however for voters it is discovered with a lag (e.g. post election) effect. The endowment of rational expectations amongst voters is conditional on the information set available to them at any given time. Hence, voters judgments are based on observed economic outcomes and ‘rational retrospective’ voting is determined where opportunistic government are incentivised to manipulate macroeconomic policy variables to appear more proficient prior to an election.

Cukierman and Meltzer (1986) use the proposition of asymmetric information to explain the government’s preference for discretionary policy action. The study shows that discretionary policy imposes a social cost and the costs are only eliminated if all voters have the same information as the government. They termed the resulting loss as the “cost of democracy” and this cost only disappears, without a constitution when the public is fully informed. The model implies that social welfare is not maximised by the government with private information who maximise the probability of getting

re-elected. In the model, the prediction states that the public expects the government to increase its welfare before an election.

2.7 Remittances and the Labour Market

There has been substantial amount of data documented on international migration in both host and home countries. The general perception in this field is that migration enhances the welfare of people living in the host country with only some exceptions (Friedberg and Hunt, 1995). For example in this study the authors report the analysis on the United States which concludes that a 10% increase in the fraction of immigrants in the population reduced the native wage by as much as 1%. The analysis of net migration is far from complete and what is needed is to analyse the effects on the home country (sending country) labour market. The general perception on these issues follows that the most skilled workers will leave the home country and hence there will be a brain drain which could negatively affect the productivity of the labour market back home. Although it should be noted that a brain drain does not necessarily imply a negative impact in developing countries. For example, Beine et al. (2001) conclude that there are conditions under which the brain drain can be beneficial to the home country's economy. Similarly Dos Santos and Postel-Vinay (2003) state that the main benefit from international migration is when migrant workers improve the efficiency of their home country's economy. This is through the process of diffusing the knowledge back home which has been acquired from overseas in the form of physical and human capital.

For the remainder of this section the focus will be on documenting on the literature concerned with the effects of remittances on the labour market in the home country. The study by Djajić (1986) advances the work of Rivera-Batiz (1982) in examining the effects of migration on the welfare of the remaining residents in a small open economy producing both tradable and non-tradable goods. The study shows that if remittances inflows exceed a critical amount, there will be benefit to the remaining residents from

migration even if they do not receive any remittances themselves. The study finds that emigration has been encouraged by many Mediterranean countries with the ambition of attracting large flows of remittances into to these countries. The model used in the study follows a simple process whereby remittances received by the families back home increase consumption demand in the home economy.

Furthermore, the returning migrants spend their extra income in durable and non-durable goods. At the same time part of the remittances could still be used in a productive way through direct investment in local projects or alternatively as savings through the use of the banking system.

Funkhouser (1992) focuses on the relationship between mass emigration and remittances in El Salvador to examine if there are any effects on labour force participation rates, brain drain and wages in the Salvadoran labour market.³ The study concludes that remittance inflows have significant effects on the labour force participation of the remaining households. This is prevalent in the result primarily because of the income effect whereby workers in the home country rely too heavily on remittances and hence reduce their working hours for more leisure time. Furthermore, Funkhouser (1992) suggests that aggregate demand may increase following the high levels of remittance inflows into local labour markets and the demand for labour would increase. The study's main finding concludes that the labour force participation rate are higher for women compared to men when there is emigration of a household member. The second result of the paper follows that changes in the labour force from migration causes changes in wages. More specifically, the effects of the shortages of skilled labour are not as severe. This is as a result of an increase in the demand for labour increased in conjunction with an economic recovery where the skilled migrants do not return to El Salvador.

In analysing remittances effects on the labour market, it is important to focus on employment and unemployment and the interactions between migrants. Zachariah et al. (2001) provide an alternative view of remittances as they view them as

³The author uses six data sources on emigrants from El Salvador and two data sources for the native El Salvadoran population.

responding in a similar way to welfare payments. The study focuses on the Kerala state in India where a sample survey shows that the worker population ratio was much higher for non-migrant households (55%) compared to emigrant households (31.6%). They suggest that this finding originates from the fact that the emigrant households are more selective when searching for work compared to non-migrant households. This is confirmed by the data collected by the authors whereby emigrant households depend more on self employment (48%) than non-migrant households (45.3%). The study's section on the effects of migration on employment and unemployment concludes with the powerful statement that "because unemployed persons belonging to emigrant households enjoy the financial support of the emigrant members, they are not in any hurry to get employed" (p. 55).

Galasi and Kollo (2002) build on previous studies by analysing the effects of unemployment benefits on the duration and incidence of unemployment. Galasi and Kollo (2002) view remittance inflows similar to the effect of increasing unemployment benefits thereby increasing the individual's reservation wages and replacement rate. The authors acknowledge that counter arguments exist to the common view that an increase in benefits is unfavourable for job search intensity which results in a decrease in the probabilistic chances for re-employment for the unemployed workers. A longer search period for a job will allow a better job search match by allowing individual workers greater time to match their skills to the appropriate job. Furthermore, this provides greater market knowledge for individuals who are not searching for jobs. Therefore, to answer these issues there needs to be extensive in depth analysis and greater coverage of household data survey for remittance receiving households to seek their employment status, education levels, income levels and their opinions on seeking re-employment.

2.8 Remittances, Financial Development and Monetary policy

The idea that a well functioning financial system is an essential requirement for a country's economic growth and considered almost as an obvious prerequisite by most scholars (Miller, 1998). Given the sheer magnitude of global remittance flows, it is not surprising that the literature on remittances also focuses on financial development and monetary policy. The empirical relationship between financial development and economic growth has been studied extensively within the literature across both developed and developing countries. The empirical evidence finds that remittances contribute to economic growth be it through consumption, investment, or savings. Glytsos (2002) models the indirect and direct effects of remittances on incomes and investment in Pakistan, India, and Morocco. This study gathers conclusive results and concludes that the evidence varies among the Mediterranean countries, however finds that investment rises with remittances in six out of the seven countries.

The direct relationship between remittances and financial development, incorporates several demand side and supply side channels. With the demand side, we see remittance receiving households' use of the formal remittance service improve the financial literacy rate. Therefore, these unbanked migrant households are more likely to manage their remittance receipts in an efficient way by opening bank accounts to deposit their money because of the high fixed costs of sending remittances due to their irregular characteristics. Furthermore, remittance receiving households widen their use of bank services and financial products with the opening of bank accounts. On the supply-side, the wider range of remittance deposits enables banks to increase the availability of loanable funds and thus the banks' ability to lend to both remittance and non remittance receiving households is expanded. On the other hand, an alternative approach is to model the relationship between remittances and financial development through the indirect, growth focused approach which allows for possible interactions between remittances and financial development in estimating growth equations for the recipient countries. Remittances provide an alternative source of

funding through the alleviation of credit constraints. Giuliano and Ruiz-Arranz (2009) provide empirical evidence through standard growth equations, by estimating the interaction of remittances and financial development for a sample of 73 countries over the 1975-2002 period.

The current focus in the literature between remittances and financial development centers on determining whether these variables are complements or substitutes. The studies in the literature which consider the complementarity hypothesis (Aggarwal et al., 2011; Mundaca, 2009) or the substitutability hypothesis (Ramirez and Sharma, 2013) analyse the combined effects of remittances and financial development on economic growth. What the literature fails to address is to provide a wider range of study which enables us to compare cross country and cross regional differences in the results. As shown in the literature, remittances are transferred through official and unofficial channels (World Bank, 2018). Furthermore, Nyamongo et al. (2012) show that when remittances are channeled through formal avenues they positively impact the growth of and the quality of bank loan products which they can take advantage of in the future. If the effect on the financial sector is significant and large enough then we would expect financial development. Nyamongo et al. (2012) examine a panel of 36 countries in Sub-Saharan Africa and reveal that remittances appear to be an important source for economic growth and work as a complement to financial development. In addition, a more developed financial system within the home country should entail lower costs of transferring money from the source country (Freund and Spatafora, 2008). Therefore, this would reduce the number of households who are less likely to remit due to budget constraints and increase the amount remitted by the migrant.

More importantly, the two closely related studies that examine the link between financial development and remittances include Gupta et al. (2009) and Aggarwal et al. (2011). Gupta et al. (2009) use a sample of 44 Sub Saharan African countries for the period 1975-2004 and find that remittances have a positive impact on bank deposits. The study stipulates that in all instances, remittances are statistically significant as a

positive determinant of financial development. Furthermore, the study finds that while GDP per capita seems to have a significant effect on financial development, the magnitude of the effect is small. Although Gupta et al. (2009) provides an insight into how remittances can affect financial depth, it provides little information regarding the effects of remittances on financial inclusion. Anzoategui et al. (2014) go further in analysing the effects of remittances on financial inclusion. Financial inclusion is not the same as financial depth as financial inclusion focuses on those businesses and individuals who have access to useful and affordable financial products and services to meet their needs in a way that is responsible and sustainable. Anzoategui et al. (2014) concentrate on the impact of remittances on financial inclusion directly and unlike other literature in the field, the study considers other formal financial institutions in El Salvador such as cooperatives, credit unions and financiers. Furthermore, the study looks at whether households apply for loans and examines the impact of remittances on credit demand. This enables us to assess to what extent remittances might relax credit constraints.

Chapter 3

Remittances and Fiscal Cyclicity in Developing countries

3.1 Introduction

Understanding remittance flows requires understanding why these flows are unique and are distinct from those of official aid or private capital flows which are documented more extensively in the literature. In more detail, remittance inflows in comparison to official aid or private capital flows are direct private transactions between people in different countries which represent the actions of individuals rather than government actions. The underlying figures support this statement as remittance inflows into developing countries represent a staggering 38% of total net private capital flows.⁴ This development in part may be due to the reduced average transfer cost as a result of the rapid growth of money transfer institutions. International capital flows in developing economies over the past two decades have seen a large increase to over 12% of GDP since the 1990s where they represented only 4% of developing-country GDP (World Bank, 2010). Figure 3.1 reinforces the importance of remittances as officially recorded remittances exceed total development aid by 50%, amounting to a value of \$125 billion in 2004. Remittances only suffered a drop during the recent global financial crisis in 2008 because the impact of the real-sector spillovers were quite severe, and fell heavily on energy-exporting and developed countries, the primary sources of immigrant remittances (Barajas et al., 2011). Remittance flows to developing countries are projected to slow down during 2015, owing to the weak economic conditions in Europe and Russia. Flows are expected to accelerate in 2016, with a projected value of \$479 billion by 2017 in line with the more positive global economic outlook. Furthermore, remittances have proved to be more stable than private debt and portfolio equity flows and also less volatile than official aid flows as reported by the recent analysis by the World Bank's Global Economic prospects 2015 report (World Bank, 2018).

⁴Data is obtained from the World Bank database online at: <http://econ.worldbank.org> World Bank (2018)

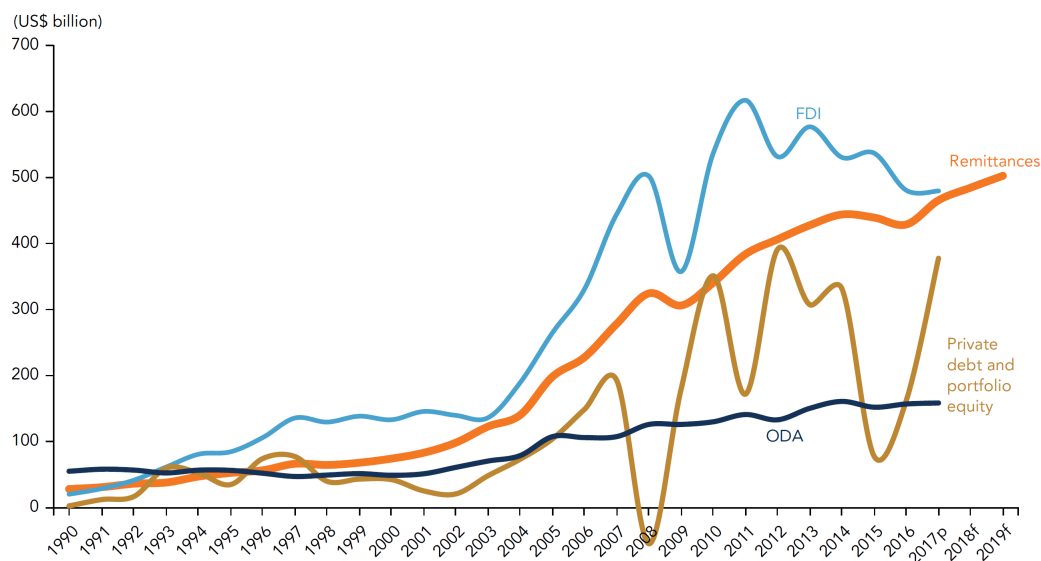


Figure 3.1: Remittances, Private debt & portfolio equity and ODA, 1990-2019. Source: World Bank (2018), World Bank staff calculations and forecasts, World Development Indicators

Researchers have attempted to understand these flows on these economies primarily through a microeconomic aspect (Melkonyan and Grigorian, 2012; Amuedo-Dorantes, 2006). Understanding the benefits of these flows through the impact on economic development in developing countries will enable governments to maximise the potential of these flows. Consequently, understanding the macroeconomic implications of remittances will allow policymakers in developing economies to make informed decisions regarding the potential benefits and costs of migration. To the extent governments in developing economies need to be mindful of the potential loss of skilled workers also known as ‘brain drain’ and evaluate the potential gain from the investment by remittance receiving households is greater than the loss of the skilled workers. However, the ‘brain drain’ phenomenon is dependent on the migrants’ education level and the well being of the remittance receiving families. Niimi et al. (2008) present findings which confirm that skilled migrants earn more than unskilled migrants. However, they often come from better-off families whose demand for remittances may be lower than those from poorer families.

It can be perfectly reasonable to assume that remittances have the same economic impact as the official aid flows and private capital flows but they differ greatly in some

aspects. There are three key differences between remittances and other international flows which are agreed upon in the literature. The widely accepted definition of remittances are that they are non-returnable, nonmarket personal transfers between households across countries. The main difference between remittances and the official aid flows are that the former are exchanged in small transfers between private individuals whereas official aid flows are government to government transfers usually in large amounts. Crucially, the presence of familial relationships sets remittances apart from the official aid flows and contributes to the uniqueness of remittances. Furthermore, when analysing remittance behaviour we can see the interactions among family members is dependent upon the economic situation of the family.

The documented literature consists of contrasting views on the macroeconomic consequences of remittances on investment, economic growth, consumption and poverty (Chami et al., 2005, 2008; Barajas et al., 2011; Giuliano and Ruiz-Arranz, 2009; Combes et al., 2015). Conventional wisdom regarding remittances centers on issues; with a few exceptions; that remittances are a stable and reliable source of foreign exchange; they reduce poverty; they minimise macroeconomic volatility; they alleviate credit constraints; provide a buffer against consumption shocks and enhance investment in physical and human capital. Furthermore, there is a tendency amongst policy makers to highlight remittances to be the ‘cure’ for the economic challenges facing developing countries.

The purpose of this chapter is to broadly examine how remittance inflows can affect key macroeconomic decisions made by the government and macroeconomic policies in developing countries. In more detail, the study will explore how the cyclicity of fiscal policy responds to remittance inflows. By using panel data methods this research will investigate the degree to which remittance inflows are effectively utilised by households. This is achieved by investigating the timing of government expenditure and government taxation policies in relation to remittance inflows. However, governments could abuse their position in receiving these extra flows by timing their expenditure policies. For example, government could increase government expenditures when remittance inflows

are high (higher taxation) and vice versa irrespective of the country's economic cycle. Whilst many studies have specifically attempted to seek the effects of remittances on macroeconomic volatility (Chami et al., 2008), economic growth (Giuliano and Ruiz-Arranz, 2009) and competitiveness Acosta et al. (2009b), few studies have attempted to seek the effects of remittances on fiscal cyclicalities. From the perspective of a developing country it is important to understand how remittances affect the decisions made on fiscal related policies which are crucial not just from an economic point of view but also from a political perspective. Furthermore, this chapter will assist developing nations governments to understand their expenditure policies and tax policies in regard to the influence of remittances on household family incomes, attitudes to employment and the flow of migration between countries.

Most economists (Alesina et al., 2008; Christiano et al., 2011) agree that discretionary government expenditure and tax revenues should remain constant over the business cycle. The issue regarding the cyclicalities of fiscal policy originates from the prescribed view that if governments followed this rule then fiscal policy would follow a countercyclical pattern. Furthermore, during a boom period the level of government expenditure as a percentage of GDP would decrease because of automatic stabilisers, whilst government revenues as a percentage of GDP should increase (with a degree of progressivity and constant tax rates) following the reinforcement from tax cuts in recessions and tax increases in booms. The opposite result would occur in recessions. Most notably, in developing countries fiscal policy would follow the opposite scenario where fiscal policy is procyclical. Government expenditure as a percentage of GDP decreases during recessions and increases during boom periods, whilst deficits decrease in recessions and increase in boom periods.⁵ Gavin and Perotti (1997) were one of the earliest authors to note that fiscal policy is procyclical in the Latin American region. Several others including Kaminsky et al. (2005); Manasse (2007); Talvi and Végh (2005); Catao and Sutton (2002); Alesina et al. (2008) explore this phenomenon and note that this result is not only restricted to Latin American countries but is common

⁵In OECD countries the general convention is that fiscal policy is countercyclical. Galí and Perotti (2003) go in to more detail to explore the cyclical properties of fiscal policy in OECD countries.

in many though not all developing countries. As a result, developing economies follow sub-optimal procyclical fiscal policies that contribute to long term macroeconomic instability. The reasoning for this is concentrated around the difficulty in attaining the supply of credit, where in bad times developing countries experience difficulty in borrowing, or can only do so at higher interest rates. This argument may be flawed as it fails to address several key issues. Namely, why do these countries not self-insure whilst in ‘good’ times where they can accumulate reserves, so that they are subject to less budget constraints. Additionally, why are lenders deterred from providing these countries with extra funds. There have been cases that some countries have tried to self-insure in ‘good’ times to build up an accumulation of reserves as was the case with Nigeria. A country like Nigeria should be brimming with foreign reserves up to now but has failed to build on the large accumulation in the level of reserves from \$4.98bn in May 1999 to \$59.37bn in March 2007 (CBN, 2007). The cause for concern in Nigeria’s case was its inability of its government to create stable economic management whilst an over-reliance on oil for foreign exchange inflows during the past two decades. Furthermore, the recent decline in foreign reserves has exacerbated the problem due to the continuous fall in global oil prices.

To address these issues one needs to consider other factors which could influence the government fiscal decision making process. In this chapter, remittances are analysed to determine if they create potential moral hazard problems which could affect the cyclicity of fiscal policy. More specifically, there needs to be consideration towards the potential distortion towards excess or insufficient government spending when remittances are increasing or decreasing without considering the economic conditions. The aim of this chapter will help build on the existing literature of fiscal policymaking in developing countries whilst providing an alternative view of fiscal sustainability through the impact of remittance inflows. The study emphasises the wider impact of remittances on macroeconomic policy and why fiscal policy is often considered to be more volatile in developing economies compared to major developed economies.

The rest of this chapter is organised as follows, Section 3.2 provides an overview of

the methodology; Section 3.3 outlines the data sources, definitions; Section 3.4 reviews the descriptive statistics; Section 3.5 presents the empirical results consisting of the regression results for each region, while Section 3.6 concludes the study and presents some possible areas of further work.

3.2 Methodology

The methodology in this chapter follows the underpinnings of Gavin and Perotti (1997) theoretical framework which stipulates that credit constraints faced by developing countries would prevent them from raising money in international capital markets during economic downturns and would consequently force them to adopt a contractionary fiscal policy. In this study the following dynamic model in Equation (1) and (2) allow us to test the hypothesis of the influence of remittance inflows on the cyclical policy of fiscal policy in a panel data framework.

$$G_{i,t} = \alpha + \varphi G_{i,t-1} + \beta_0 \Delta Y_{i,t} + \beta_1 R_{i,t} + C' X_{i,t} + \beta_2 R * \Delta Y_{i,t} \quad (1)$$

$$+\varepsilon_{i,t}$$

$$TR_{i,t} = \alpha + \varphi TR_{i,t-1} + \beta_0 \Delta Y_{i,t} + \beta_1 R_{i,t} + C' X_{i,t} + \beta_2 R * \Delta Y_{i,t} \quad (2)$$

$$+\varepsilon_{i,t}$$

where t denotes the time subscripts and i indexes the countries, $G_{i,t}$ and $TR_{i,t}$ are the fiscal policy indicators (government final consumption expenditure and tax revenue measured as percentages of GDP), $\Delta Y_{i,t}$ is a measure of the business cycle,⁶ $R_{i,t}$ denotes remittance inflows into the receiving country, $X_{i,t}$ is a matrix of control variables which could affect changes in the fiscal policy indicator. Two alternative measures of public spending are used which is why there are two different econometric

⁶The output gap and the GDP growth rate are the two variables used for the estimation. The output gap is defined as the log deviation of GDP from its Christiano-Fitzgerald trend (Christiano and Fitzgerald, 2003). The Christiano-Fitzgerald trend is used in this study rather than the Hodrick-Prescott trend as it is a bandpass filter which is more efficient in modelling business cycles compared to the Hodrick-Prescott trend.

estimations: general government final consumption expenditure (as % of GDP) and tax revenue (as % of GDP). Kaminsky et al. (2005) argue that taxation revenues constitutes an outcome which is endogenously related to the business cycle. Indeed, taxation revenues increase during booms and fall during recession periods as the tax base moves positively with the business cycle. The vector $X_{i,t}$ is included in order to capture cross country differences in fiscal policy. The control variables included in this study are: foreign direct investment (FDI) (net inflows), net official development assistance and official aid received (NODA), net barter terms of trade index (NBTT), Inflation (annual %), Polity Democracy variable (Polity), Real GDP per capita, and Population, ages 15-64 (% of total) (Pop).

The FDI variable is included as part of the empirical methodology in order to control for some countries that potentially are over dependent on investment by companies which have the potential to influence the potential spending power of the government. Similarly, the NODA variable is included to create an even ‘playing field’ for some countries who are not heavily dependent on aid flows which exert an influence to their current spending levels. Inflation is included to represent the same purchasing power across all the countries in the panel dataset. The Polity variable is chosen to represent the potential for ‘democracies’, ‘anocracies’ and ‘autocracies’ to spend more or less compared to one another. The population variable gives the model true validity regarding countries that have greater populations compared to other countries are more likely to spend more and vice versa. The net barter terms of trade index is given as the relative price of a country’s exports compared to its imports. This variable provides an outlook for the government as it represents the gain from international trade which could affect the government’s fiscal decisions in order to improve domestic industries for the benefit of its exported goods and services. The Real GDP per capita variable is used as a control variable as it enables the model to estimate the regression coefficients whilst controlling for countries that are economically more advanced than others which could influence the potential for greater government spending.

Equation (1) follows the same format employed by Arellano and Bond (1991);

Arellano and Bover (1995); Blundell and Bond (1998). The Generalised Method of Moments (GMM) is the estimation method used in this study because it controls for the unobserved country-specific effects as well as the bias caused by the lagged dependent variables. Country fixed effects or random effects⁷ are included, so that the regression estimates also reflect within-country variation.

The control variables are utilised as separate components as the strictly exogenous instrumental variables which will help in explaining the cross country differences in government final consumption expenditure and taxation revenue. The model described above in equations (1) and (2) are able to model the cyclical conditions of the economy via the Output Gap variable and financing constraints through the foreign aid variable (net official development assistance and official aid received (NODA)). The lagged dependent variables ($\phi G_{i,t-1}$, $\phi TR_{i,t-1}$) are included in both models to capture the lag effects of government final consumption expenditure and taxation revenue. The inclusion of the output gap variable ($\Delta Y_{i,t}$) is important as it enables the study to analyse the cyclicity of fiscal policy for the subsequent analysis of the impact of remittances on fiscal cyclicity. Moreover, the reason for including the $R * \Delta Y_{i,t}$ (Remittance and Output gap interaction term) interaction variable is to determine whether remittances enhance, diminish, or has no affect on the cyclicity of fiscal policy.

Chami et al. (2008) examine the relationship between remittances and government spending and conclude that there is a positive relationship between the two variables in remittance dependent economies. They conclude that countries that receive remittances in large quantities, can support higher future debt levels, a finding that corroborates the correlation between remittances, public debt levels, and banking sector credit to the public sector. Moreover, the higher debt levels tend to be associated with an increase the level of government spending.

Similarly, Alesina et al. (2008) study the cyclical response of the budget surplus and total government spending in two samples of countries (OECD and Non-OECD

⁷The use of the fixed effects or random effects model are determined according to the Hausman test.

countries). The Output Gap coefficient is positive for the OECD countries and insignificantly different from zero in developing countries. Thus, fiscal policy is countercyclical in developed countries, a result which is synonymous with previous empirical studies (Kaminsky et al., 2005). This result is consistent with the political agency model which stipulates that corruption is more widespread in developing countries. This type of procyclicality occurs in both booms and recessions, and should be more prevalent in countries where political corruption is at the forefront and can affect the accountability of the incumbent government in respect to the voters.

The hypothesis tested in equation (1) determine whether remittance inflows enhance the cyclicity of fiscal policy, diminishes the cyclicity of fiscal policy or does not have an effect on the cyclicity of fiscal policy.

$$H_0: \text{ If } \frac{\partial G_{i,t}}{\partial R * \Delta Y_{i,t}} < 0 \text{ or } \frac{\partial TR_{i,t}}{\partial R * \Delta Y_{i,t}} > 0,$$

then an increase in remittance inflows into country i contributes to a countercyclical fiscal policy.

$$H_A: \text{ If } \frac{\partial G_{i,t}}{\partial R * \Delta Y_{i,t}} > 0 \text{ or } \frac{\partial TR_{i,t}}{\partial R * \Delta Y_{i,t}} < 0,$$

implies that an increase in remittance inflows into country i will contribute to a procyclical fiscal policy.

$$\text{In the case of } \frac{\partial G_{i,t}}{\partial R * \Delta Y_{i,t}} = 0 \text{ or } \frac{\partial TR_{i,t}}{\partial R * \Delta Y_{i,t}} = 0,$$

an increase in remittance inflows into country i will have no impact on the cyclicity of fiscal policy ('acyclical').

$$H_1: \text{ Furthermore, if } \frac{\partial G_{i,t}}{\partial R_{i,t}} > 0 \text{ or } \frac{\partial TR_{i,t}}{\partial R_{i,t}} > 0,$$

an increase in the level of remittances into country i will increase government expenditures or taxation revenue.

$$H_N: \text{ If } \frac{\partial G_{i,t}}{\partial R_{i,t}} < 0 \text{ or } \frac{\partial TR_{i,t}}{\partial R_{i,t}} < 0,$$

an increase in remittance inflows into country i will force the government to reduce its expenditures or experience a decline in taxation receipts.

$$\text{If } \frac{\partial G_{i,t}}{\partial R_{i,t}} = 0 \text{ or } \frac{\partial TR_{i,t}}{\partial R_{i,t}} = 0,$$

the level of remittance inflows into country i will have no impact on government expenditures or taxation revenue.

The extensive literature concludes that fiscal policy in developing economies follows a procyclical trend as described by Alesina et al. (2008) who infer that voters seek to “starve the Leviathan” to reduce political rents. This translates as voters who initially observe the state of the economy but not the rents appropriated by corrupt governments (more likely to occur in developing countries). These voters optimally demand more public goods and lower taxes during a boom period, to induce a procyclical bias in fiscal policy which is consistent in more corrupt democracies. The role of remittance inflows are viewed as a potential solution to the procyclicality bias in fiscal policy, as remittance inflows could help alleviate the dependency on lower taxes and more public goods demanded by the public because of the extra disposable income available to satisfy their basic needs.

3.2.1 Moment Conditions for GMM Estimator

The moment conditions of the Generalised Method of Moments (GMM) estimator are derived for Equation 1 and Equation 2:

$$G_{i,t} = \sum_{k=1}^2 b_k G_{i,t-k} + \beta_1 R_{i,t} + C' X_{i,t} + \beta_2 R * \Delta Y_{i,t} + \varepsilon_{i,t}, \quad (3)$$

where $G_{i,t}$ is the fiscal policy indicator in country i in year t . The main concept is to find the explanatory variables which are correlated with the chosen instrumental variables, but not with the random error term. The technique of first differencing Equation (3) is used to eliminate the country specific effect to obtain the following regression:

$$\Delta G_{i,t} = \sum_{k=1}^2 b_k \Delta G_{i,t-k} + \beta_1 R_{i,t} + C' \Delta X_{i,t} + \beta_2 R * \Delta Y_{i,t} + \Delta \varepsilon_{i,t}, \quad (4)$$

where $\Delta G_{i,t} = G_{i,t} - G_{i,t-1}$. Under the assumption that the error term is free from serial correlation, Arellano and Bond (1991) note that the values of G confirm that the instruments are valid for the lagged dependent variable $\Delta G_{i,t-1}$. It is assumed that $C' X_{i,t}$ (control variables) is weakly exogenous, resulting in $C' X_{i,t}$ to be uncorrelated with future values of the error term.

The GMM dynamic first difference estimator is represented by the following linear moment conditions,

$$E [G_{i,t-s} \Delta \varepsilon_{i,t}] = 0 \quad \text{for } s \geq 2, t = 3, \dots, T \quad (5)$$

$$E [C' X_{i,t-s} \Delta \varepsilon_{i,t}] = 0 \quad \text{for } s \geq 2, t = 3, \dots, T \quad (6)$$

In simulation studies it is found that the GMM estimators are subject to large finite sample bias and poor precision. The explanation for this is that when the explanatory variables are persistent over time, the resulting regression (in differences) is less reliable as the lagged levels of these explanatory variables are weak instruments. Both Arellano and Bover (1995), and Blundell and Bond (1998) find a way to increase the precision of the estimates by combining the original regression in levels and the differences regression.

3.3 Data

The main variables under consideration for the empirical analysis are obtained from the International Monetary Fund's International Financial Statistics (IMF IFS) database (obtained from the Thomson Reuters DataStream software), the World Bank database, the Migration Policy Institute (MPI) and through the individual country government statistics databases.

Fifty one developing countries under consideration for this panel data research which have been selected according to data availability and a fair representation of the selected regions across the world. In order for there to be consistency when testing the cyclicity of fiscal policy, there needs to be at least two or three cycles in each country. Thus the rule for country inclusion requires a minimum of 20 years of data. In general, the inclusion for a larger cut-off point is greatly beneficial for the robustness of the results because countries with only limited number of observations just add noise to the estimates. Additionally, smaller countries are prone to large shocks which makes them difficult to compare with countries that are larger in the dataset.

Figure 3.2 provides a visual representation of the selected developing countries highlighted in red in the research.

3.3.1 Data Descriptions and Measurements

The control variables included in this study which could affect the key baseline results are given below and described⁸:

a) Foreign direct investment, net inflows (% of GDP) - (FDI)

Refers to the net inflows of investment to acquire a lasting management interest operating for an enterprise other than that of the investor. It comprises the reinvestment of earnings, the sum of equity capital, short term capital as shown in the balance of payments, and other long-term capital. The variable shows the net inflows in the reporting economy from foreign investors divided by GDP.

b) Net official development assistance and official aid received (current US\$) - (NODA)

Net official development assistance consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies. It also includes loans which have a grant element of at least 25 percent. Net official aid refers to aid flows from donor countries to recipient countries.

⁸A greater set of control variables is included in Chapter 5. This includes the world oil price (CROIL) which helps to control those countries that are oil exporters.

c) Net barter terms of trade index (2000 = 100) - (NBTT)

Calculated as the percentage ratio of export value indexes to import value indexes, measured relative to the base year 2000. It can be also interpreted as the amount of import goods that can be purchased per unit of export goods.

d) Inflation, GDP deflator (annual %)

Measured by the annual growth rate of the GDP implicit deflator which shows the rate of change in the general price level in the economy as a whole.

e) Real GDP per capita (current US\$)

GDP per capita is gross domestic product divided by midyear population.

f) Polity Democracy variable- (Polity)

The latest version (Polity IV score) contains coded annual information regarding the level of democracy for independent states which have a total population greater than 500,000 and covers the period 1800-2014. The index is computed on the evaluation of how the state's elections are viewed in terms of openness and competitiveness, the nature of political participation in general, and the extent of checks on executive authority. For each country and year a score is computed which ranges from -10 to 10, with -10 to -6 symbolising 'autocracies', -5 to 5 corresponding to 'anocracies', and 6 to 10 representing 'democracies'.

g) Population, ages 15-64 (% of total)

Based on the de facto definition of population and is defined of the percentage of the total population that is in the age group of 15-64.

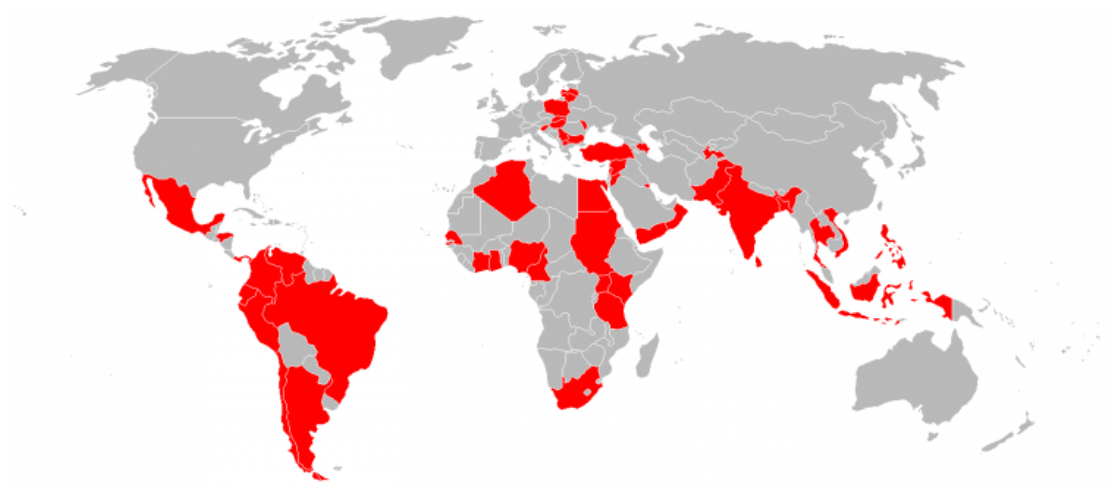


Figure 3.2: Selected countries in the study

The data collected for the empirical analysis needs to be defined to understand the key variables of interest. Firstly, the data collected on remittances (Workers' remittances and compensation, total received as % of GDP) is from the IMF's definition of remittances which includes three broad categories: workers' remittances which refer to cash or in kind from migrants to their households in the countries of origin, compensation of employees which denote the salaries, wages, and other remuneration, in cash transfer payments, paid to individuals who work in another country to which they legally reside in, and lastly migrant transfers which are applicable to migrants who transfer financial assets who legally reside in another country for more than a year. While the categories described by the IMF are well defined, there still remains some limitations in that there may be an underestimation of remittance flows because they fail to capture informal remittance transfers, including when migrants carry cash or goods when they return home. This study will use a representative variable used by the IMF to make the analysis more consistent and reliable to infer the results from.

3.4 Descriptive Statistics

The dataset is divided into the regions and (Full dataset, Asia, Latin America, Africa, MENA and Europe) are described by analysing the descriptive statistics in Table 3.1. The full dataset sample is split into five regions to analyse if the results differ between these regions. The descriptive statistics tables for the regional sub-samples are reported in Appendix A (Tables A.1-A.5).

The descriptive statistics for each sample reported in this section represent the datasets on which the panel data estimations will be performed on.

3.4.1 Full sample

Table 3.1 consists of the full 51 countries up to 1275 observations. Remittances represent 4.16% of GDP from 1990-2014 whilst Figure 3.3 displays how the average level of remittance inflows (% of GDP) for the 51 developing countries under consideration evolve throughout the study's time period. Figure 3.3 reinforces the continual upward trend of remittances during the past 25 years, however remittances into these countries suffered a sharp drop during the recent 2008 global financial crisis but the upward trend has re-emerged as many countries have recovered from their recessions. Before proceeding with regression analysis, it is useful to review the cross-country correlations with the main variables of interest. The cross-country correlations between remittance inflows and real GDP are given in Figure 3.4 which represents a bar chart graphic which reveals some interesting points for the different regions in the dataset. In general, there are more countries in the dataset with a positive relationship between remittance inflows and real GDP whilst the European and the Asian countries have positive correlations and the MENA countries have negative correlations. The correlation analysis provides some stimulus to the regression analysis in the upcoming subsection. This is because a positive correlation between remittance inflows and real GDP is viewed as a two-way causality

relationship. This indicates that an increase in real GDP causes an increase in remittances which is contrary to the motivating need to remit from migrant workers to developing countries that suffer from economic hardship. The positive correlation between these two variables could also indicate that an increase in remittance inflows induces a positive effect on real GDP figures which is more of a plausible explanation. This is due to the extra resources from overseas countries that could help alleviate poverty and contribute to a more productive workforce. Figure 3.5 provides an overview of the cross-country correlations between remittance inflows and government consumption expenditure variables. In general there is an even spread between positive and negative correlations across the whole dataset but it is interesting to note that a large degree of the European countries have negative correlations. This could indicate that either remittance inflows decrease when the government decides to spend more or remittance inflows increase when the government operates contractionary policies designed to control potential debt problems. Figure 3.6 illustrates the relationship between government consumption expenditure and real GDP which can indicate if a country operates a procyclical, countercyclical or acyclical fiscal policies. Visually, Figure 3.6 reveals that there is an even spread between positive and negative correlations between the variables but many Latin American countries have positive correlations (procyclical) which indicates there are still major issues within the region. Lastly, Figure 3.7⁹ reveals a scatter plot showing the relationship between Government consumption expenditure and Remittance inflows for the full dataset. From the plot, it appears there is not a statistically strong linear relationship but one which confirms that there is a weak positive relationship between the two variables.

⁹The data point shown in red gives the average value for the full dataset.

Table 3.1: Descriptive Statistics: Full Dataset

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
Year	1275	2002	7.21	1990	2014
Country	1275	26	14.73	1	51
Output Gap	1236	0.0004	0.02	-0.12	0.11
Remittances (% of GDP)	1099	4.16	6.61	0.00013	49.59
Government consumption expenditure (% of GDP)	1204	14.48	5.40	2.98	76.22
Tax Revenue (% of GDP)	660	15.26	9.00	0.09	65.90
Polity Democracy	1315	2.93	6.29	-10	10
Net Barter terms of trade index	1006	109.67	31.57	43.88	262.09
Net official development assistance and official aid received (NODA)	1079	3.01	4.34	-0.69	30.22
Population ages 15-64 (%)	1251	61.49	6.51	45.71	76.36
Real GDP per capita (ln)	1216	7.67	1.16	5.29	10.49
Remittances x Outputgap	1097	0.002	0.13	-1.10	1.30
Foreign Direct Investment	1169	3.29	4.75	-20.21	50.97

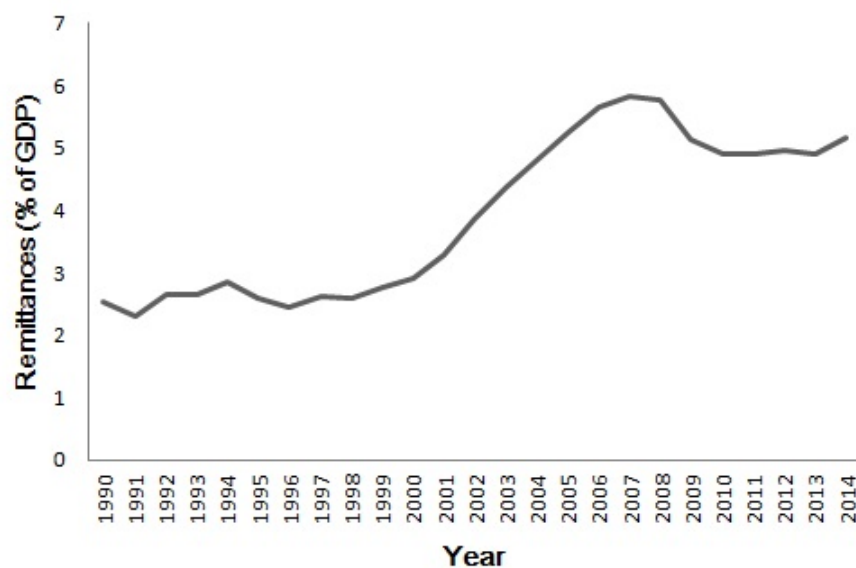


Figure 3.3: Remittances as percent of GDP, Full dataset, 1990-2014

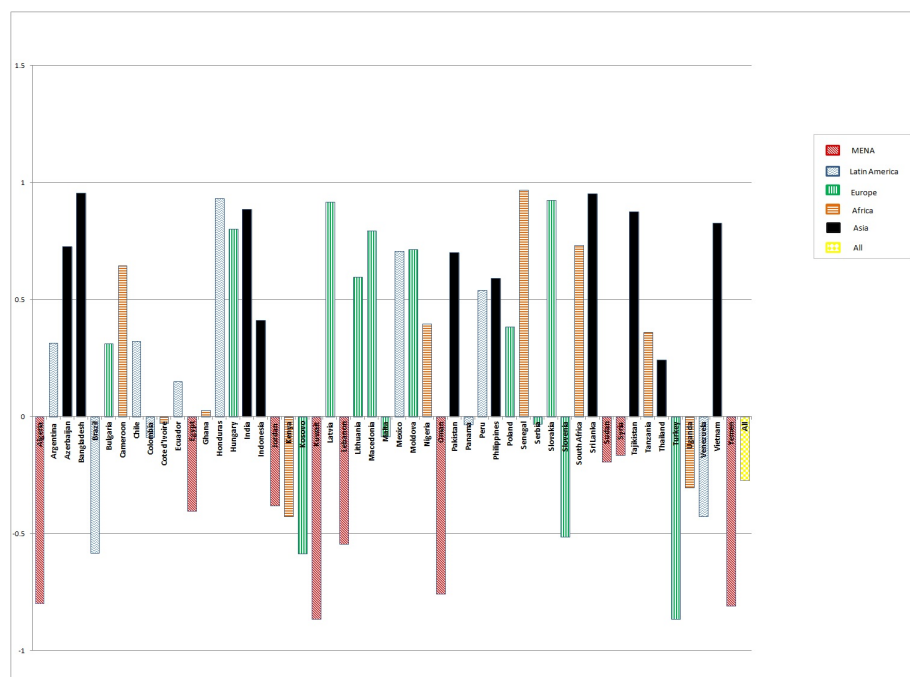


Figure 3.4: Cross country correlations between Remittance inflows and Real GDP, 1990-2014

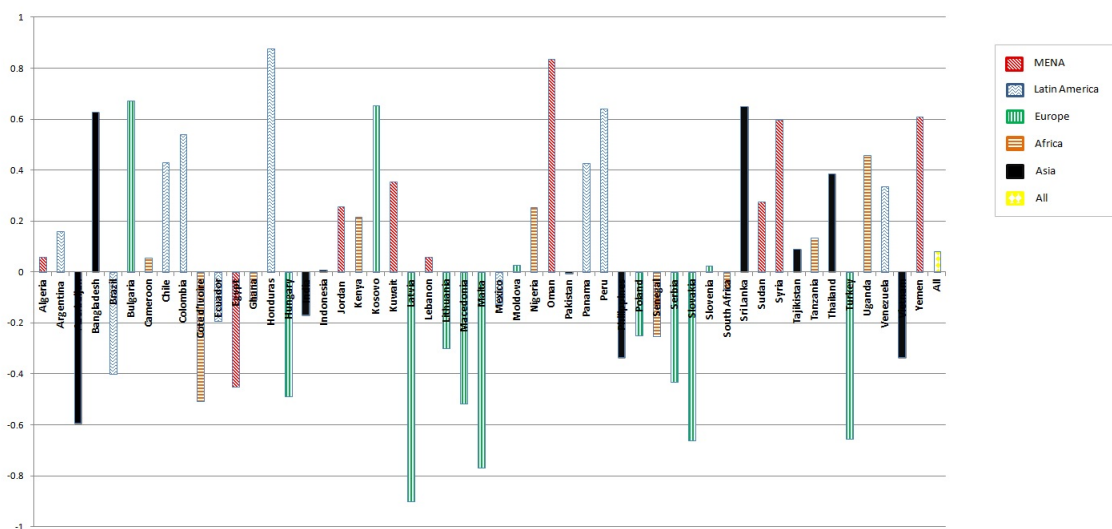


Figure 3.5: Cross country correlations between Remittance inflows and Government consumption expenditure, 1990-2014

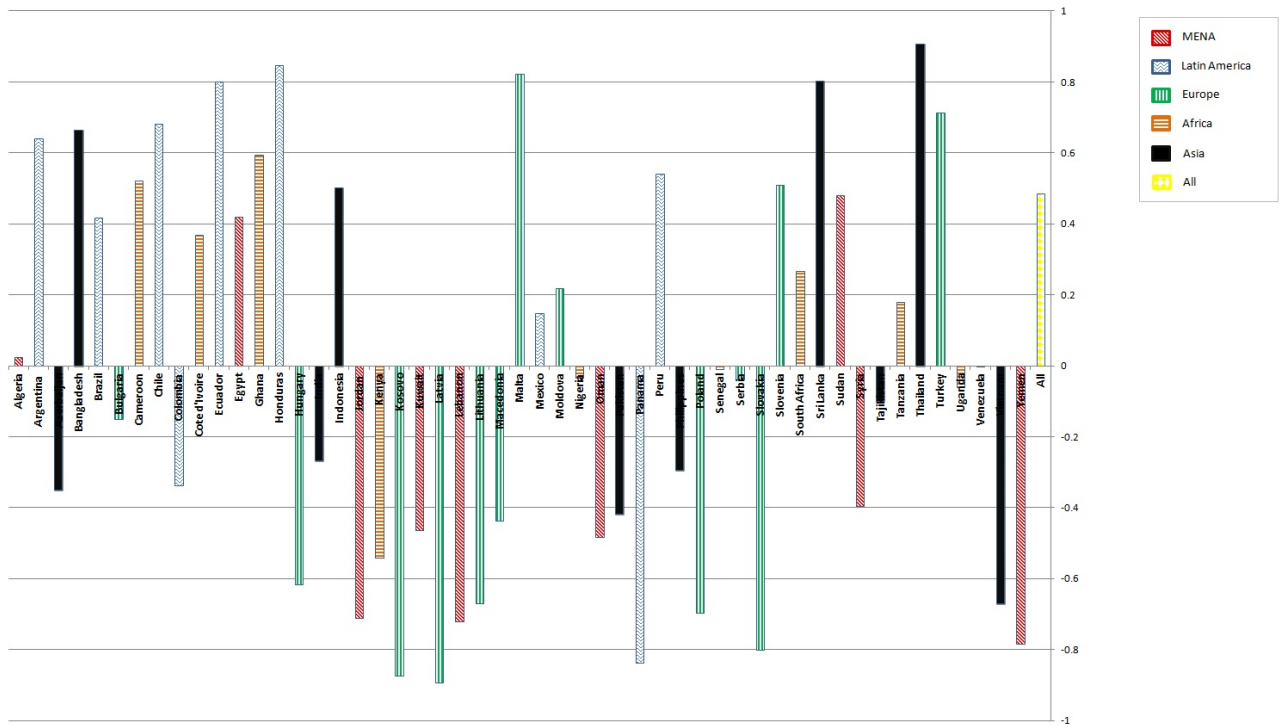


Figure 3.6: Cross country correlations between Government consumption expenditure and Real GDP, 1990-2014

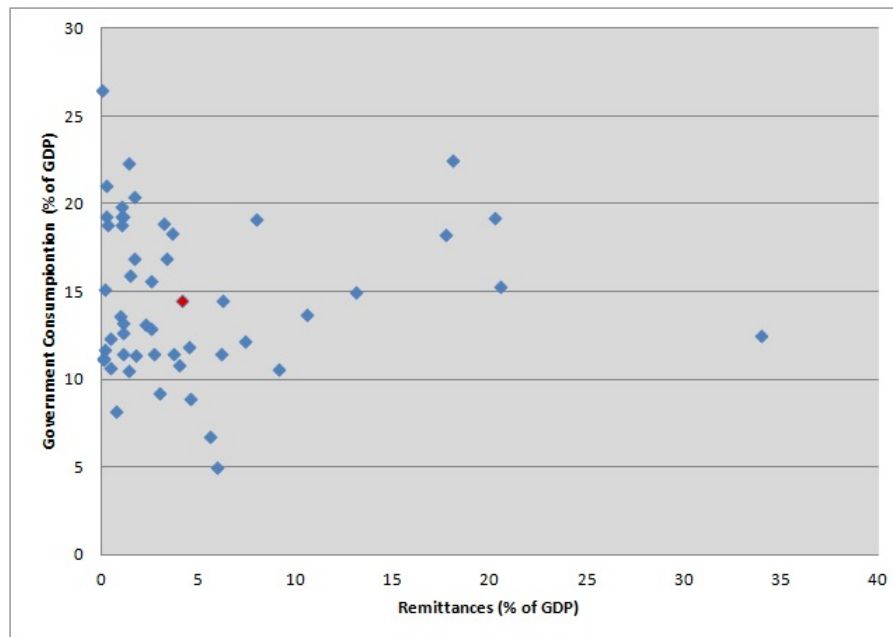


Figure 3.7: Bivariate relationship between Government Consumption expenditure and Remittances, 1990-2014

3.4.2 Asia

The countries included in the dataset comprise of countries from both South Asia and Central Asia (in Table A.1). The dependency of remittances of the two regions in Asia differ in terms of how many countries they rely on to fund the remittance inflows. Central Asia is heavily reliant on the economic activity in Russia, a major remittance source country which has recently suffered economically and resulted in migrant job losses. Moreover, the depreciation of the ruble has compounded the impact on migrant workers by reducing their real incomes and hence the value of remittances in US dollar terms. South Asia typically has been a net exporter of millions of migrants to other parts of the world most notably the UK, US and Canada. Improving economic prospects in the migrants destination countries will continue to support flows to the region. The growth in remittances in the South Asian region has been forecasted by the World Bank (2018) to pick up to \$126 billion in 2016 and \$132 billion in 2017 as countries like Pakistan, Nepal, Sri Lanka and Bangladesh continue to depend heavily on these flows. What we can observe from the data on remittances in this dataset is that it forms a large percentage of total GDP in the region (5.97 % of GDP) which indicates that remittance inflows are large compared to the output of the country.

3.4.3 Latin America

The Latin American region depends on remittance inflows but differs in respect to the country source of these flows. While most Mexican and Latin American migrants go to the United States, for many South American countries, Europe continues to be their preferred destination. Countries such as Brazil, Chile, Paraguay and Uruguay consist of migrants emigrating to Europe to countries such as Spain, where language seems to play an important role. Moreover, the recent economic crisis in Spain has had a significant impact on the migrants income predominantly from South American countries. Remittances still form a large percentage of total GDP in the region (2.03% of GDP) as is evident in Table A.2. More notably the Polity Democracy variable displays a larger value (6.32) as a result of many ‘young’ democracies emerging in the region during the past two decades which could encourage greater government oversight on the economy. The working population (Pop ages 15-64 (%) = 62.28%) also represents a good ratio for the working age population which could be linked to the number of migrants in the region.

3.4.4 Africa

The Africa dataset includes countries from the Sub-Saharan African region and it should be noted that Nigeria alone accounts for almost two-thirds of total remittance inflows. However, stagnation of remittance inflows to Nigeria has partly been offset by strong growth in South Africa, Uganda and Kenya. The growth of remittance flows to the region is expected to recover in 2016 and 2017 to 3.4 and 3.8 percent respectively as countries like Nigeria will be able to support domestic economic activity which should alleviate credit problems within the country. Table A.3 reveals that remittance flows are on average 2.09 % of GDP which is expected to increase over the coming five to ten years.

3.4.5 Europe

The European dataset for this study has the greatest data coverage consisting predominantly of the Eastern European region of countries. The demographic and economic challenges faced by many countries in this region are the main drivers of migration in the region. As the data shows in Table A.4 the working age population at 67.62% is sufficient but is forecast to decline in all Central European countries with the exception of Turkey because of the exodus of workers to countries like the U.K.. Remittances are stable in the region at 4.05% of GDP and as expected the Polity Democracy variable (7.64) shows that the Europe dataset comprises of governments which operate democratically.

3.4.6 MENA

Most notably in the MENA dataset (in Table A.5), it is evident to note that Remittance inflows (as % of GDP) consists of the greatest value with a mean value of 7.34% of GDP. This result is not surprising as the recent Migration and Development report (World Bank, 2018) confirms that forced migration and internally displaced populations,

particularly in the MENA region have been rising and are still rising to contribute to an increasing number of worldwide refugees (for e.g. the recent Syrian refugee crisis). However, the outlook for remittances is negative in the MENA region over the coming years. The region continues to be dominated by the continued low oil prices and the conflicts in the region contributing to internal displacement and forced migration across borders.

3.5 Empirical Results

The empirical analysis undertaken for this chapter is aimed to test if there is a relationship between remittance inflows and the cyclicity of fiscal policy. The results imply that remittances contribute to procyclical fiscal policy in the full sample, Asia, Latin America, Europe, and MENA regions. However, the results for the Africa dataset reveal that remittances have a countercyclical effect on fiscal policy in the region. By splitting the sample of countries of the full datasets into different regions and performing separate panel data regressions we can see that there is a degree of variation and heterogeneity between all of the regions.

Table 3.2 outlines the empirical results obtained from the full sample dataset, whilst Tables 3.3 - 3.7 report the empirical results for the Asia, Latin America, Africa, Europe and MENA region datasets.

3.5.1 Full sample

Table 3.2: Baseline estimates of the GMM and FE regressions (Full sample)

DV (Government final consumption expenditure)	FE (1)	S-GMM (2)	D-GMM (3)
Government final consumption expenditure (% of GDP) (-1)	0.676 (0.000)***	0.831 (0.000)***	0.636 (0.000)***
Remittances (% of GDP)	0.017 (0.301)	-0.001 (0.965)	0.147 (0.098)*
Output Gap	0.905 (0.724)	3.666 (0.424)	-4.817 (0.056)*
Polity Democracy index	-0.017 (0.310)	0.057 (0.131)	0.046 (0.599)
Remittances x Outputgap	-1.162 (0.006)***	-2.290 (0.422)	0.076 (0.087)*
Foreign Direct Investment	0.014 (0.246)	0.041 (0.140)	-0.045 (0.382)
Observations	885	885	834
Countries	51	51	51
Hausman test statistic: p-value	0.000		
Hansen's over identification test: p-value		1.000	0.303
Number of instruments		88	45
DV (Tax Revenue)	FE (1)	S-GMM (2)	D-GMM (3)
Tax Revenue (% of GDP) (-1)	0.676 (0.000)***	0.904 (0.000)***	0.805 (0.000)***
Remittances (% of GDP)	0.104 (0.040)**	-0.050 (0.270)	-0.071 (0.124)
Output Gap	4.392 (0.429)	6.467 (0.593)	0.555 (0.065)*
Polity Democracy index	0.048 (0.186)	-0.035 (0.306)	-0.124 (0.161)
Remittances x Outputgap	1.066 (0.189)	-1.627 (0.635)	-2.270 (0.098)*
Foreign Direct Investment	0.073 (0.004)***	0.094 (0.270)	0.196 (0.049)**
Observations	497	498	446
Countries	51	51	51
Hausman test statistic: p-value	0.000		
Hansen's over identification test: p-value		1.000	0.361
Number of instruments		86	44

Notes: All equations are estimated with the use of panel data estimators. The Difference GMM and S-GMM and D-GMM regressions include the Net official development assistance and official aid received (NODA), Net Barter terms of trade index, and the rate of inflation variables as the exogenous instrumental variables. The endogenous GMM instruments include the lagged values of Government final consumption expenditure and Real GDP per capita (Ln) variables. Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator.*Significant at 10%, **significant at 5%, ***significant at 1%.

Tables 3.2 - 3.7 represent the econometric results of Equation 1 and Equation 2.¹⁰ In the first column of Table 3.2 the Fixed Effects (FE) model is computed with the same variables as with the two other regression methods (System GMM and Difference GMM) regressions). The variables of primary interest concern the dependent variable (Government final consumption expenditure (GFCons) and Taxation revenue), Remittances variable and the Remittance x Output gap (RY) interaction variable. Column 1 consists of either the fixed effects or the random effects models which are chosen according to the Hausman specification test (Hausman, 1978). If the Hausman test does indicate a significant difference ($p < 0.05$)¹¹, the random effects estimator is a ‘biased’ estimator, and therefore the fixed effects estimator is to be preferred over the random effects estimator. The FE estimation for Table 3.2 (full dataset) displays a key result which confirms that there is a significant effect of the first lag of GFCons and RY variables on the dependent variable. The RY interaction variable in the FE estimation confirms that remittance inflows do significantly affect the cyclicity of fiscal policy in that they contribute to a countercyclical fiscal policy.

Column 2 and Column 3 utilise a different panel data estimation by using the System GMM (SGMM) and the Difference GMM (DGMM) estimation techniques. These dynamic panel data models¹² are specifically designed for dynamic ‘small-T, large-N’ panels that may contain fixed effects and separate from those fixed effects idiosyncratic errors that are heteroskedastic and correlated within but not across individuals. The coefficient estimates obtained for the SGMM model (Column 2) differ quite substantially from the DGMM model (Column 3) as the SGMM model shows that remittances contribute to a countercyclical fiscal policy (-2.290, RY variable) once we take into consideration the impact of remittances from a procyclical fiscal policy (3.666, Output Gap variable).¹³ However, the RY variable for the DGMM model is statistically significant whilst confirming that remittances worsen the cyclicity of

¹⁰The econometric software package used for the analysis is the Stata 12 (SE) version. The format of the reported results in tables 3.2- 3.7 include estimations for both of the chosen dependent variables

¹¹The Hausman test statistic (p-values) are reported in tables 3.2 - 3.7.

¹²Roodman (2009) xtabond2 command version of the SGMM and DGMM is employed rather Arellano-Bond’s (1991) estimator which is the xtabond command.

¹³Both the SGMM and the DGMM are valid regression outputs since the value of Hansen’s over identification test (p-value, accept H_0) confirms that the restrictions in place are valid under the null hypothesis. There is no evidence for autocorrelation under the H_0 with the use of Arellano-Bond’s test for autocorrelation in first-differenced errors.

fiscal policy (from an Output Gap coefficient value of -4.817 to an RY coefficient value of 0.076) to cause fiscal policy to be procyclical.

Comparatively, by focusing on the alternative dependent variable as taxation revenue in Table 3.2 we can see that the RY interaction variable is negative and statistically significant (-2.270) for the DGMM model which implies that remittance inflows have a negative impact on taxation receipts during a potential boom period. This result provides a small insight into the effects of remittances in the labour market. Hence, there is a possibility that an increase in remittance flows has a negative impact on the households labour supply. Several studies have investigated this result (Funkhouser, 2006; Amuedo-Dorantes, 2006; Hanson, 2007) and found that remittances received by an household have an overall negative impact on the number of labour hours supplied by men and women aged between 16-65. Furthermore, Justino and Shemyakina (2012) go further in finding this effect of remittances on the labour market by concluding that the effect is stronger for men than for women in post-conflict Tajikistan.¹⁴ This is an intriguing result in itself as previous studies have shown that female labour supply is typically more responsive to changes in remittance inflows compared to men. The authors explain this finding by stating that men were more likely to migrate to post-conflict Tajikistan where they may expect to migrate in the near future.

¹⁴Tajikistan is included in country sample as part of the Asia region.

3.5.2 Asia

Table 3.3: Baseline estimates of the GMM and FE regressions (Asia sample)

DV (Government final consumption expenditure)	FE (1)	S-GMM (2)	D-GMM (3)
Government final consumption expenditure (% of GDP) (-1)	0.665 (0.000)***	0.733 (0.043)**	0.440 (0.073)*
Remittances (% of GDP)	-0.056 (0.006)***	-0.040 (0.812)	0.129 (0.040)**
Output Gap	-6.338 (0.171)	3.511 (0.097)*	-5.836 (0.049)**
Polity Democracy index	0.005 (0.780)	-0.060 (0.939)	0.074 (0.620)
Remittances x Outputgap	0.295 (0.640)	-2.010 (0.892)	-2.694 (0.080)*
Foreign Direct Investment	0.037 (0.024)**	0.039 (0.967)	0.045 (0.053)*
Observations	197	204	187
Countries	10	10	10
Hausman test statistic: p-value	0.000		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		86	45
DV (Tax Revenue)	RE (1)	S-GMM (2)	D-GMM (3)
Tax Revenue (% of GDP) (-1)	0.859 (0.000)***	0.879 (0.021)**	-0.304 (0.076)*
Remittances (% of GDP)	-0.040 (0.511)	-0.220 (0.173)	-1.352 (0.079)*
Output Gap	6.675 (0.316)	-4.945 (0.823)	4.879 (0.193)
Polity Democracy index	0.036 (0.016)**	0.221 (0.404)	-0.229 (0.129)
Remittances x Outputgap	0.417 (0.773)	1.130 (0.429)	-4.902 (0.094)*
Foreign Direct Investment	-0.075 (0.180)	0.266 (0.661)	1.704 (0.187)
Observations	127	127	117
Countries	10	10	10
Hausman test statistic: p-value	0.4741		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		86	44

Notes: All equations are estimated with the use of panel data estimators. The Difference GMM and S-GMM and D-GMM regressions include the Net official development assistance and official aid received (NODA), Net Barter terms of trade index, and the rate of inflation variables as the exogenous instrumental variables. The endogenous GMM instruments include the lagged values of Government final consumption expenditure and Real GDP per capita (Ln) variables. Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. *Significant at 10%, **significant at 5%, ***significant at 1%.

Table 3.3 displays the panel data regression results for Asia which confirm that the effect of remittances on fiscal cyclicalities is only statistically significant for the DGMM model. The RY interaction variable has a coefficient value of -2.694 compared to the output gap coefficient which has a coefficient of -5.836, confirming that remittance inflows dampen the countercyclical fiscal policy thereby having a procyclical effect on fiscal policy. This provides a potentially interesting result which signifies that an increase in remittance inflows contributes to a greater procyclical fiscal policy where the extra resources from the remittance inflows enhance fiscal expenditures whilst the country is in a potential boom period which implies that there is a moral hazard problem regarding the government's decision making processes.

By observing the alternative dependent variable (Taxation revenue) in Table 3.3 we can see that the procyclical effect is stronger as the RY variable has a statistically significant coefficient value for the DGMM of -4.902 in comparison to the output gap value of 4.879, which strongly asserts that remittances have a demotivating factor on labour supply or the pre-effect cause of an increase in remittances is from the lack of job opportunities in the home country which results in workers to migrate to other countries. Rodriguez (2000), provides further motivation to strengthen this argument by investigating women migrant workers in the Philippines who are leaving the country in order to search for work in the developed world, whereby the combination of increased women's participation in the workforce and the lack of family friendly labour policies in the Philippines has seen the labour force diminish subsequently.

3.5.3 Latin America

Table 3.4: Baseline estimates of the GMM and FE regressions (Latin America sample)

DV (Government final consumption expenditure)	FE (1)	S-GMM (2)	D-GMM (3)
Government final consumption expenditure (% of GDP) (-1)	0.688 (0.000)***	0.730 (0.070)*	1.054 (0.073)*
Remittances (% of GDP)	0.128 (0.035)**	-0.139 (0.742)	0.452 (0.041)**
Output Gap	5.326 (0.144)	-4.892 (0.903)	2.991 (0.062)*
Polity Democracy index	-0.009 (0.845)	0.182 (0.791)	-0.050 (0.923)
Remittances x Outputgap	-0.907 (0.481)	4.460 (0.819)	2.633 (0.094)*
Foreign Direct Investment	-0.014 (0.759)	0.159 (0.580)	-0.436 (0.053)*
Observations	230	230	220
Countries	10	10	10
Hausman test statistic: p-value	0.0001		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		88	45
DV (Tax Revenue)	FE (1)	S-GMM (2)	D-GMM (3)
Tax Revenue (% of GDP) (-1)	0.665 (0.000)***	0.903 (0.007)***	0.546 (0.365)
Remittances (% of GDP)	0.150 (0.398)	0.024 (0.072)*	-0.118 (0.885)*
Output Gap	-3.236 (0.582)	-5.229 (0.620)	-0.699 (0.093)*
Polity Democracy index	0.043 (0.555)	-0.241 (0.753)	-0.027 (0.954)
Remittances x Outputgap	1.164 (0.510)	6.476 (0.649)	0.113 (0.987)
Foreign Direct Investment	0.085 (0.252)	0.008 (0.972)	-0.015 (0.089)*
Observations	106	106	95
Countries	10	10	10
Hausman test statistic: p-value	0.000		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		88	43

Notes: All equations are estimated with the use of panel data estimators. The Difference GMM and S-GMM and D-GMM regressions include the Net official development assistance and official aid received (NODA), Net Barter terms of trade index, and the rate of inflation variables as the exogenous instrumental variables. The endogenous GMM instruments include the lagged values of Government final consumption expenditure and Real GDP per capita (Ln) variables. Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator.*Significant at 10%, **significant at 5%, ***significant at 1%.

The results obtained for the Latin America sample further reinforce that remittances contribute to a procyclical fiscal policy on the basis of the significant RY coefficient (2.633) and the Remittances coefficient (0.452) given in Table 3.4 (DGMM model). The results for the alternative dependent variable (Taxation revenue) suggest that remittances contribute to a countercyclical fiscal policy but the key coefficients are insignificant in the sample to conclude any relationship. Furthermore, Jackman (2014) studies the impact of remittances on unemployment for a sample of 18 Latin American and Caribbean countries which signifies that when the remittance-to-GDP ratio is low (below 3.25% of GDP), remittances have a positive and significant impact on unemployment, however as they increase, remittances have a negative impact on unemployment. Indeed, this could be due to the possible under utilisation of remittances at low levels. This is plausible when remittance are low if a large portion of remittances are used to cover the expenses for the receiving household. However, as the magnitude increases, and goes beyond the day-to-day needs of the household, the investment effect of remittances dominates to cause a negative relationship between unemployment and remittances.

3.5.4 Africa

Table 3.5: Baseline estimates of the GMM and FE regressions (Africa sample)

DV (Government final consumption expenditure)	FE (1)	S-GMM (2)	D-GMM (3)
Government final consumption expenditure (% of GDP) (-1)	0.665 (0.000)***	0.590 (0.548)	0.506 (0.029)**
Remittances (% of GDP)	0.110 (0.134)	-0.577 (0.401)	-0.178 (0.094)*
Output Gap	10.253 (0.328)	-3.804 (0.974)	-8.656 (0.061)*
Polity Democracy index	-0.124 (0.010)**	0.226 (0.236)	0.180 (0.828)
Remittances x Outputgap	-4.881 (0.140)	10.745 (0.199)	-2.126 (0.087)*
Foreign Direct Investment	0.103 (0.195)	0.070 (0.958)	0.513 (0.614)
Observations	190	190	181
Countries	9	9	9
Hausman test statistic: p-value	0.0008		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		124	45
DV (Tax Revenue)	FE (1)	S-GMM (2)	D-GMM (3)
Tax Revenue (% of GDP) (-1)	0.480 (0.000)***	-0.075 (0.908)	0.263 (0.071)*
Remittances (% of GDP)	0.354 (0.010)**	0.603 (0.192)	0.456 (0.089)*
Output Gap	16.677 (0.196)	5.073 (0.039)**	4.942 (0.059)*
Polity Democracy index	-0.030 (0.628)	-0.064 (0.737)	-0.018 (0.923)
Remittances x Outputgap	-2.298 (0.519)	-4.753 (0.330)	-1.292 (0.549)
Foreign Direct Investment	-0.252 (0.030)**	0.254 (0.671)	-0.0006 (0.999)
Observations	89	89	78
Countries	9	9	9
Hausman test statistic: p-value	0.0016		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		70	39

Notes: All equations are estimated with the use of panel data estimators. The Difference GMM and S-GMM and D-GMM regressions include the Net official development assistance and official aid received (NODA), Net Barter terms of trade index, and the rate of inflation variables as the exogenous instrumental variables. The endogenous GMM instruments include the lagged values of Government final consumption expenditure and Real GDP per capita (Ln) variables. Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator.*Significant at 10%, **significant at 5%, ***significant at 1%.

The Africa sample provides some key results which differ from the other regions in the dataset. The results shown in Table 3.5 conclude that the Government consumption expenditure regression reveals that remittances contribute to a countercyclical fiscal policy whilst the alternative dependent variable (Taxation revenue) is statistically insignificant. The RY coefficient for the DGMM regression (Government consumption expenditure) has a negative and statistically significant coefficient (-2.126) further reinforced with a negative and statistically significant remittances coefficient (-0.178). These results indicate that in the African region, remittances contribute to a countercyclical fiscal policy. The landscape of migration within the African region is a complicated process where overseas emigration, especially Sub-Saharan Africa, is less pronounced compared to other developing regions. Furthermore, cultural, historical and linguistic bonds between African nations and their former colonies have produced strong flow of skilled and unskilled workers between them. These factors reinforce that migration does have benefits which come in the form of remittances which enable greater opportunities for the recipient households to emerge out of poverty.

3.5.5 Europe

Table 3.6: Baseline estimates of the GMM and FE regressions (Europe sample)

DV (Government final consumption expenditure)	FE (1)	S-GMM (2)	D-GMM (3)
Government final consumption expenditure (% of GDP) (-1)	0.509 (0.000)***	0.874 (0.013)**	0.651 (0.030)**
Remittances (% of GDP)	-0.027 (0.582)	0.126 (0.764)	0.203 (0.049)**
Output Gap	-7.092 (0.181)	-5.688 (0.105)	-1.251 (0.033)**
Polity Democracy index	0.036 (0.873)	-0.047 (0.962)	-0.431 (0.067)*
Remittances x Outputgap	-0.564 (0.445)	-1.217 (0.070)*	0.372 (0.091)*
Foreign Direct Investment	0.006 (0.717)	0.029 (0.666)	0.015 (0.706)
Observations	143	143	130
Countries	13	13	13
Hausman test statistic: p-value	0.0428		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		67	37
DV (Tax Revenue)	RE (1)	S-GMM (2)	D-GMM (3)
Tax Revenue (% of GDP) (-1)	0.876 (0.000)***	0.903 (0.000)***	0.766 (0.000)***
Remittances (% of GDP)	0.026 (0.818)	0.040 (0.733)	0.159 (0.003)***
Output Gap	-2.182 (0.205)	4.284 (0.078)*	-3.132 (0.076)*
Polity Democracy index	0.906 (0.191)	0.487 (0.415)	0.376 (0.719)
Remittances x Outputgap	2.562 (2.888)	-0.185 (0.109)	-2.391 (0.028)**
Foreign Direct Investment	0.063 (0.216)	0.031 (0.711)	0.010 (0.261)
Observations	100	101	89
Countries	13	13	13
Hausman test statistic: p-value	0.2161		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		72	37

Notes: All equations are estimated with the use of panel data estimators. The Difference GMM and S-GMM and D-GMM regressions include the Net official development assistance and official aid received (NODA), Net Barter terms of trade index, and the rate of inflation variables as the exogenous instrumental variables. The endogenous GMM instruments include the lagged values of Government final consumption expenditure and Real GDP per capita (Ln) variables. Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator.*Significant at 10%, **significant at 5%, ***significant at 1%.

The European results confirm that remittances contribute to a procyclical fiscal policy. Firstly, the Europe dataset confirms this result is statistically significant for both dependent variables (RY coefficients of 0.372 and -2.391). Stratan et al. (2013) focus their labour market analysis on Moldova and conclude that remittances have a stronger impact on part-time workers (1% increase of remittances implies a 0.17% increase in the part-time workers to employed population ratio) compared to full-time workers (1% increase in remittances causes an increase in the unemployment rate by 0.03%). However, the authors note that the long term effects on the labour market could be directly influenced by the improvements in human capital because of the reduced constraints of financing children's education and thus positively influencing the development of human capital particularly in Moldova's concentrated rural areas.

3.5.6 MENA

Table 3.7: Baseline estimates of the GMM and FE regressions (MENA sample)

DV (Government final consumption expenditure)	FE (1)	S-GMM (2)	D-GMM (3)
Government final consumption expenditure (% of GDP) (-1)	0.690 (0.001)***	0.325 (0.740)	0.574 (0.015)**
Remittances (% of GDP)	0.015 (0.767)	0.351 (0.582)	0.236 (0.056)*
Output Gap	-9.539 (0.441)	-6.642 (0.102)	-7.232 (0.098)*
Polity Democracy index	0.008 (0.939)	1.435 (0.324)	0.412 (0.919)
Remittances x Outputgap	-0.744 (0.465)	7.924 (0.580)	5.377 (0.040)**
Foreign Direct Investment	-0.032 (0.441)	-0.476 (0.441)	-0.479 (0.162)
Observations	125	114	116
Countries	9	9	9
Hausman test statistic: p-value	0.0151		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		113	63
<hr/>			
DV (Tax Revenue)			
Tax Revenue (% of GDP) (-1)	0.311 (0.005)***	3.554 (0.698)	0.313 (0.198)
Remittances (% of GDP)	-0.017 (0.847)	-1.449 (0.711)	0.503 (0.097)*
Output Gap	3.508 (0.204)	12.079 (0.794)	3.481 (0.077)*
Polity Democracy index	0.140 (0.448)	-1.822 (0.806)	1.135 (0.540)
Remittances x Outputgap	-0.059 (0.973)	-5.957 (0.717)	-10.911 (0.849)
Foreign Direct Investment	0.185 (0.009)***	-3.080 (0.662)	-0.005 (0.986)
Observations	75	75	67
Countries	9	9	9
Hausman test statistic: p-value	0.0009		
Hansen's over identification test: p-value		1.000	1.000
Number of instruments		82	50

Notes: All equations are estimated with the use of panel data estimators. The Difference GMM and S-GMM and D-GMM regressions include the Net official development assistance and official aid received (NODA), Net Barter terms of trade index, and the rate of inflation variables as the exogenous instrumental variables. The endogenous GMM instruments include the lagged values of Government final consumption expenditure and Real GDP per capita (Ln) variables. Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator.*Significant at 10%, **significant at 5%, ***significant at 1%.

The MENA results presented in Table 3.7 give similar results to the other regions. The government consumption expenditure dependent variable regression has an RY coefficient of 5.377 whilst the taxation revenue dependent variable has an RY coefficient of -10.911. Moreover, these results concur with all the regions in the exception of Africa in that remittances reinforce fiscal policy to be procyclical. International migration and remittances have been particularly dominant in the Middle East and North Africa. The surge in migration in this region was caused by the oil price rises in the late 1970s, whilst economies of the Persian Gulf boomed, migrants from Lebanon, Jordan and Egypt began seeking high pay jobs in countries such as Saudi Arabia, Iraq and Kuwait. During the same period workers from Morocco, Tunisia and Algeria began seeking labour-intensive jobs in Western Europe. Van Dalen et al. (2005) show in an empirical study for Egypt, Turkey and Morocco that remittance inflows motivates emigrants in their home country to emigrate. This causes a trigger-effect to stimulate a negative impact on the labour force disposal for potential economic development. The authors view this phenomenon to largely be prevalent concerning remittance inflows into Morocco. The results obtained in this study for the MENA dataset corroborate these previous findings mentioned which seem to be influenced to a larger extent by the North African countries.

3.6 Conclusion

Recent literature has highlighted the importance of remittances on several macroeconomic variables, most notably economic growth, poverty, investment and consumption. However, this study focuses primarily on the potential for remittances to influence government expenditures across the business cycle.

The chapter focuses on a large panel dataset that comprises a variety of developing countries across a range of different regions across the world. The analysis is conducted by employing fixed effects, system and difference GMM analysis to conclude that remittance inflows have a direct impact on the business cycle for the 51 chosen developing countries. More specifically, the full dataset reveals that remittances are a factor in causing fiscal policy to be procyclical over the business cycle. However, the analysis found the direct opposite result whilst focusing on the African dataset but not for the other regional datasets. This finding obtained in this study has the potential for several policy implications in the current macroeconomic context. The growing importance of developing country governments worldwide to realise the effective channel to foster development through remittances is centred around the potential for labour markets to fully achieve the benefits of these flows. As mentioned earlier, previous studies have identified that remittances negatively impact the labour force which can inhibit these countries to develop through additional economic resources. Henceforth, the government is inclined to spend more than the norm in order to ensure that the long term effects are not permanent. It is imperative for these countries to acknowledge that whilst remittances are potentially useful during an economic downturn, they can be wasteful during a potential boom period where they may not be needed to such a degree since the economy is performing well.

This chapter provides the macroeconomic analysis of fiscal cyclicity in developing economies but with the focus on the influence of remittance inflows. Importantly, it should be acknowledged that specific flows such as remittances are not restricted to only microeconomic implications but can include macroeconomic implications from

the analysis conducted in this study. Moreover, the impact of this chapter on the existing literature is to provide an alternative focus on the cyclicity of fiscal policy by examining how remittances affect the working population and the government. This chapter builds on the existing framework provided by Alesina et al. (2008) and goes further by examining how remittances can affect fiscal policy over the business cycle. The main direction of this chapter focuses on providing robust results through the use of two dependent variables: government consumption expenditure and taxation revenue and focuses on the Remittance-Output gap interaction variable to seek any effects on the fiscal cycle. Moreover, the result of the chapter corroborates previous studies in that fiscal policy in developing countries is procyclical. It also adds to the existing literature by analysing the impact of remittances on fiscal related decisions and household decisions. This result can be interpreted in two different ways which are of use for further research. Firstly, remittances directly impact the business cycle by altering the labour supply decisions of migrant households to result in an inefficient workforce that is reliant on benefits and other payments by the government. The alternative view is, the magnitude of the procyclicality could be enhanced by political motives which have not been captured in this chapter. Furthermore, by introducing the perspective of voters in the model we can model the impact of manipulating voters prior to elections which could open room for corruption, resource diversion and therefore greater procyclicality in fiscal policy.

Chapter 4

Remittances and Financial Development in Developing Economies: A Cross-Regional Analysis

4.1 Introduction

The growing importance of remittances for development and poverty alleviation, has seen an increase in literature on the economic and developmental impact of remittance inflows. In particular for small countries where the remittances to GDP ratio is high and exceeds 30% (e.g. Moldova and Tajikistan, (World Bank, 2018)) it is important to understand the expanding nature of financial services in these countries whilst ensuring that development and poverty reduction strategies are high priority on each country's policies (Loayza and Rancière, 2006; Mishkin, 2007). Despite the increasing importance of remittances in international capital flows across the world, the relationship between remittances in developing economies has received relatively little attention. This is in contrast with studies that have placed emphasis in explaining the relationship between economic growth and other sources of foreign capital, such as capital flows and foreign direct investment (Alfaro et al., 2004).

There is a pool of literature which focuses on the relationship between financial development and economic growth. The earliest theoretical arguments in support of the role of financial development supporting economic growth are found in the work of Bagehot (1873), and Hicks (1969). Hicks (1969) noted that financial intermediaries are important for innovation and development. He examined the historical role played by the financial system in sparking industrialisation in England through the mobilisation of capital for “immense works”. This chapter will build on the foundations embedded in the financial development and economic growth literature whilst introducing the potential effects of remittances within this relationship.

Remittance inflows to recipient countries are often seen as a stable and sustainable way to ease credit constraints in developing countries. The relationship between remittances and financial development is intriguing and the relatively small and recent literature on remittances and financial development can be categorised under two main topics. The first is a set of studies which explore the relationship between remittances and financial development whilst examining the impact of remittances on economic growth (Nyamongo et al., 2012; Giuliano and Ruiz-Arranz, 2009). The other set of studies explore the relationship between financial development and remittances, with an emphasis on exploring the effects of financial deepening and financial widening (Aggarwal et al., 2011). For instance, Giuliano and Ruiz-Arranz (2009) find that remittances boost growth in countries with less developed financial systems by providing an alternative way to finance investment and help overcome liquidity constraints. The substitutability hypothesis found the study by Giuliano and Ruiz-Arranz (2009) is supported by other studies which focus on Latin American and Caribbean countries by Ramirez and Sharma (2013); and for a larger set of studies by Gapen et al. (2009). The extent to which remittances can influence financial development is *a priori* unclear. The notion that remittances can improve financial development in developing countries is derived from the concept that remittances pass through financial institutions. This influences the way recipient households demand and gain other financial services, which they may not have had access to otherwise (Orozco and Fedewa, 2005). Orozco and Fedewa (2005) find that the provision of remittance transfer services enables unbanked recipients or recipients with limited financial intermediation to establish credit histories, to take advantage of health and educational savings plans, among other investments.

This chapter is related to the burgeoning body of research between remittances and broad financial development. The purpose of this chapter is to contribute to the discussion on clarifying the relation between remittances and financial development. The existing literature is limited in exploring the relationship between remittances and economic growth. Not much has been done on the role of remittance inflows in

enhancing financial development to support economic growth across a dynamic panel dataset. This will be achieved by proposing a framework which addresses the impact of remittances on the breadth and depth of the financial sector. Furthermore, it will determine whether financial development strengthens the effects of remittances on economic growth or simply a substitute to remittances by enabling transfer recipients to spend remittances in a way which negatively impacts economic growth in the recipient country.

Aiming to capture country and regional differences this chapter employs panel data techniques (Difference GMM (D-GMM) estimation) across regional datasets of Africa, Middle East and North Africa (MENA), Asia, Latin America, Europe. Furthermore, this chapter provides practical contributions to the existing literature on remittances in developing countries by using a method which is able to disaggregate the data for regional comparisons. This chapter will examine if the effects of remittances on economic growth are more significant in one area compared to another depending on the level of financial development.

The chapter is organised as follows, Section 4.2 provides an overview of the literature between remittances and financial development; Section 4.3 outlines the empirical methodology and data with a detailed construction of a financial development index; Section 4.4 presents the empirical results, while Section 4.5 concludes and presents some areas of further research.

4.2 Literature Review

Intuitively remittances are beneficial to households as they are a source of insurance and serve a function to increase households willingness to engage in credit markets. For instance, Demirgüç-Kunt et al. (2011), examine the importance of remittances on the banking sector in Mexico by using municipality level data on the fraction of households receiving remittances and measures on the banking depth and breadth for the country. The results suggest that remittances are a significant factor in greater banking breadth (or outreach) and depth, increasing the number of branches and accounts per capita and

the amount of deposits to GDP. Demirgüç-Kunt et al. (2011) define banking breadth as the percentage of households in a given municipality opening a bank account in Mexico, and the average balance in the accounts which influence bank depth is determined by households' demand for banking services. The importance of the study highlights how remittances create a positive impact on the share of credit volume to GDP. Gupta et al. (2009), argue that remittances improve financial development in Sub-Saharan African countries by easing the immediate budget constraints of recipient households, and provide opportunity for small savers to gain a greater share in the formal financial sector. Moreover, remittances can help in increasing investments and developing small enterprises. Woodruff and Zenteno (2007) show that higher migration is associated with higher capital output ratios and larger investments among micro-enterprises in Mexico. Studies such as Richter (2008) further reinforce the positive effects of remittances on credit demand by showing that remittances at the household level exert a positive effect on credit demand. The authors investigate the potential effects of the receipts of remittances and household participation in credit markets. They find that remittances may provide households with insurance and a greater willingness to engage in credit contracts. However, they find that the direct effect of remittances might reduce credit demand through the reduction of liquidity constraints at the household level.

The importance of analysing the channels through which migration and remittances affect credit markets is crucial to understanding how gaining access to credit markets for households could affect their decision making and gives us an idea on the efficiency of the financial sector. The two main strands of literature analyse this issue by focusing on whether the relationship between remittances and credit markets should be classified as either complements or substitutes. The extant literature, however, suggests that the empirical evidence of a relationship between remittances and credit markets is ambiguous. Anzoategui et al. (2014) use household level survey data for El-Salvador to examine whether remittances affect household's use of credit and savings instruments from formal financial institutions. The study reveals that remittances through the promotion of deposit accounts, have a positive impact on

financial inclusion. The results are robust to the endogeneity of remittances by including unobserved household characteristics with the use of instrumental variables analysis. However, the study reveals that remittances do not have a significant effect on credit from formal financial institutions.

Nyamongo et al. (2012) find that, when remittances are received through formal channels, they positively impact the growth of the financial sector. Moreover, this is more likely to be the case when the recipients of such funds open accounts with commercial banks which could lead to greater financial development given the wider knowledge and information acquired by the customers. Aggarwal et al. (2011), find that remittances are positively associated with bank deposits and credit. Furthermore, they show that where there is a higher level of financial development, remittances have a lower marginal effect on economic growth. This is because financial development is known to be associated with producing information about allocating capital and possible investments; the monitoring of firms and corporate governance; diversification, trading and management of risk; pooling and mobilisation of savings; and relaxing the exchange of goods and services. These financial functions are a contributing factor on savings and investment decisions, technological innovations and ultimately are contributing factors for economic growth (Brown, 1994; Misati, 2007).

The existing literature also focuses on the link between remittances and credit markets as substitutes as both credit suppliers and migrants can both play an insurance role and can be considered as substitutes. In this scenario, we would expect the relationship between remittances and credit markets to be negative. Moreover, Fafchamps and Lund (2003) show that gifts and informal loans with similar characteristics to remittances are highly correlated with consumption smoothing but not able to efficiently share risk at the village level. Furthermore, Amuedo-Dorantes and Pozo (2004) emphasise while remittances enhance foreign exchange flows, the exchange rate appreciation may erode international competitiveness for those countries which depend on the tradable sector. At the macroeconomic level, the impact of remittances occurs through the multiplier effect as households engage in the

consumption of goods and services; investment in human capital, which results in an improvement in labour productivity and investment in gross capital formation. Furthermore, the multiplier effect is stimulated by the increase in the amount of financial capital, which can be used by both recipient and non-recipient households. Despite the positive impact of remittances in developing economies, they cannot ensure long term economic growth or solve structural economic problems due to systemic problems including unstable political climates and economic policies, in addition to corruption which is a prominent feature in developing economies (Orozco, 2007). Lundahl (1985) and Kirwan (1986) examine the developmental impact of remittance inflows. Kirwan (1986) use welfare analysis of the effects of emigration on the source country whose output consists of non-traded goods. The study examines the welfare effect of emigration which depends on the magnitude of remittances. They find that remittances merely maintain source-country nominal income at its pre-emigration level.

Some studies have attempted to identify the impact of remittances on economic growth whether they be positive or negative (Lucas and Stark, 1985; Chami et al., 2008; Nyamongo et al., 2012; Zouheir and Sghaier, 2014). Zouheir and Sghaier (2014) show that in the North African region, the two variables are complements with continuing financial deepening strengthening the positive impact of remittances on growth, rather than mitigating it. The model used by Chami et al. (2008) shows that altruistically motivated remittances are there to compensate their recipients in the case of bad economic outcomes, but also create incentives which lead to moral hazard problems. Subsequently, the moral hazard problems created by remittances can be strong enough to negatively affect economic growth. The authors show that remittances differ greatly from private capital flows at least in terms of their motivation and their effects. Therefore, recent findings in the empirical literature show ambiguous results for the relationship between remittances and economic growth. Moreover, the existing literature shows there is no conclusive answer about the impact of remittances on economic growth which could be due to the contrasting findings on

the multiple channels through which remittances can affect economic growth. The impact of remittances on key macroeconomic variables depends on a country's socioeconomic conditions and the channels through which they feed through to the economy. Furthermore, it is important to find out the factors which influence or affect this process so that countries in the developing world are able to fully realise the benefits of these flows. Special attention is given to the financial development of the country which is able to isolate the effects of remittance inflows on economic growth (Giuliano and Ruiz-Arranz, 2009).

4.3 Methodology and Data

There are several challenges in measuring the impact of remittances on financial development. Most importantly, there has been no consensus in the extant literature on an adequate measure of financial development. (Giuliano and Ruiz-Arranz, 2009) use four different measures: loan to GDP ratio, credit to GDP ratio, deposit to GDP ratio, and M2 to GDP ratio to provide a broad variety of measures based on financial sector development. The measures covered here refer only to the size of the financial sector, whereby other studies such as Bettin and Zazzaro (2012) employ a different approach to measure financial development by focusing on bank inefficiency. However, due to data availability, long run trends are difficult to extrapolate from the analysis because the sample is limited from 1991 to 2005. For these reasons, in this study, a financial development index is constructed which is able to capture more features of the financial sector and in the process, provide a clearer analysis of the effects of remittances on economic growth. Moreover, this section outlines the non-linear Difference GMM model (Arellano and Bover, 1995; Blundell and Bond, 1998) along with detailed explanations of the chosen explanatory (including the remittances-finance interaction term) and control variables. The model employed in this chapter aims to assist in explaining the interaction between remittances and a country's economic growth which is currently lacking in the field of remittances, and

to analyse how remittances and the development of the financial system in a country could influence economic growth.

4.3.1 Financial Development Index

This section outlines how the composite measure of financial development is constructed with the use of various variables from several existing measures. With the passage of time, financial sectors have developed and diversified across the globe and these financial systems have become multifaceted. Moreover, the diversity present in financial systems across countries implies that it is important to focus on a measure of financial development which consists of multiple indicators. The extensive empirical work undertaken and recent studies focus on financial depth indicators from a financial development dataset developed by Beck et al. (2000) and the International Financial Statistics of the International Monetary Fund. Sahay et al. (2015) construct a financial development index considers both financial markets and financial institutions. For practical and policy formulation purposes, this chapter supports the view that an index that attempts to incorporate aspects of both financial markets and institutions should be preferred. Therefore, I adapt Sahay et al. (2015) approach by modifying the construction of their financial index by including the size of the financial system, financial institutional efficiency, and financial institutional depth which, arguably, makes it more comprehensive. Furthermore, more recently created financial development indices in the literature include Svirydzenka (2016) who creates an index by using a standard three-step approach found in the literature by reducing multidimensional data into one summary index. Dekle and Pundit (2015) use a similar approach to combine three sub-indices into one index through the process of normalisation. However, Dekle and Pundit (2015) limit their index to 23 Asian economies mainly to compare the South Asian economies to the stronger economies in the eastern region namely, Hong Kong, China, the Republic of Korea, and Singapore.

Before proceeding with the construction of the financial development index it is

important to compare other studies which have constructed different measures of the financial development index. Studies including Menyah et al. (2014) have examined the relationship between financial development and economic growth for 21 African countries. The authors acknowledge that it is difficult to use a single variable to capture the extent of financial development. The multi-dimensional aspect of financial development leads to interrelations between the financial indicators and results in higher correlations between them. They develop a financial development index based on four different financial development indicators: log of M2 to GDP, log of liquid liabilities to GDP, log of total domestic credit to private sector to GDP. Moreover, they note, that within the African region these indicators will accurately capture the developments in the financial sector. Within the same context, Dorucci et al. (2009) construct composite indices to measure domestic financial development in 26 emerging economies, using mature economies as benchmark for comparative analysis. Dorucci et al. (2009) create a domestic financial development index (DFD) based on three main criteria. Namely these include: (1) Institutional dimension, (2) Market dimension (size and access to finance), and (3) Market dimension (performance). The authors note that the variables included in each category are broad in nature, i.e. they capture phenomena that go beyond financial development per se which could be viewed as a drawback for the measure to accurately capture the key characteristics of financial development. The bulk of literature on financial development focuses on variables measuring the size of financial markets, taken as proxies for the overall degree of financial development in the country. Beck et al. (2000) are among the authors who have provided the most notable and important contributions in this field of research. They develop a new database on financial development for a large panel of countries, with a time span going back to 1960. Rajan and Zingales (2003) focus on different influences on financial development by concentrating on the politics of financial development in the twentieth century. While they focus primarily on the influence of interest groups in affecting the progress and speed of financial development, they also employ different measures such as the equity market

capitalisation over GDP, security issues over GDP, and the number of listed companies per million of population.

4.3.2 Construction of the Financial Development Index

The financial development index indicator based on the dynamic single factor model by Stock and Watson (1991) is used as the financial development index variable for the model outlined in Section 4.3.3. Kaufmann et al. (2008) utilise similar methods by estimating various dimensions of governance in 212 countries over the period of 1996-2007. The authors emphasize the importance of the constructed aggregate indicators for cross-country and over time comparisons of governance. In this study, we add to the existing literature by giving an insight to the differences of financial development across countries. The financial development index is computed as follows:

$$fd_{i,t} = \alpha + \beta_1 f_{i,t} + \xi_{i,t} \quad (7)$$

$$f_{i,t} = \lambda f_{i,t-1} + v_{i,t} \quad (8)$$

where $fd_{i,t}$ denotes a $n \times 1$ vector of the index of financial development for country i in period t that is hypothesized to move contemporaneously with overall economic conditions. $f_{i,t}$ is a $n \times k$ vector consisting of measures derived from the financial development category variables ¹⁵ ($k=7$ if all seven measures are available for the country), α is the constant term which models disturbance, $\xi_{i,t}$ is the idiosyncratic error. $fd_{i,t}$ consists of two stochastic components: the common unobserved scalar time series variable, $f_{i,t}$, and an n -dimensional component which represents idiosyncratic movements in the measurement error and the series, $\xi_{i,t}$.

Equation (7) is referred to as the ‘measurement equation’ and Equation (8) is known as the ‘state equation’. In this chapter both equations are jointly estimated by Maximum Likelihood Estimation (MLE) and the Kalman Filter¹⁶. Equation (8) is a specification

¹⁵Financial development variables are obtained from section 4.3.1

¹⁶The Kalman Filter and MLE specifications are described in greater detail in Appendix B

which is based on capturing persistence in the development of the index. Furthermore, the specification of the model accounts for random effects which is embedded in both error terms, $\xi_{i,t}$ and $v_{i,t}$.

The financial development index constructed overcomes the critique raised by Gapen et al. (2009) and Bettin and Zazzaro (2012), who state that most studies only focus on the measures of the size of the economy thereby ignoring its efficiency. Such a measure can combine these aspects of the financial sector. We argue that the proposed financial index is therefore able to provide a better overall representation of the financial sector by being able to include key features such as both size and efficiency.

4.3.3 Empirical Methodology and Data

This section focuses on the effects of remittances on financial sector development and economic growth in the recipient countries with the use of a fixed effects (FE) or random effects (RE) model, and a non-linear Difference GMM model (Arellano and Bover, 1995; Blundell and Bond, 1998). The advantage of this approach is that the econometric specification can include endogenous variables by controlling the endogeneity of the lagged dependent variable of real GDP per capita. Country fixed effects or random effects are included, so that the regression estimates also reflect within-country variation.¹⁷ This chapter will focus on cross regional analysis which splits the countries up into five regions: Africa, MENA, Asia, Latin America, and Europe so that further analysis can be provided with consistency in relation to the previous chapter. The proposed model is presented in equations (9) and (10):

$$y_{i,t} = \alpha + \varphi y_{i,t-1} + \beta_1 r_{i,t} + \beta_2 f d_{i,t} + \beta_3 r_{i,t} f d_{i,t} + \beta z'_{i,t} + \varepsilon_{i,t} \quad (9)$$

$$\varepsilon_{i,t} = \mu_i + v_{i,t} \quad (10)$$

¹⁷The use of the fixed effects or random effects model are determined according to the Hausman test.

where i denotes the country and t a generic year, $y_{i,t}$ is the growth rate of real GDP per capita, $r_{i,t}$ denotes the share of remittance inflows in GDP for the receiving country, $fd_{i,t}$ is the financial development index variable (from Section 3.2), $z'_{i,t}$ is a transpose vector of basic control variables which could have an impact on the average real GDP per capita, and $\varepsilon_{i,t}$ is a disturbance term which comprises of two orthogonal components: μ_i is a country specific effect, and $v_{i,t}$ is an idiosyncratic shock. The coefficient β_3 represents the coefficient of the interaction term (between financial development and remittances), which allows for a non-linear impact of remittances on economic growth, depending on the level of financial development in the recipient country. This is particularly important because the consideration of the interaction can potentially distinguish how remittances can affect economic growth according to the analysis of the subgroup countries.

The inclusion of the interaction term in equation (9) between remittances and financial development is used to overcome issues regarding endogeneity. Theoretically, it is possible for the efficiency of financial markets and the magnitude of remittances to increase with higher growth rates. However, an overstatement of the effects of these two variables is likely with respect to their interaction on growth. The interaction term ($r_{i,t}fd_{i,t}$) is incorporated to represent the role of remittances on economic growth whilst including the financial transmission mechanism. The inclusion is motivated by the fact that the extant literature is unclear on whether these two variables are complements (complementarity hypothesis) or substitutes (substitutability hypothesis). Proponents of the former (the complementarity hypothesis) base their argument on how remittances and financial development support one another (Aggarwal et al., 2011). On the one hand, the complementarity hypothesis stipulates that a higher degree of financial development enables migrants to send money home faster, cheaper and with more ease and safety. Henceforth the interests of financial institutions in remittance receiving countries is engaged with greater competition than before, along with institutional reforms with a view towards channelling remittances towards productive investment projects. On the other hand, the substitutability hypothesis is based on the condition that remittances inhibit the progress of financial

development in emigration countries, by allowing people to invest in high return projects despite credit difficulties (Giuliano and Ruiz-Arranz, 2009).

Before proceeding with the empirical analysis, it is important to note that the difference GMM system is used to allow for endogenous regressors whilst correcting for the endogeneity of the lagged dependent variable. The variables of most interest in the model are the financial development measure and the remittances-finance interaction term. The estimation methods follow the same format employed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The Generalised Method of Moments (GMM) is the estimation method used in this study because it can control for the unobserved country-specific effects as well as the bias caused by the lagged dependent variables. More specifically, this chapter uses estimations done using five variations of the model: The first uses the financial development index variable for the FE or RE estimations. The second and third variations use the S-GMM and D-GMM methods and the financial development index variable. This is followed by the other two variations which include the bank deposits to GDP ratio and the interest rate spread estimated by D-GMM. The bank deposits to GDP ratio is used as it is the broadest measure of the financial sector, excluding the M3 to GDP ratio. The interest rate spread is included as a measure to cover the cost efficiency component of financial development.

The D-GMM estimator uses a technique known as first differencing to eliminate the problem of endogeneity. In addition to eliminating the time invariant country fixed effects, first differencing also constructs instruments for the endogenous regressors, i.e. the lagged dependent variable $y_{i,t-1}$ in equation (3). Furthermore, these instruments are used to estimate α . The transformation commonly used for the D-GMM is the first difference transformation. Equation (5) shows the basic representation of a D-GMM regression. Applying the relevant transform to equations (9) and (10) gives equation (11):

$$\Delta y_{i,t} = \alpha \Delta y_{i,t-1} + \Delta x'_{i,t} + \Delta \varepsilon_{i,t} \quad (11)$$

where $\Delta y_{i,t-1}$ denotes the lagged dependent variable, and $\Delta x'_{i,t}$ represents the explanatory variables listed in equation (9).

The dataset includes fifty-one developing countries chosen according to the previous chapter and is selected according to data availability and regional representation. The data sources on the creation of this index are primarily derived from the World Bank's World Development Indicators (WDI) database and the International Monetary Fund's International Financial Statistics database (IMF IFS) to form the financial indicator (Cihak et al., 2012):

1. The size of the financial system- the size of the financial system is often referred to as the financial sector when it is relative to the size of financial markets
 - (a) Liquid liabilities to GDP ratio (%) - defined as M3 to GDP ratio, and is predominantly used when the deposits to GDP ratio data is unavailable. The advantage of this measure is that the data is readily available but is subject to inaccuracy because the measure includes M2 which could result in the variable measuring the ability to provide transaction services rather than offering an insight into the level of financial depth Khan and Senhadji (2000)
 - (b) Bank deposits to GDP ratio (%) - deposits in banks and other financial institutions as a share of GDP
2. Financial institutional efficiency- the ability of the financial sector to provide high quality products and services at the lowest possible cost

- (a) Deposit interest rate (%) - refers to the rate paid by commercial (or similar) banks for time, demand, or saving deposits
 - (b) Bank capital to total assets ratio (%) - is the ratio of bank capital and reserves to total assets
 - (c) Interest rate spread (%) - the difference between the lending and deposit interest rate
3. Financial institutional depth- a more comprehensive measure compared to 1. This measure shows the size of the financial sector relative to the economy. Furthermore, it is the size of banks, financial institutions, financial markets in a country, collated together and compared to a measure of economic output.
- (a) Domestic credit to private sector to GDP ratio (%) - domestic loans to the private sector. By definition this indicator is the least exhaustive and more of a limited proxy of financial depth but is widely available for developing countries.
 - (b) Private credit by deposit money banks and other financial institutions to GDP ratio (%) - private credit by deposit money banks and other financial institutions to GDP

The control variables employed in this chapter are included to reflect the different levels of real GDP.

- **Net official development assistance and official aid received (current US\$) - (NODA)**

Net official development assistance consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies. It

also includes loans which have a grant element of at least 25 percent. Net official aid refers to aid flows from donor countries to recipient countries. Official aid received into developing economies has seen a general consensus on its positive effects on economic growth. A vast majority of these studies find positive effects on economic growth in the short and long run. In the context of recent literature, it is found that the estimated effect of aid on economic growth can be explained by the increase in consumer demand, explained by the increase in the value added in services (Magesan, 2015). Therefore, to account for the potential differences in aid for each country this study includes the NODA as a control variable.

- **Net barter terms of trade index (2000 = 100) - (NBTT)**

Calculated as the percentage ratio of export value indexes to import value indexes, measured relative to the base year 2000. It can be also interpreted as the amount of import goods that can be purchased per unit of export goods. The measure reflects the competitive strength and position of a country or a specific industry in the international market. Furthermore, it measures the relationship between prices a country receives for its exports and the prices it pays for its imports. The measure is included in the specification because it enables this study to account for a potential improvement in the terms of trade which leads to an increase in export revenue and therefore a rise in a country's real GDP. A deterioration in the the terms of trade likewise induces a contraction in real GDP.

- **Inflation, GDP deflator (annual %)**

Measured by the annual growth rate of the GDP implicit deflator which shows the rate of change in the general price level in the economy as a whole. Given that inflation measures the degree of uncertainty about the future market environment, it

is expected to have a negative relationship with economic growth. Moreover, firms within an uncertain environment are less likely to make long term commitments in the presence of high price variability (Caporale et al., 2009). Within a panel data framework, it is important to account for the variability in inflation across the dataset and within the regions. Inflation has been shown to reduce economic activity in many countries by the process of creating inefficiencies that lead to the misallocation of resources and a general decline in macroeconomic performance. The long-run relationship between economic growth and inflation does not imply causality. This is based on the theory that sustained growth caused by rising aggregate demand can lead to acceleration in inflation as the economy utilises the scarce resources. Furthermore, Giuliano and Ruiz-Arranz (2009) use inflation within their model specification to control for Real GDP growth.

- **Real effective exchange rate (2010=100)**

Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. In a market-based economy, household, producer, and government choices about resource allocation are influenced by relative prices, including the real exchange rate, real wages, real interest rates, and other prices in the economy. Relative prices also largely reflect these agents' choices. Thus, relative prices convey vital information about the interaction of economic agents in an economy and with the rest of the world. An increase in the real exchange rate is associated with exports becoming more expensive whilst imports become cheaper; therefore, an increase will result in a loss in trade competitiveness. There is a relatively large body of literature which suggests there is a correlation between real GDP growth and the real exchange rate. On the assumption that countries will have higher productivity levels in the traded goods sector, there is an incentive to maintain the relative price of the traded goods high enough to make it possible for the shift of resources in to the sector for production.

This is common with the literature on developing economies as Rodrik (2008) finds that growth acceleration occurs, on average, after ten years of a steady increase in the undervaluation of the currency.

- **Population, ages 15-64 (% of total)**

Based on the *de facto* definition of population and is defined of the percentage of the total population that is in the age group of 15-64. This variable provides the model with true validity regarding countries that have greater populations compared to other developing countries and are more likely to have higher levels of real GDP. Within growth models it is important for economists to take into consideration the impact of fundamental demographic processes on economic growth. Dyson (2010) claims that mortality decline aids economic growth which therefore leads to an increase in the standards of living. In addition to mortality decline, Dyson (2010) has identified fertility, population growth, age-structural change, and urbanisation as demographic factors which could affect economic growth.

4.4 Empirical Analysis

4.4.1 Financial Development Index Results

The index of financial development is estimated for the 51-country sample on an annual basis over the time period 1990 to 2015.

Table C.1 in Appendix C provides a ranking of financial development, based on the mean of the index for each country. The results show the financial development index as the primary index of the study with various results across all countries in the dataset. The rank measures listed in Table C.1 are organised as follows: Rank 1 refers to the rankings of the financial development index, Fin. dev. is the value of the financial development

index, Rank 2 refers to rankings based on the Bank deposits to GDP ratio variable, and Rank 3 is the rankings based on the interest rate spread variable. Additionally, Figures D.1 to D.5 in Appendix D illustrate the variable results among the regional datasets. The best performing region in the dataset as measured by the financial development index ranking (Rank 1) is the MENA region. Countries including Lebanon (1), Jordan (4), Kuwait (6), Egypt (7), and Algeria (8) feature in the top 10.¹⁸ Within the MENA region, countries like Lebanon and Kuwait have benefited from significant capital inflows from the gulf region because of the high oil prices in the region. Furthermore, Lebanon's economy is service-oriented with the focus mostly on the financial services, trade and tourism sectors. Figures C.1 to C.5 provide an overview of the results in terms of the regional datasets. Moreover, the graphs illustrate the potential differences among each of the three indicators. Among the European countries: Malta (2), Slovakia (10), Slovenia (11) and Hungary (15) feature among the top 20, while the leaders in Asia are Thailand (3), India (19) and Indonesia (22). The leaders in Latin American sample consist of Panama (5), Chile (12), Brazil (14), and Honduras (16). The MENA region consists of countries which dominate the top 20 in the index consisting of Lebanon (1), Jordan (4), Kuwait (6), Egypt (7), and Algeria (8). As for the African countries, South Africa (9) features high up the index but the majority of the African countries are lower down the rankings including Kenya (25), Cameroon (29), Cote d'Ivoire (41), Nigeria (44), Senegal (46), Uganda (47), and Ghana (48). The results from the three rankings indicate that the financial development index and the Bank deposits to GDP ratio index measure provides similar results compared to the interest rate spread index.

¹⁸The discussion here reports the result based on the financial development index estimated and the ranking of the financial development index (Rank 1).

4.4.2 Descriptive Statistics

Table 4.1: Descriptive Statistics: Full Sample

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
Log of real GDP per capita	1236	0.0004	0.02	-0.12	1319
Remittances inflows to GDP ratio	1099	4.16	6.61	0.00013	49.59
Population ages 15-64 (% of total population)	1321	61.71	6.55	45.71	76.90
Real effective exchange rate (2010=100)	557	95.52	26.53	34.53	319.76
Net official development assistance and official aid received (NODA) (% of GNI)	1265	3.12	4.24	-0.68	30.22
Inflation, GDP deflator (annual %)	1319	35.36	236.67	-26.81	6261.24
Net Barter terms of trade index	1218	111.07	34.11	43.88	290.90
Private credit by deposit money banks to GDP (%)	1078	31.56	25.36	1.08	165.86
Financial development index	842	1.60	1.18	0.19	8.59
Liquid liabilities to GDP (%)	1194	45.33	34.83	6.06	252.72
Bank deposits to GDP (%)	1217	37.67	31.98	1.84	245.43
Deposit interest rate (%)	1127	33.40	348.77	0.13	9394.29
Bank capital to assets ratio (%)	594	10.45	4.37	1.49	73.95
Interest rate spread (%)	979	11.85	79.52	-72.40	2334.96
Domestic credit to private sector (% of GDP)	1250	36.85	30.43	0.19	166.50

Table 4.1 provides the summary statistics of the variables of interest for the 51 countries which includes 1326 observations. The mean value of remittance inflows to GDP ratio through the sample of the study (from 1990-2015) is 4.16% of GDP; whilst there is considerable variation in the ratio of remittances to GDP across countries, ranging from less than 1% of GDP (Chile) to 50% for Tajikistan in 2013. The financial development proxies also vary considerably: Bank deposits to GDP ratio is, on average, 38% of GDP but with great variation across countries and time periods. From a low of 2% (Tajikistan) to a high of 245% (Lebanon). Liquidity is, on average, 45% of GDP in the sample, with a low of 6% (Tajikistan) and a high of 253% (Lebanon). Finally, the

financial development index ranges from 1.18 (Turkey) to 8.59 (Lebanon). Through the examination of the descriptive statistics it is evident to see Lebanon performs very well with the variables discussed which sees the country ranked first on the constructed financial development index. However, we should be careful of interpreting the Lebanon results because data availability for the early portion of the dataset is limited. Figures D.6 to D.12 in Appendix D illustrate the normal distribution (Kernel density function fitted) of the financial development index. The MENA and the European sample show that there are some countries with higher financial development in contrast with the other samples. The full, Asia, Latin America and African samples consist of countries with lower financial development and the subsequent results will be more significant to countries with lower levels of financial development. Figure D.12 shows a different perspective to analyse the investment potential of remittance inflows by focusing on the cyclicity of these flows in relation to real GDP. If these flows are profit driven they should be positively related with real GDP, or procyclical. If they are compensatory in nature (i.e. remittances are sent home for altruistic reasons) they should be related negatively related with the recipient country GDP or countercyclical. Figure D.12 shows the correlations of the cyclical components of real GDP and remittance inflows for fifty-one developing countries. It is clear from the figure that remittances are procyclical for the majority of countries in the dataset to differing degrees. Consequently, this could in turn suggest the positive relationship between remittances and economic growth is influenced by migrants who generally send more money home when there are greater investment opportunities.

4.4.3 Full Sample

Table 4.2: Baseline estimates of the Difference GMM regressions (Full sample)

Model	FE	S-GMM	D-GMM		
DV (growth of Real GDP per capita)	(1)	(2)	(3)	(4)	(5)
Growth of real GDP per capita (-1)	0.931*** (0.000)	0.896*** (0.000)	0.859*** (0.000)	0.124*** (0.000)	0.877*** (0.000)
Log of remittances inflows (% of GDP)	0.0009 (0.572)	-0.019 (0.223)	0.018*** (0.000)	0.027** (0.029)	0.021* (0.068)
Financial development index	-0.010 (0.333)	-0.120* (0.074)	-0.149* (0.079)	- -	- -
Bank deposits to GDP ratio	- -	- -	- -	-0.330*** (0.001)	- -
Interest rate spread	- -	- -	- -	- -	-0.071** (0.048)
Remittances-finance interaction term	0.0008 (0.401)	0.011 (0.223)	0.012*** (0.001)	0.015** (0.036)	-0.0006* (0.086)
Foreign Direct Investment	0.00004 (0.443)	0.0008* (0.057)	0.0002*** (0.000)	0.009*** (0.000)	0.00003 (0.343)
Inflation	0.000001 (0.913)	-0.0000003 (0.879)	-0.00003*** (0.003)	-0.001** (0.011)	0.0006** (0.015)
Real exchange rate	-0.0002 (0.146)	-0.00003 (0.953)	-0.0003* (0.065)	-0.0006** (0.046)	-0.0002*** (0.006)
Population	0.003* (0.067)	0.018* (0.059)	-0.003 (0.175)	-0.004 (0.192)	-0.007** (0.011)
Net barter terms of trade index	0.0002*** (0.001)	0.0002 (0.306)	0.0006*** (0.000)	0.0007*** (0.001)	0.0006*** (0.000)
NODA	-0.001 (0.512)	-0.007 (0.557)	-0.003* (0.083)	0.005 (0.805)	0.002 (0.555)
Observations	311	311	613	950	720
Countries	51	51	51	51	51
Hausman test statistic: p-value	0.030				
Hansen's overidentification test: p-value		0.739	0.142	0.073	0.057
Number of instruments		99	28	27	27

Notes: All equations are estimated with the use of panel data estimators. Column 1 represents the fixed effects model as determined by the Hausman test. The S-GMM and D-GMM regressions includes the Net official development assistance and official aid received (NODA), Net barter terms of trade index, population, real exchange rate, inflation and foreign direct investment variables as the exogenous instrumental variables. The endogenous GMM instrument includes the lagged value of Real GDP per capita (Ln). Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

Tables 4.2 to 4.7 consist of the GMM regressions for the full dataset and the regional datasets which include three different proxies of financial development. Column (1) represents the financial development index measure which is either estimated using the fixed effects or random effects model. Column (2) represents the S-GMM regression and uses the financial development index as a measure of financial development. Similarly, the financial development index is used as a variable for Column (3) for the D-GMM regression.¹⁹ Models (2) and (3) in Tables 4.2 to 4.7 refer to the financial development index, constructed in the way described in Section 4.3.2, while models (4) and (5) use bank deposits to GDP ratio and the interest rate spread (%).

The S-GMM model (Model (2)) provides similar results to the D-GMM model, however the remittances-finance interaction term is statistically insignificant. It is evident to see that impact of remittance inflows on economic growth is practically nil when the variable is added as an explanatory variable for all four measures. Table 4.2 displays the full estimation results²⁰ and we can see the change between the financial development measure in column (3) and the remittances finance interaction term will go to a positive value from -0.149 to 0.012 (remittances finance interaction term). Columns (4) and (5) reinforce the result with a coefficient values of 0.015 and -0.0006 retrospectively. This result suggests that there is a positive impact of remittance inflows on economic growth for those countries in the developing world which are less financially developed. In countries with limited capabilities along with certain market imperfections, remittances are not used for financial investment and are more likely to be spent on non-growth activities such as consumption by households.

¹⁹The D-GMM estimator is preferred to the S-GMM estimator in Chapters 4 and 5 due to weak instrument problem of the S-GMM estimator in dynamic panel data models as explained by Bun and Windmeijer (2010).

²⁰This section will focus on analysing the results of the constructed financial development index measure.

4.4.4 Regional Results

4.4.4 (a) Europe

Table 4.3: Baseline estimates of the Difference GMM regressions (Europe)

Model	FE	S-GMM	D-GMM		
DV (growth of Real GDP per capita)	(1)	(2)	(3)	(4)	(5)
Growth of real GDP per capita (-1)	0.905*** (0.000)	0.873*** (0.000)	0.963*** (0.000)	0.899*** (0.000)	0.962*** (0.000)
Log of remittances inflows (% of GDP)	0.020*** (0.002)	-0.162 (0.341)	-0.015 (0.207)	-0.003 (0.997)	-0.002 (0.965)
Financial development index	0.004 (0.761)	0.0003 (0.812)	-0.003 (0.976)	- -	- -
Bank deposits to GDP ratio	- -	- -	- -	-0.006 (0.992)	- -
Interest rate spread	- -	- -	- -	- -	-0.010 (0.823)
Remittances-finance interaction term	0.0002 (0.829)	0.104 (0.102)	0.012 (0.886)	0.0003 (0.999)	0.001 (0.966)
Foreign Direct Investment	0.00006 (0.273)	0.009*** (0.000)	0.0001 (0.899)	-0.0001 (0.958)	-0.0002 (0.870)
Inflation	0.0009 (0.275)	-0.011*** (0.002)	0.0004* (0.052)	-0.0008 (0.962)	-0.001 (0.595)
Real exchange rate	-0.002** (0.016)	-0.013 (0.296)	-0.0002 (0.976)	-0.001 (0.474)	-0.002 (0.271)
Population	0.016*** (0.002)	0.098** (0.045)	-0.002 (0.998)	0.005 (0.630)	0.009** (0.047)
Net barter terms of trade index	0.0002 (0.696)	0.037*** (0.000)	0.003 (0.943)	-0.0004 (0.983)	-0.0001 (0.961)
NODA	0.003 (0.449)	-0.055** (0.039)	-0.024 (0.865)	0.001 (0.969)	0.004 (0.333)
Observations	111	111	107	126	108
Countries	13	13	13	13	13
Hausman test statistic: p-value	0.000				
Hansen's overidentification test: p-value		1.000	0.811	0.801	0.983
Number of instruments		38	27	27	27

Notes: All equations are estimated with the use of panel data estimators. Column 1 represents the fixed effects model as determined by the Hausman test. The S-GMM and D-GMM regressions includes the Net official development assistance and official aid received (NODA), Net barter terms of trade index, population, real exchange rate, inflation and foreign direct investment variables as the exogenous instrumental variables. The endogenous GMM instrument includes the lagged value of Real GDP per capita (Ln). Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

The methodology chosen for the simulations for the remaining regional results has been corrected for instrumental biasedness. Roodman (2009) `xtabond2` command version of the D-GMM is only valid for the full sample estimation and therefore it is not correct to use this method for the remaining regional simulations. This is due to the number of groups (number of countries) in the panel data regression being relatively small to the number of instruments within the specification of the model. The Stata routine, `xtbcfe`, is used to overcome this problem. The routine performs an iterative bootstrap-based bias correction for the fixed effects (FE) estimator and the D-GMM estimator in dynamic panels as proposed by De Vos et al. (2015).

Within the European sample it is evident to see from Table 4.3, remittances have a positive but an insignificant impact on economic growth. This is confirmed as the remittances finance interaction term is a positive value (0.012) as opposed to the financial development index measure which is a negative value (-0.003). Specifications (4) and (5) provide similar results and show that there is no significant effect of remittances on economic growth within this region. The positive impact of remittances on economic growth for the countries in the European sample could entirely be due to a statistical outcome but this is not true. The methodology chosen includes an interaction term within the dynamic panel linear regression model which is able to impose a monotonic linear structure of dependence between remittance inflows and real GDP per capita levels. Moreover, the positive effects of remittances for economic growth are diminishing with increasing levels of financial development with the use of this methodology. As this study is aimed at finding policy implications for countries with lower rather than higher values of financial development it will enable a fairer comparison of the results between each region.

4.4.4 (b) Asia

Table 4.4: Baseline estimates of the Difference GMM regressions (Asia)

Model	FE	S-GMM	D-GMM		
DV (growth of Real GDP per capita)	(1)	(2)	(3)	(4)	(5)
Growth of real GDP per capita (-1)	0.453** (0.040)	0.320* (0.089)	0.407** (0.045)	0.495 (0.177)	0.719* (0.078)
Log of remittances inflows (% of GDP)	0.158** (0.030)	0.0003 (0.181)	0.014* (0.068)	-0.050 (0.234)	0.156** (0.019)
Financial development index	0.873** (0.032)	0.0007 (0.340)	0.144* (0.097)	- -	- -
Bank deposits to GDP ratio	- -	- -	- -	-0.747* (0.065)	- -
Interest rate spread	- -	- -	- -	- -	-0.302* (0.078)
Remittances-finance interaction term	-0.088** (0.029)	0.101* (0.078)	0.011 (0.888)	0.017 (0.290)	-0.032* (0.091)
Foreign Direct Investment	-0.022** (0.037)	0.0001 (0.205)	0.006 (0.183)	0.002** (0.044)	-0.040 (0.054)
Inflation	-0.007* (0.058)	0.0005* (0.067)	-0.003 (0.477)	-0.0009 (0.185)	0.001 (0.755)
Real exchange rate	0.004** (0.031)	0.008 (0.458)	0.0001 (0.532)	0.0002 (0.429)	0.0001 (0.727)
Population	0.009 (0.103)	0.0003** (0.040)	0.023 (0.504)	0.065 (0.137)	-0.008 (0.876)
Net barter terms of trade index	-0.004** (0.032)	-0.0003 (0.102)	0.003 (0.697)	0.002 (0.394)	0.002 (0.358)
NODA	0.109** (0.037)	0.208** (0.039)	0.008 (0.961)	-0.092 (0.117)	-0.034 (0.343)
Observations	85	106	106	195	132
Countries	10	10	10	10	10
Hausman test statistic: p-value	0.003				
Hansen's overidentification test: p-value		1.000	0.891	0.912	0.915
Number of instruments		38	28	27	27

Notes: All equations are estimated with the use of panel data estimators. Column 1 represents the fixed effects model as determined by the Hausman test. The S-GMM and D-GMM regressions includes the Net official development assistance and official aid received (NODA), Net barter terms of trade index, population, real exchange rate, inflation and foreign direct investment variables as the exogenous instrumental variables. The endogenous GMM instrument includes the lagged value of Real GDP per capita (Ln). Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

The Asian sample shown in Table 4.4 shows results which shows a weak relationship between remittance inflows, financial development, and real GDP per capita. It is evident to see there is only a small positive impact on economic growth as the remittances finance interaction term is a small positive and insignificant value (0.011) as opposed to the financial development index measure which is also a positive and significant value (0.144). These results could suggest that remittances have a negligible effect on economic growth within Asian countries. Furthermore, it is important to focus on the control variables which have a greater impact on economic growth. The five control variables (inflation, population, NODA, FDI, Real exchange rate, Net barter terms of trade index) have no effect on economic growth whereas for specification (4) it is evident to conclude that FDI has a small positive impact on economic growth. The results suggest that within the Asian sample, the negligible effects of remittances on real GDP per capita could be as a consequence of the monies received in these countries not being reinvested into the financial market by the sender but the funds are sent to their family, who utilise these funds in different ways. Furthermore, this could suggest that these remittances are not being fully used in the most productive way to contribute to economic prosperity.

4.4.4 (c) Latin America

Table 4.5: Baseline estimates of the Difference GMM regressions (Latin America)

Model	RE	S-GMM	D-GMM		
DV (growth of Real GDP per capita)	(1)	(2)	(3)	(4)	(5)
Growth of real GDP per capita (-1)	0.947*** (0.000)	0.713* (0.067)	0.999*** (0.000)	0.996*** (0.000)	0.902*** (0.000)
Log of remittances inflows (% of GDP)	0.001 (0.926)	0.0002 (0.813)	0.009* (0.085)	0.066** (0.046)	-0.030 (0.876)
Financial development index	0.003 (0.715)	-0.421* (0.093)	0.007** (0.049)	- (0.011)	- (0.011)
Bank deposits to GDP ratio	- (0.011)	- (0.011)	- (0.011)	0.018** (0.011)	- (0.011)
Interest rate spread	- (0.387)	- (0.387)	- (0.387)	- (0.387)	-0.015 (0.387)
Remittances-finance interaction term	-0.008 (0.640)	-0.003 (0.172)	0.011* (0.091)	0.025* (0.063)	0.007 (0.890)
Foreign Direct Investment	0.003 (0.122)	0.045** (0.011)	0.003 (0.510)	0.004* (0.071)	0.007* (0.071)
Inflation	0.000004 (0.674)	0.0002*** (0.000)	-0.000006 (0.999)	0.00001 (0.974)	-0.0003 (0.618)
Real exchange rate	-0.0002 (0.351)	-0.004*** (0.000)	-0.00005 (0.966)	-0.0002 (0.871)	-0.0006 (0.386)
Population	0.0002 (0.892)	0.153* (0.091)	-0.001 (0.194)	0.003 (0.989)	-0.004 (0.916)
Net barter terms of trade index	0.0003*** (0.001)	-0.0008* (0.093)	0.0001 (0.833)	0.0002** (0.017)	0.00001 (0.959)
NODA	-0.032*** (0.007)	0.00003 (0.781)	-0.043 (0.380)	-0.056 (0.725)	-0.020 (0.440)
Observations	129	129	126	143	128
Countries	10	10	10	10	10
Hausman test statistic: p-value	0.450				
Hansen's overidentification test: p-value		0.913	0.628	0.901	0.871
Number of instruments		38	27	27	27

Notes: All equations are estimated with the use of panel data estimators. Column 1 represents the random effects model as determined by the Hausman test. The S-GMM and D-GMM regressions includes the Net official development assistance and official aid received (NODA), Net barter terms of trade index, population, real exchange rate, inflation and foreign direct investment variables as the exogenous instrumental variables. The endogenous GMM instrument includes the lagged value of Real GDP per capita (Ln). Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

The Latin American results represented in Table 4.5 show that remittances complement the financial system within the Latin American countries and have a positive impact on economic output. It is important to note that the coefficients of interest on the random effects estimator are insignificant so regressions (3) and (4) provide the most significant and reliable results. The Latin American and the Caribbean region consists of countries which are characterised by many challenges such as low bank credit to private sector and domestic equity market liquidity which is underdeveloped by international standards. Moreover, issues such as the expansion of bank credit has been biased in favour of consumption rather than production and the provision of long term finance, whether it be to firms, infrastructure, or households. These issues still remain problematic over several decades within the region. The result in columns in (4) further reinforce the results explained in column (3).

4.4.4 (d) MENA

Table 4.6: Baseline estimates of the Difference GMM regressions (MENA)

Model	FE	S-GMM	D-GMM		
DV (growth of Real GDP per capita)	(1)	(2)	(3)	(4)	(5)
Growth of real GDP per capita (-1)	0.725*** (0.000)	0.650* (0.058)	0.519** (0.018)	0.942* (0.073)	0.121 (0.142)
Log of remittances inflows (% of GDP)	-0.001 (0.990)	-0.00001 (0.911)	0.318* (0.082)	0.282 (0.238)	0.095 (0.440)
Financial development index	-0.018 (0.604)	0.00002 (0.102)	-0.190* (0.098)	- -	- -
Bank deposits to GDP ratio	- -	- -	- -	0.362 (0.326)	- -
Interest rate spread	- -	- -	- -	- -	0.502 (0.178)
Remittances-finance interaction term	0.004 (0.931)	0.002* (0.053)	0.034* (0.091)	-0.016 (0.322)	-0.052 (0.182)
Foreign Direct Investment	-0.006 (0.531)	-0.0002 (0.181)	0.011* (0.098)	-0.042 (0.274)	-0.010 (0.708)
Inflation	0.00002 (0.954)	0.0001 (0.104)	0.003 (0.861)	0.008 (0.238)	0.004 (0.112)
Real exchange rate	-0.0005 (0.640)	-0.0006 (0.102)	0.049** (0.040)	0.070 (0.810)	0.128 (0.109)
Population	0.009* (0.098)	0.0001** (0.045)	0.031 (0.738)	0.0002 (0.993)	0.091 (0.135)
Net barter terms of trade index	0.0001 (0.447)	0.0002 (0.232)	-0.003 (0.750)	-0.007* (0.070)	-0.006 (0.153)
NODA	0.043 (0.179)	0.003 (0.238)	0.061 (0.773)	-0.001 (0.461)	-0.022 (0.746)
Observations	178	105	105	150	124
Countries	9	9	9	9	9
Hausman test statistic: p-value	0.009				
Hansen's overidentification test: p-value		0.489	0.532	0.193	0.721
Number of instruments		38	27	28	27

Notes: All equations are estimated with the use of panel data estimators. Column 1 represents the fixed effects model as determined by the Hausman test. The S-GMM and D-GMM regressions includes the Net official development assistance and official aid received (NODA), Net barter terms of trade index, population, real exchange rate, inflation and foreign direct investment variables as the exogenous instrumental variables. The endogenous GMM instrument includes the lagged value of Real GDP per capita (Ln). Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

The MENA regional results follow a similar format to the Latin American region for the financial development index variable as remittances have a positive and significant impact on economic growth (0.034) which indicates these inflows could further enhance the development of the financial sector within the region. Columns (4) and (5) provide opposing and insignificant results whilst some key control variables including FDI and the Real exchange rate are also positive and significant. The financial development channel can provide an important role in the region for the foreseeable future among some uncertainty within the region. Remittances in this region are found to play a crucial role through their interaction with credit as it promotes growth by substituting credit, thus improving the allocation of capital and therefore accelerating economic growth.

4.4.4 (e) Africa

Table 4.7: Baseline estimates of the Difference GMM regressions (Africa)

Model	RE	S-GMM	D-GMM		
DV (growth of Real GDP per capita)	(1)	(2)	(3)	(4)	(5)
Growth of real GDP per capita (-1)	0.879*** (0.000)	0.671* (0.078)	0.619*** (0.000)	0.962*** (0.000)	0.473* (0.066)
Log of remittances inflows (% of GDP)	0.004 (0.838)	0.005 (0.109)	0.008* (0.098)	-0.008 (0.701)	-0.011 (0.475)
Financial development index	0.104 (0.241)	0.003 (0.601)	0.0001* (0.063)	- -	- -
Bank deposits to GDP ratio	- -	- -	- -	-0.038 (0.760)	- -
Interest rate spread	- -	- -	- -	- -	-0.063 (0.371)
Remittances-finance interaction term	-0.007 (0.315)	0.002 (0.201)	0.020*** (0.008)	0.0006 (0.316)	0.005* (0.078)
Foreign Direct Investment	-0.00001 (0.998)	-0.00004** (0.034)	0.005** (0.045)	-0.0008 (0.193)	0.010 (0.328)
Inflation	-0.0003 (0.304)	0.00001 (0.811)	0.00001 (0.981)	0.0007 (0.328)	0.00005 (0.105)
Real exchange rate	-0.0001 (0.474)	0.027*** (0.000)	0.003* (0.064)	-0.0008*** (0.008)	0.00004 (0.180)
Population	0.032* (0.080)	0.047* (0.081)	-0.002 (0.954)	-0.032 (0.382)	-0.083* (0.093)
Net barter terms of trade index	0.0005 (0.243)	0.028*** (0.000)	0.001 (0.748)	-0.002 (0.294)	0.0004* (0.078)
NODA	0.003 (0.451)	0.0001 (0.391)	-0.009** (0.025)	-0.017 (0.227)	-0.007 (0.872)
Observations	123	58	89	188	158
Countries	9	9	9	9	9
Hausman test statistic: p-value	1.000				
Hansen's overidentification test: p-value		1.000	0.788	0.835	0.078
Number of instruments		41	27	28	27

Notes: All equations are estimated with the use of panel data estimators. Column 1 represents the random effects model as determined by the Hausman test. The S-GMM and D-GMM regressions includes the Net official development assistance and official aid received (NODA), Net barter terms of trade index, population, real exchange rate, inflation and foreign direct investment variables as the exogenous instrumental variables. The endogenous GMM instrument includes the lagged value of Real GDP per capita (Ln). Robust standard errors are used which are based on Windmeijer's finite-sample correction for a two-step covariance matrix. P values are reported in parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

The African region provides similar results (in Table 4.7) to the Latin American and MENA regions. Furthermore, the impact of remittances on economic growth is positive but it is not significant for specifications (4) and (5). The results for the African region show the robustness of the results with respect to significance of the financial development index variable. The construction of the index provides different aspects of the financial sector to be captured in Africa. The influx of remittance inflows into the region has benefited the region as the region has led the world in innovative financial services based on mobile telephony, especially in East Africa. The fast spread of systems such as M-Pesa, M-Shwari, and M-Kopa in Kenya has helped in reducing transaction costs whilst personal transactions have become more efficient even in the absence of traditional financial infrastructure.

4.4.5 Remittances, Financial Development and Economic Growth

This section aims to shed further light on the relationship between remittances, financial development and economic growth. Furthermore, by focusing on the long-term effects of remittances on economic growth this study can provide analysis on the monotonic linear structure of dependence of the impact of remittance inflows on GDP per capita levels. The coefficient on remittance inflows (β_1) in equation (9) refers to its influence on GDP per capita for countries with financial development equivalent to 0. However, this value fails to include information about the relationship between remittances, finance and output. To fully infer the effects of this relationship, β_3 , the coefficient on the interaction term between the measures of financial development and remittances needs to be considered, since:

$$\frac{\partial y_{i,t}}{\partial r_{i,t}} = \beta_1 + \beta_3 f d_{i,t} = \beta_{i,t} \quad (12)$$

Equation (12) represents the relationship between remittances and the growth rate of real GDP per capita for the varying levels of financial development. $\beta_{i,t}$ can be

interpreted as follows: given the level of financial development in the country, if remittance inflows increase in country i at time t increase by a factor of 1%; the growth rate of real GDP per capita will change by a factor of $\beta_{i,t}\%$. Table 4.8 displays the results for $\beta_{i,t}$ for all regions which consist of three different measures: financial development index (1), bank deposits to GDP (2) and the interest rate spread (3). The results show that for the full sample, given a 10% increase in remittance inflows for a country with average financial development (for each measure used) would lead to an increase in real GDP per capita over one year by 0.3%. The Asia, Latin America and African samples shows a similar outcome for measure (1) but not for measures (2) and (3). Similarly, for the other regions the inference depends on the financial development measure used. The positive marginal effect of remittance inflows on economic output given the level of financial development can be explained by binding liquidity constraints within these countries. The majority of the countries in the sample used in this chapter are those of which have low financial development so the financial sector is not well developed, resulting in the supply of loans for productive activities being restricted and hence insufficient. Therefore, the provision of transfers from abroad could be a route through which these countries can overcome these issues. The results represented in Table 4.8 represent mixed results given that on the other end of the financial development distribution (e.g. in South Africa, and Indonesia), moral hazard problems can occur, as Chami et al. (2008) noted. If the majority of remittances are spent on consumption and labour supply is lower, there will be lower long-term effects on economic growth. This could be a possible explanation for the negative impact of remittances on real GDP per capita (for measures (2) and (3)) and for those countries with higher financial development. The results for measures (2) and (3) are variable and large in magnitude, signifying that there is less reliability in measuring the effects of remittances on economic growth with these measures of financial development.

Table 4.8: The estimated effects of remittance inflows on GDP per capita for different levels of financial development

Region	(1) $(\beta_{i,t})^*$ Financial development index	(2) $(\beta_{i,t})^*$ Bank deposits to GDP ratio	(3) $(\beta_{i,t})^*$ Interest rate spread
Full	0.0364** (0.045)	0.0774* (0.091)	0.0199 (0.103)
Europe	0.0049*** (0.006)	-0.0019*** (0.001)	-0.0001 (0.203)
Asia	0.0305* (0.067)	0.00565** (0.030)	0.103 (0.128)
Latin America	0.0235 (0.107)	0.1481 (0.118)	-0.0154* (0.082)
MENA	0.3972 (0.391)	0.2224 (0.229)	0.0231** (0.043)
Africa	0.0251** (0.032)	-0.0062 (0.511)	-0.0005 (0.324)

Notes: $\beta_{i,t}$ is calculated from the mean value of the financial development measure. P values are reported in parentheses.

*Significant at 10%, **significant at 5%, ***significant at 1%

4.5 Conclusion

What is the impact of remittances on economic growth? How does the level of financial development in these developing countries influence the relationship between remittances and economic growth? Is there evidence that remittances have enhancing or diminishing effects on economic growth? To shed some light on these questions, this chapter analyses these key issues within the developing world. The economic growth and remittances relationship is a relatively new topic within the literature. It arose over the past two decades, as remittance inflows have reached their highest levels with governments in developing countries paying further attention to realise their full benefits. However, there is no consensus in the literature which examines the impact of remittance inflows on financial development with the use of cross-country panel data analysis and a financial development index. The analysis focused on the effects of remittances on financial sector development and economic growth in developing countries with the use of a non-linear D-GMM model (Arellano and Bover, 1995; Blundell and Bond, 1998). Moreover, with the use of 51 country panel dataset over 1990-2015 the study aims to bridge the gap in the existing literature in remittances and financial development. This study adds to the existing literature through the creation of a financial development index variable which brings together several existing measures of financial development.

The analysis split up into six datasets which shows mixed results and additionally measures the long run impact of remittances on economic growth in Section 4.4.5. Europe and Asian regions show that remittances and financial sector development are not complementary with each other as they hinder economic growth in these regions. However, the full dataset, Latin America, MENA and Africa show that remittances promote economic growth with countries that are less financially developed. Table 4.9 reinforces the result for the full sample as remittances are shown to have a positive impact on economic growth in the long term. All findings control for the endogeneity of remittances and real GDP with the use of the fixed effects (or random effects) and

D-GMM regressions which aim to reduce bias in the results.

The main lessons to take from the study from countries in these regions to fully understand and invest in developing their financial systems to fully realise the benefits of remittances and higher economic growth. Future research needs to focus on not only increasing remittances across the board by reducing transfer costs as suggested by policymakers, but also to understand why remittances do not seem to boost economic growth in countries with well-functioning financial markets.

Chapter 5

Remittances and Monetary Policy in Developing Economies

5.1 Introduction

Recent years have marked the increasing role of emigrant remittances across the developing world. Thus, issues central to developing countries include the role of development finance and remittances within communities. It is not surprising to see that remittances have engaged the attention of policy makers, global development institutions and researchers worldwide. Given the shortage of external financing, remittances are welcomed as a way of promoting investment and to stimulate economic growth. Furthermore, remittances provide an avenue to finance imports as they are an alternative form of foreign exchange which could relax balance of payments restraints. A large fraction of remittance inflows is spent on consumption (Orozco and Fedewa, 2005), but this can come at cost by increasing the price of non-tradables in the receiving country thereby producing inflationary pressures in the economy.

Research has documented that increases in the level of remittance inflows could precipitate an increase in the real exchange rate of the recipient economy, adversely affecting export competitiveness and, therefore causing a trade deficit (Corden and Neary, 1982). Remittances have a wide array of potential effects on the recipient economy. Most notably they contribute to financial development, affect economic growth and business cycles, and could lead to a Dutch Disease phenomenon, among other microeconomic and macroeconomic consequences. Interest in examining the role of remittances in economic growth has dominated the literature in recent times. However, the importance of remittances as a source of development finance has enhanced the interest of the relationship between remittances, the exchange rate and

other monetary policy variables. From a macroeconomic perspective, remittance inflows have the potential to induce economic growth by enhancing aggregate demand in the economy. However, some studies have reported there to be a mixed relationship between remittances and key macroeconomic variables like the real exchange rate. Along these lines of thought, the issues faced by receiving countries of remittances could conflict on several policy objectives, namely export competitiveness, inflation, external financing, among others. The primary concerns for governments in developing countries concerns the ability of central banks to perform their functions correctly as they lack independence in their operations. Hence, the objectives of monetary policy for central banks are not clearly defined. The priorities for governments in developing countries vary as some may opt to target output growth during periods of a slowdown by increasing liquidity in order to increase credit expansion. Conversely, other developing countries could be concerned by the adoption of higher government spending and will focus on other policies where central banks may resort to establishing nominal anchors that form a specific design to monetary policy. Some developing countries may decide in pegging the exchange rate as an option but may decide against this option if they suffer from high inflation. Therefore, targeting inflation may provide a more robust and sustainable measure for the design of monetary policy.

Indeed, the evidence is growing for the importance of the monetary policy transmission mechanism in developing countries. Furthermore, according to the literature the presence of remittance inflows among households pose challenges to macroeconomic policymaking. This is through upward pressures on the real exchange rate, therefore contributing to the weakening of institutions involved in fiscal policy whilst affecting long term economic growth. The monetary policy angle has been explored in the remittances literature, but these have relied on certain restrictive assumptions that fail to apply to most countries. Chami et al. (2008) use a DSGE framework to derive an optimal monetary policy rule for a recipient economy. They find that remittances not only cause a more volatile business cycle, but they also

increase output and labour market risk. Therefore, the optimal policy deviates from the Friedman rule, emphasising the need for independent government policy instruments. The question of whether remittances are beneficial to an economy is subject to various other factors. One that is increasingly mentioned in the literature is a Dutch Disease effect, which requires that the traded goods sector of a remittances receiving economy be the primary source of enhancing other sectors' productive capacity. Consequently, a Dutch Disease effect will arise with the influx of remittances causing the economy's real exchange rate to appreciate. This chapter will focus on the relationship between remittances and the nominal exchange rate and provide developing economies with a perspective to analyse how remittances affect the exchange rate in the short and long term.

This chapter seeks to guide further insight into the relationship between the effectiveness of monetary policy and to understand how monetary policy responds to remittance inflows. Moreover, this chapter contributes to the existing literature in the study of remittances by using modelling techniques which account for differences in monetary policy across regions and countries thereby, improving current macroeconomic policies within developing countries. First, the use of panel vector autoregression (PVAR) analysis provides analysis into the dynamics of monetary policy and remittances. This is achieved whilst accounting for the country specific effects through the panel dataset. Secondly, the use of impulse response analysis enables this study to capture the impact of shocks from each system variable. Furthermore, the effects of remittance volatility on real GDP and the monetary policy rate are captured using PVAR analysis.

5.2 Literature Review

The reasons why migrant workers send money back home has been extensively researched with respect to the microeconomics literature on remittances. However, residents of labour-exporting countries have received flows of remittances which are

greater than other capital inflows, making them important to research at the macro level. The impact of remittances on monetary policy has eluded policymakers and the attention of empirical researchers, which has caused a lack of focus on the relationship between monetary policy and remittances (Vacaflores, 2012). Heilmann (2006) states that the inflows of remittances can generate inflationary pressures, whilst simultaneously increasing the internal demand for imported goods. Narayan et al. (2011) confirm this effect for a set of 54 developing countries for the period 1995-2004, showing that remittances can generate inflationary pressures which are accentuated in the long-run. Furthermore, they find that improvements in democracy and the involvement of the military in politics can reduce inflation rates, current account deficits and the U.S interest rate.

The use of PVAR analysis has risen in recent years over the advantages over other models including DSGE models. These DSGE models by construction impose a lot of restrictions, not always in line with the statistical properties of the data. Thus, the policy strategies deduced from the analysis are hardwired in the assumptions of the model and must be considered as a benchmark rather than the real-world policy constraints faced by policymakers worldwide. In the literature, Gninafon and Mignon (2016), apply a panel VAR model to a set of 22 countries over the 1980-2011 period to analyse three key macroeconomic imbalances, namely current account discrepancies (external imbalances), output gaps (internal imbalances), and exchange rate misalignments. The analysis finds that macroeconomic imbalances strongly interact through a causal relationship. Specifically, the study uses PVAR analysis to examine a positive shock on the output gap which leads to a positive response of exchange-rate misalignments and a significant and negative response of the current-account gap. The use of PVAR analysis in macroeconomics is not limited to literature focusing on key macroeconomic variables. Imai et al. (2014) examine the effects of remittances on the growth rate of GDP per capita using annual panel data for a set of 24 Asian or Pacific countries. The study finds that while remittance inflows have been beneficial to economic growth, they are also source of output shocks.

Studies on remittances have grown over the past decade with the increased interest on monetary flows. A small strand of literature focuses on the link between remittances and monetary policy. According to the model proposed by Vacaflares (2012), higher levels of remittance inflows alter the effectiveness of monetary policy. A decline in the nominal interest rate leads to an increase in investment following a monetary injection because of the wealth effect. Furthermore, the liquidity effect is accentuated by the higher levels of remittances which originates from the monetary shock, increasing capital and investment, and enabling households to increase leisure time. This is known as the negative labour effect and is consistent output decreasing over time.

The divergent views proposed in the literature show that the linkage between remittance inflows, the exchange rate and monetary policy remain inconclusive and is currently expanding. Adenutsi and Ahortor (2008) examine the underlying monetary factors which could affect the changing levels of remittances by examining key monetary aggregates including the interest rate, exchange rate, and the domestic price level. The authors base the theoretical framework on a modified variable price Mundell-Fleming model. The use of a Vector Autoregression (VAR) applied to a quarterly dataset covering the period of 1983(4) to 2005(4). The authors produce a long-run model which reveals that the exchange rate, and the interest rate positively impact remittances while the domestic price level negatively impacts remittances. The confusion surrounding this result in relevance to the existing literature is exacerbated by the proposition by Ruiz and Vargas-Silva (2010, p174) who stipulate that remittances are small relative to the size of the country's GDP and will not have an impact on monetary policy: "If these flows are not large and/or not significant given the total size of the economy, then their impact on variables such as inflation, exchange rates and output will be minimal". However, this argument could be perceived to be false when analysing countries such as Ghana, in which they constitute up to only 0.4% of GDP and Mexico where the results are insignificant as they add up to 2.0% of GDP?

This chapter adds to the recent debate on the intermediary function of financial

development in the link between private capital flows and economic growth (see, Giuliano and Ruiz-Arranz, 2009). The literature shows the interaction between remittances and the financial market and shows how remittances can be a substitute for financial markets in economic growth when capital markets are on the downfall.

5.3 Methodology and Data

5.3.1 PVAR Model

This chapter uses the panel vector autoregressive (PVAR) models that avoid most of the restrictive assumptions introduced by the dynamic stochastic general equilibrium (DSGE) models which are unsuitable for the use in developing countries (Senbeta, 2011). The advantages of the PVAR follow on from those included in vector autoregressive (VAR) models. Namely, these include the advantage of treating all variables as endogenous, but there is also flexibility in including exogenous variables which is applied to the regional sub samples. Thus, PVARs solve the problem of endogeneity which is considered to be the main obstacle in panel data econometric analysis. Furthermore, PVARs enable the analysis to include the impact of innovations among variables to produce dynamic solutions, which is not possible with the use of ordinary least squares (OLS) and other standard regression models.

The PVAR model is a mix of the conventional VAR model in which all variables are treated as endogenous *a priori*. Additionally, the PVAR model captures the unobserved individual heterogeneous effects as represented in the baseline model in equation (13):

$$y_{i,t} = D_{0i}(t) + \varphi y_{i,t-1} + \sum_{k=1}^p \alpha_{i,t} y_{i,t-k} + D_{il} X_{i,t} + \mu_{i,t} \quad (13)$$

where $y_{i,t}$ is a vector of k endogenous variables for each country. $D_{0i}(t)$ captures all the deterministic components of the model (including constants and the seasonal dummies specific to each country), $y_{i,t-k}$ refers to the lagged endogenous variables, and $\mu_{i,t}$ is

a $k \times 1$ vector of the random error term. Exogeneity has been included in the model and is reflected by $X_{i,t}$ which is an $M \times 1$ vector of exogenous variables common to all countries i .

In this chapter $y_{i,t}$ is represented by the following vector of a three variable panel VAR:

$$y_{i,t} = \begin{bmatrix} LNREM_{i,t} \\ MP_{i,t} \\ RGDPCG_{i,t} \end{bmatrix} \quad (14)$$

where $RGDPCG_{i,t}$ represents the real GDP per capita growth variable, $MP_{i,t}$ ²¹ refers to the subsets of different monetary policy indicators which denotes the nominal exchange rate as the main measure of the monetary policy rate and this measure refers to the exchange rate determined by national authorities and is calculated as an annual average relative to monthly averages (local currency relative to the U.S dollar). Furthermore, two alternative measures of the monetary policy rate include the central bank policy rate and the broad money supply. $LNREM_{i,t}$ is the measure of remittance inflows into the recipient country (Personal remittances received as a ratio of GDP).

Implementing the Panel VAR procedure requires imposing the same underlying structures for each cross-sectional unit (country). This chapter follows Abrigo and Love (2016) who use the generalised method of moments (GMM) framework to estimate panel VAR models. The three most notable characteristics of the PVAR model include its ability to include lag of all endogenous variables of unit i (country) also known as ‘dynamic interdependencies’. Secondly, the error terms $\mu_{i,t}$ are correlated across i are also known as ‘static interdependences’. Thirdly, the slope coefficient and the intercept, and the variance of the shocks may be unit specific which is known as the ‘cross sectional heterogeneity’ feature. These prominent features help distinguish panel VARs (PVARs) typically used in macroeconomic and financial analyses from those used in microeconomic studies. This includes studies such as Vidangos (2009) where interdependencies are typically ignored and sectoral homogeneity is assumed. Vidangos (2009) examines the variation in individual labour

²¹ $MP_{i,t}$ refers to the monetary policy rate indicators

income over time and the subsequent effects on income, the wage rate, hours of unemployment, and hours of work. What is also apparent within macroeconomic PVARs is that it enables studies to distinguish between dynamic interdependencies and cross sectional homogeneity.

5.3.2 Empirical Specification

Based on equation (13), this chapter further investigates into the existing relationship by including remittance volatility. Remittance volatility is specified as a function of the lags of endogenous variables whilst controlling for the country and time specific effects. As an example the PVAR structure for row 1 in equation (14) is represented in the following format:

$$LNREM_{i,t} = \sum_{j=1}^p \lambda_1 MP_{i,t-j} + \sum_{j=1}^p \lambda_2 LNREM_{i,t-j} + \sum_{j=1}^p \lambda_3 RGDPCG_{i,t-j} + X_{i,t} + f_i + d_t + \xi_{i,t} \quad (15)$$

where $LNREM_{i,t}$ denotes remittance inflows for country i at time t , $MP_{i,t-j}$ is the lag of monetary policy rate variables for country i at time t , $RGDPCG_{i,t-j}$ is the lag of the growth rate of real GDP per capita, $X_{i,t}$ denotes the exogenous variables in the system, f_i represents the country specific fixed effects, d_t denotes the time dummies, and $\xi_{i,t}$ is the random error term.

Furthermore, the PVAR structures for the monetary policy rate and the growth rate of real GDP per capita is given in equation (16) and equation (17):

$$MP_{i,t} = \sum_{j=1}^p \lambda_1 LNREM_{i,t-j} + \sum_{j=1}^p \lambda_2 MP_{i,t-j} + \sum_{j=1}^p \lambda_3 RGDPCG_{i,t-j} + X_{i,t} + f_i + d_t + \xi_{i,t} \quad (16)$$

$$RGDPCG_{i,t} = \sum_{j=1}^p \lambda_1 LNREM_{i,t-j} + \sum_{j=1}^p \lambda_2 RGDPCG_{i,t-j} + \sum_{j=1}^p \lambda_3 MP_{i,t-j} + X_{i,t} + f_i + d_t + \xi_{i,t} \quad (17)$$

Additionally the volatility of remittances is modelled using a PVAR structure in equation (18):

$$\sigma_n LNREM_{i,t} = \sum_{j=1}^p \lambda_1 MP_{i,t-j} + \sum_{j=1}^p \lambda_2 \sigma_n LNREM_{i,t-j} + \sum_{j=1}^p \lambda_3 RGDPCG_{i,t-j} + X_{i,t} + f_i + d_t + \xi_{i,t} \quad (18)$$

where $\sigma_n LNREM_{i,t}$ denotes the volatility of remittance inflows for country i at time t .

5.3.3 Identification of the PVAR Cholesky Decomposition Ordering

Impulse response function analysis describes the reaction of one variable to innovations to another variable whilst holding all other shocks equal to zero. However, since the variance covariance matrix of the error terms is unlikely to be diagonal, we have to decompose the residuals in a way to make them orthogonal allowing the PVAR to isolate the shocks. Conventionally, this chapter chooses to adopt the Cholesky decomposition of the variance-covariance matrix of residuals which enables the system to adopt a particular ordering between the residuals of any two elements to the variable that comes first in the ordering. The identifying assumption is that the variable that comes earlier in the ordering is able to affect the following variables contemporaneously, while those that come later affect the previous variables with a lag. Therefore, the variables that come earlier in the system are those which are more exogenous and the ones that appear later are more endogenous. The three variable PVAR vector described in equation (14) has been ordered in such a way to fit the Choleski ordering for greater scope of analysis. The specification in equation (14) shows that the $LNREM_{i,t}$ and $MP_{i,t}$ and feature earlier in the PVAR vector and therefore the shocks of these two variables have an effect on the contemporaneous value of $RGDPCG_{i,t}$. The ordering of the PVAR vector has been setup in such a way to show that remittance inflows and the monetary policy rate have an effect on the growth rate of real GDP per capita with a lag.

The identifying assumption in the Cholesky decomposition of the variance-covariance matrix of residuals posits that the beginning variable contemporaneously affects the following variables whilst the variables which occur later in the order impact the former with a lag. Thus, a variable x which appears before variable y is said to be weakly exogenous with respect to y . The benchmark case will consider the ordering of $LNREM_{i,t}$, $MP_{i,t}$, $RGDPCG_{i,t}$. This contemporaneous causal order runs from remittances to the nominal exchange rate and to the growth rate of real GDP per capita. This ordering permits the growth rate of real GDP per capita to react contemporaneously to remittance shocks. The PVAR results will report two cases, the first will include remittances first followed by the monetary policy rate variable and then by the growth rate of real GDP per capita. The reasoning behind placing remittances first assumes that the variable contemporaneously affect all variables whilst the other two variables ($MP_{i,t}$, $RGDPCG_{i,t}$) affect remittances with a lag. The underlying order is motivated by the fact that remittances are largely driven by external factors which include the output of the migrants host countries (Elbadawi and Rocha, 1992). Furthermore, remittances precede the monetary policy rate variable implies that in the case of exchange rates migrants do not respond and adjust their remitting patterns prior to contemporaneous movements of the exchange rate, which may be explained by the fact the migrant is in a different time zone as the recipient country. Therefore, a time delay exists in the decision to remit for the migrant to adjust quickly enough to the exchange rate. The second ordering will place the monetary policy rate followed by remittances and the growth rate of real GDP per capita. This ordering will place greater emphasis on the monetary policy rate variable to influence the decision of the migrant to remit. Given that the second PVAR Cholesky ordering is less realistic, the first ordering as remittance inflows as the first variable will be the baseline case for the analysis.

5.3.4 Panel Unit Root Tests

The PVAR model used in this chapter requires all series to be stationary when estimating the PVAR. In this way, the estimation results will provide reliable short and long run results. Therefore, before proceeding on to the PVAR estimation results it is necessary to undertake panel unit root tests. Panel unit root testing emerges from the same principles of time series unit root testing. However, the major difference between the two is that we have to consider the asymptotic behaviour of the time-series dimension T and the cross-sectional dimension N . For this chapter, the results will be reported for the Fisher-type tests which includes the Augmented Dickey Fuller (ADF) and the Phillips-Perron (PP) tests. These tests conduct unit-root tests for each panel individually, and then combine the p-values from these tests to produce an overall test. However, these tests suffer from low power as we accept the null hypothesis too often. In order to avoid this problem this chapter uses panel data unit root tests developed by Levin et al. (2002); Im et al. (2003); Hadri et al. (2010). Individual unit root tests have limited power. The power of a test is determined by the probability of rejecting the null when it is false and the null hypothesis is a unit root.

5.3.4 (a) Fisher-type tests

This sub-section and the following sub-section will provide the methodology of the ADF and the PP unit root tests with the appropriate assumptions included. The following hypotheses apply to both tests:

H_o : Series contains a unit root

H_1 : Series does not contain a unit root

The hypotheses above is consistent with the lag order p is permitted to vary across individuals.

The procedure of the augmented Dickey-Fuller (ADF) works as follows:

First, we run the ADF test for each cross-section on the equation:

$$\Delta y_{i,t} = \alpha y_{i,t-1} + \sum_{L=1}^{p_i} \partial_{iLt} \Delta y_{i,t-L} + \alpha_{mi} d_{mt} + \mu_{i,t} \quad (19)$$

In the second step we run two auxiliary regressions:

1. $\Delta y_{i,t}$ on $\Delta y_{i,t-L}$ and d_{mt} to obtain residuals $\hat{\mu}_{i,t}$ and
2. $y_{i,t-1}$ on $\Delta y_{i,t-L}$ and d_{mt} to get residuals $\hat{v}_{i,t-1}$.

The third step involves standardising the residuals through the process of transformation

$$\tilde{e}_{i,t} = \frac{\hat{e}_{i,t}}{\hat{\sigma}_{\varepsilon,i}} \quad (20)$$

$$\tilde{v}_{i,t-1} = \frac{\hat{v}_{i,t}}{\hat{\sigma}_{\varepsilon,i}} \quad (21)$$

where $\hat{\sigma}_{\varepsilon,i}$ represent the standard error from ADF regression. Lastly, the pooled OLS regression is run on the assumption that $\rho = 0$.

$$\hat{e}_{i,t} = \rho \hat{v}_{i,t-1} + \tilde{e}_{i,t} \quad (22)$$

The main difference between the Phillips-Perron test and the augmented Dickey-Fuller test statistics concern the robustness of the statistics in relation to serial correlation. The PP statistics have been made robust to serial correlation using the Newey and West (1987) heteroskedasticity and autocorrelation consistent covariance matrix estimator.

5.3.4 (b) Levin, Lin and Chu test

The Levin et al. (2002) test assumes that there is a common unit root process so that p_i is identical across cross-sections. The test employs a null hypothesis of a unit root and similarly to the Breitung (2000) test it employs the basic ADF specification as in equation (19). We assume that a common condition holds in that $\alpha = \rho - 1$, but allow the lag order for difference terms to vary across cross-section according to ρ_i . The method described in the LLC test requires that we derive estimates from α from proxies of $\Delta y_{i,t}$ and $y_{i,t}$ that are free of deterministic and autocorrelation components.

For a given set of lag orders, two additional sets of regressions estimated, by regressing $\Delta y_{i,t}$ and $y_{i,t-1}$ on the lag terms $\Delta y_{i,t-j}$ (for $j = 1, \dots, p_i$) and the exogenous variables $X_{i,t}$. The estimated coefficient from both sets of regressions are denoted $(\hat{\partial}, \hat{d})$ and $(\hat{\partial}, \hat{d})$, respectively.

5.3.4 (c) Breitung test

The Breitung unit root test (2000) although similar in construction to the LLC test it differs in two distinct ways. Firstly, the autoregressive portion of the equation is the only portion used when constructing the standardised proxies. Secondly, these proxies are transformed and detrended. Most importantly, the LLC test is based on t-statistics that are adjusted to reflect that under the null hypothesis, the t-statistics have a nonzero mean because of the inclusion of panel-specific means or trends. The Breitung (2000) test requires the transformation of the data before computing the regressions so standard t-statistics can be used. Additionally, the test assumes that all panels have a common autoregressive parameter and only the autoregressive component is removed when constructing the standardised proxies. The test proposes an alternative set of procedures to the LLC test that uses unbiased estimators rather than bias-corrected errors.

5.3.4 (d) Im, Pesaran and Shin test

The Im et al. (2003) is considered preferable to the LLC and Breitung tests over the assumption that it can overcome all panels to have the same value for p_i . The IPS test relaxes this assumption of a common p and allows for each panel to have its own unique p_i . The IPS test begins by specifying a separate ADF regression for each cross-section as in equation (19) where the null hypothesis may be written as:

$$H_o : \alpha_i = 0, \text{ for all } i \quad (23)$$

while the alternative hypothesis is given by:

$$y_{i,t} = \begin{cases} \alpha_i = 0 & \text{for } i=1,2,\dots,N_1 \\ \alpha_i < 0 & \text{for } i=N+1,N+2,\dots,N \end{cases}$$

5.3.5 Data

Table 5.1: List of Variables

Variable	Notation	Description	Source
Remittances	LNREM	Personal remittances received as a ratio of GDP	WDI
Financial development	FD	Financial development index*	
Monetary policy rate	LNNEE	Nominal exchange rate (per US\$, period average)	WDI
Monetary policy rate	LNCBPR	Central bank policy rate	WDI
Monetary policy rate	LNBM	Broad money supply as a ratio of GDP	WDI
Economic business cycles	RGDPCG	Growth rate of real GDP per capita	WDI
Exchange rate	LNNEE	Nominal exchange rate (per US\$, period average)	IMF IFS
Remittances volatility	$\sigma_n LNREM$	Standard deviation of remittances	WDI
World oil price	CROIL	Crude oil, Brent (World price, nominal \$)	GEMC
U.S. real GDP per capita	USRG	Growth rate of US real GDP per capita	WDI

Note: *Financial development index is obtained from author's estimates as reported in Chapter 2 of this thesis, WDI denotes the World Development Indicators, GEMC represents the Global Economic Monitor Commodities, IMF IFS denotes the International Monetary Fund's International Financial Statistics database.

All variables listed in Table 5.1 show the definitions and sources of the variables used for the PVAR analysis. The dataset follows the same format in the previous two chapters of the thesis by using fifty-one developing countries selected according to data availability and regional representation. The creation of the financial development index is given in Chapter 4 of this thesis along with comparisons to literature who use alternative financial development indices. The monetary policy rate is used as the main measure of monetary policy and three different measures are used to give greater data coverage of this variable across the developing world. The variable is used as it reflects the reactions of the monetary authorities to domestic and international economic conditions. Furthermore, the variables of remittances are derived through two measures including $LNREM$, and $\sigma_n LNREM$. The method of taking standard deviations follows the same method employed by Bugamelli and Paternò (2011). The money supply is used as an exogenous variable and is given by the log of broad money supply as a ratio of GDP.

The baseline PVAR model includes up to three endogenous variables. The reasoning for the inclusion and description of these variables among the literature is described below:

5.3.5.1 Growth rate of Real GDP per capita

Refers to the annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP per capita is gross domestic product divided by midyear population. It is calculated without including the deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

5.3.5.2 Monetary policy rate (various measures)

Finding a precise and evaluative measure in monetary policy is among the most difficult of pursuits in the economic literature. Conventional monetary policy suggests us to

believe that central banks can adjust short-term funding rates by regulating reserve requirement ratios and engaging in open market operations as their main tools of using monetary policy. However, this is not quite true since the recent 2008 global financial crisis forced central banks to use unconventional monetary policy tools.

Within the literature various measures of monetary policy have been used including sizes of monetary aggregates such as M1 or M2 are used to measure liquidity. The M1 currency encompasses currency held by the public and demand deposits with banks. Furthermore, the M2 measure of money supply includes M1 plus time and savings deposits with banks that require prior notice to deposit withdrawals. The broad money measure used in this chapter is M3 which includes M1 and M2 plus various money market instruments, such as certificates of deposit issued by banks, banks deposits denominated in foreign currency, and deposits with financial institutions other than banks.

The relationship between income and money is not stable as Friedman and Kuttner (1992) show that the relationship between money and income is not close and is unreliable. Merely, the analysis from Friedman and Kuttner (1992) presents evidence to confirm that in the United States there is no supporting relationship to either real or nominal income, or to prices, and the inclusion of M1 and other monetary aggregates corroborates these findings. Other measures including non borrowed reserves (NBRs), which measure the difference between a bank's total reserves and borrowed reserves, have been introduced because it is easier to control than either M1 or M2. However, empirical evidence from Bernanke and Mihov (1998) suggest that there is no statistically significant empirical evidence except that US monetary policy was correctly measured by the NBRs except for the period of 1979 to 1982. In addition to this measure other variables have been used as monetary policy indicators including the central bank or interbank rates. The effectiveness of the central bank rates is debated in the literature. Laurent (1988) recognised that short-term interest rates are of influence of the central bank as by their manipulative power of the interest rate. On the other hand, the short-term rates may affect many monetary aggregates

but there is no reason to suggest why interest rates should directly affect economic growth. The primary obstacle to seek a reliable measure of the monetary policy rate is the problem of the interdependence of monetary aggregates and the real economy bridged by the financial sector. In this situation monetary policy decisions are endogenous. Furthermore, this problem contributes to the difficulty in designing monetary policy, especially when seeking targets that fulfill financial stability and price stability.

In order to overcome the problems discussed in the literature this chapter will incorporate three different measures of the monetary policy rate. Firstly, the nominal exchange rate is used and represents to the exchange rate determined in a legally sanctioned exchange market. It is calculated as an annual average based on monthly averages and is relative to the U.S. dollar. It is also simply viewed as the price of the foreign currency in units of the home currency and is useful when analysing the differences between exchange rates in developing economies. The importance of this measure is applicable to when a country assesses its trading capabilities current trade situation. The nominal exchange rate can also be used to measure the equilibrium value of a country's currency, identify changes in the international price and cost competition, analyse the underlying trade flows of a country, and allocate incentives between non-tradable and tradable sectors.

Secondly, the central bank policy rate is used and represents the rate that is used by the central bank to implement or signal its monetary policy stance. It is most commonly used by central bank policy making committees. The underlying financial instrument varies from country to country as in some countries the rate refers to the discount rate whilst in others it is a repurchase agreement rate. Thirdly, the broad money supply measure is used which comprises of the sum of currency outside banks including demand deposits other than those of central government. This measure includes the time, savings, and foreign currency deposits of resident sectors other than of the central government, bank and traveler's checks, and other certain securities such as commercial and deposit paper.

5.3.5.3 Personal remittances received as a ratio of GDP

The definition used for the remittances variable is obtained from World bank estimates based on the IMF balance of payments data, and World Bank and OECD GDP estimates. The definition used in this chapter comprises of personal transfers and compensation of employees. Personal transfer consist of all current transfer made or received by resident households to non resident households. Personal transfers are defined as transfers from resident individuals to non resident individuals. Moreover, compensation of employees refers to the income of seasonal, border and other short-term workers who are resident in a country where they are non residents or where they are residents employed by nonresident entities. While the categories of remittances remain well defined by the IMF, it is important to note that the reliability of remittance data is limited. At a global level, the discrepancy between the receipts of remittances exceed their payments and this is increasing over time (IMF, 2009). Furthermore, this is more prevalent in developing countries where the greater differences in the costs of sending remittances as compared to the informal channels like carrying cash across borders. In essence the true data from remittances should reflect their altruistic properties which could possibly lower economic growth. This is possible through the appreciation of the real exchange rate and resource allocation from tradable to non-tradable goods also known as the ‘Dutch Disease’ effect. However, remittances could generate long term economic growth as a result of these monies being spent on investment, education or other sources.

5.4 Empirical Analysis

5.4.1 Descriptive Statistics

Descriptive statistics are reported in Table 5.2. This analysis will focus on discussing the median as it is less susceptible to distortions from outliers as the mean statistic is. Most notably, we can see that the median inflation (GDP deflator, annual %) is quite low (6.77) compared to its mean value (31.61) possibly due to missing observations and occurrences of deflation in some developing countries including Syria in 2016. The measure of the interest rate spread has a high mean value (11.32) which signifies the high costs of borrowing funds in developing countries. Remittance inflows as a percentage of GDP have a median value of 1.96 which tells us the increasing significance of remittances as a source of development finance in developing economies. When channeled correctly these inflows could facilitate greater economic development by increasing the median value of the growth rate of real GDP per capita above 4.34%. Furthermore, it is evident to see that the Central Bank policy rate and the real interest rate (monetary policy rate) remain at high levels of 1.87 and 5.92 respectively. This confirms that banks and central banks in the developing world will keep interest rates high to cover the cost of lending funds.

Table 5.2: Descriptive Statistics: Full Sample

Variable	Obs.	Mean	Median	Std. Dev.	Minimum	Maximum
Growth rate of real GDP per capita	1306	2.35	2.67	4.70	-30.32	35.72
Personal remittances, received (% of GDP)	1204	4.34	1.96	6.48	0.001	49.29
Remittances inflows to GDP ratio (LN)	1204	0.36	0.67	1.83	-6.72	3.90
Human Development Index	1231	0.64	0.66	0.13	0.30	0.89
Nominal exchange rate (per US\$, period averag) (LN)	1258	2.97	3.05	3.05	-10.43	9.99
Inflation, GDP deflator (annual %)	1310	31.61	6.77	230.39	-27.21	6261.24
Net Barter terms of trade index	1093	112	101.83	34.53	43.88	290.90
Financial development index	842	41.53	33.14	30.65	5.02	223.29
Real interest rate (%)	1069	7.22	5.92	11.78	-70.43	93.94
Central Bank policy rate (%) (LN)	388	1.99	1.87	0.83	-0.69	5.21
Interest rate spread (%)	1035	11.32	5.51	77.35	-72.40	2334.96
Broad money (% of GDP) (LN)	1183	3.68	3.66	0.61	1.91	5.63
Crude oil, Brentd (World price, nominal \$)	1377	47.66	28.85	33.24	12.72	111.97
U.S. interest rate (%)	1377	3.88	3.54	1.96	1.16	7.19
Growth rate of U.S. real GDP per capita	1377	1.39	1.61	1.55	-3.62	3.49

5.4.2 Panel Unit Root Results

Within time series or panel data it is important to explore the order of variable integration. The status of stationarity can help in fitting the correct model and estimate the correct coefficients. There are advantages in using panel data-based unit root tests over individual time series unit root tests. First, they have more statistical power than their univariate counterparts. Within a panel setting, the Augmented Dickey-Fuller (ADF) is more suited in identifying stationarity with more panels. Secondly, panel unit roots allow for country specific effects (fixed effects) as well as time variations in the parameters across panels. Furthermore, several other panel unit root tests are reported including the Phillips-Perron (PP), Levin, Lin and Chu (LLC),

Im, Pesaran and Shin (IPS) and Breitung (BR) tests. The results from Table 5.3 are consistent with the ADF, PP, LLC and IPS tests show that apart, from the level of Remittance inflows, the world crude oil price, and the log of real GDP per capita, all variables are integrated of order $I(0)$. Therefore, the log of remittance inflows and the growth rate of real GDP per capita are used for the panel VAR estimations. The world crude oil price is used as exogenous variable and has been transformed to an $I(0)$ variable through the first difference process. The Breitung test reveals that the majority of variables except FDI, Broad money supply, Inflation, real GDP per capita growth rate, US interest rate, and the US GDP growth rate are insignificant and not $I(0)$.

Table 5.3: Panel unit root tests

	REM	LNREM	LNNEE	LNBM
<i>Level</i>				
ADF	105.600	144.785(**)	351.622(***)	90.855
PP	109.843	199.108(***)	344.123(***)	114.332(**)
LLC	-3.543(***)	-4.801(***)	120.394(***)	-2.752(***)
IPS	-1.151	-2.914(**)	-1.803(**)	1.119
BR	-0.120	1.224	0.905	0.618(***)
	LNCBPR	INF	USRG	CROIL
<i>Level</i>				
ADF	56.448	299.976(***)	275.442(***)	18.238
PP	69.511(***)	460.745(***)	346.912(***)	18.238
LLC	-4.093 (***)	-56.670(***)	-5.143(***)	11.411
IPS	-0.293(***)	-22.353(***)	-10.201(***)	6.502
BR	-1.22(***)	-6.403(***)	-17.237(***)	10.114

Notes: Augmented Dickey Fuller (ADF) and the Phillips Perron (PP) statistics reported are based on the chi-square statistic. The Levin, Lin and Chu (LLC) test reports a standard t-statistic, the Im, Pesaran and Shin reports the W-statistic and the Breitung (BR) test reports the t-statistic. For all unit root tests the null hypothesis confirms the presence of a unit root against the alternative which states that there is no unit root. All variables are described in Table 1. *** denotes significance at the 1% level, ** shows significance at the 5% level, and * denotes significance at the 10% level.

5.4.3 Variance Decomposition Analysis

The use of variance decompositions of remittances, the monetary policy rate and real GDP per capita growth enables the separation of an endogenous variable into the component shocks of the PVAR. Thus, variance decompositions provide information about the relative importance of each random innovation in the PVAR and how it can affect the variables in the system. Before examining the impulse response functions it is important to analyse the variance decompositions of LNREM, LNNEE and RGDPCG. The variance decomposition tables for the full sample and the regional samples are reported in Appendix E. Tables E.1 to E.3 in Appendix E report the variance decompositions for the full sample whilst Tables E.4 to E.18²² report the regional variance decompositions. Table E.1 reports the results using the first Cholesky ordering system (LNREM, LNNEE, RGDPCG) whilst Tables E.2 to E.3 use the second Cholesky ordering system (LNNEE, LNREM, RGDPCG). What we observe from the results in Table E.1 that remittance inflows explain greater variation in the nominal exchange rate in comparison to real GDP per capita. In the short run, that is at a one year horizon time period, a shock to the nominal exchange rate (LNNEE) accounts for 98.928 percent variation in the fluctuation in LNNEE (own shock). Furthermore, a shock to remittance inflows causes a 1.072 percentage fluctuation in the nominal exchange rate. However, the shock to remittances inflows has a diminishing effect on the nominal exchange rate in the long term as the growth of real GDP per capita has a larger impact on the nominal exchange rate over the long term.

Table E.1 reports the variance decompositions of the growth rate of real GDP per capita which shows in the short term (one year horizon), a shock to the nominal exchange rate causes a 2.244 percentage fluctuation in the growth rate of Real GDP per capita. However, this effect is diminishing over the long term as in the fourth year period we see that a shock to remittance inflows cause a 2.362 percentage fluctuation. Table E.2

²²Tables E.1 to E.18 report point estimates with the standard errors represented in parentheses. The standard errors are calculated using 100 Monte Carlo repetitions

displays the variance decompositions of remittance inflows which is completely explained by the variable itself in the short term. However, the medium to long term effects show that the nominal exchange rate and the growth rate of real GDP per capita have a greater effect compared to the short term. Table E.2 shows that a shock to remittance inflows has a smaller impact on the nominal exchange rate in comparison with Table E.1. This is due to placement of remittance inflows in the second position of the Cholesky ordering system.

There is evidence that the results from the regional variance decompositions differ from the full sample. Most notably, the variance decompositions in the Asian for LNNEE show the variance in the real GDP per capita growth variable is influenced greatly by a shock in the nominal exchange rate.

5.4.4 Panel VAR IRF Analysis

The analysis section is structured according to the full dataset of countries, the period after the financial crisis for the full dataset, Europe, Africa, Middle East and North Africa (MENA), Latin America, and Asian samples. The data samples cover the same annual time period from 1990-2016 except for the post financial crisis dataset which covers the period from 2007-2016. This section presents the corresponding impulse response functions with the various models for each region. The impulse response functions and the panel VAR models are computed using the Eviews software. The impulse response function (IRF) analysis enables this chapter to analyse the impact of shocks to the models identified in Section 5.3.3. This chapter uses the Cholesky ordering of endogenous variables as specified in equation (14). The reasoning behind this order follows that remittances is selected first on the basis that it has an immediate impact on the other two variables (nominal exchange rate and Real GDP per capita growth rate) in the PVAR system. The following variable in the system (nominal exchange rate) has the second greatest impact on the other two variables in the PVAR system (Remittances and the growth rate of Real GDP per capita). For purposes of this study the scenario of a one unit positive shock to the nominal exchange rate (monetary policy rate variable)

is used which is the same as a nominal depreciation in the domestic currency and is therefore viewed as an expansionary monetary policy scenario. Similarly included are the robustness check scenarios which include the broad money supply and the Central Bank policy rate. A one unit positive shock in the broad money supply is termed an expansionary monetary policy and conversely a one unit positive shock in the Central Bank policy rate resonates as a contractionary monetary policy.

5.4.4.1 Full sample IRF

Model 1: Endogenous variables: LNREM, LNNEE, RGDPCG

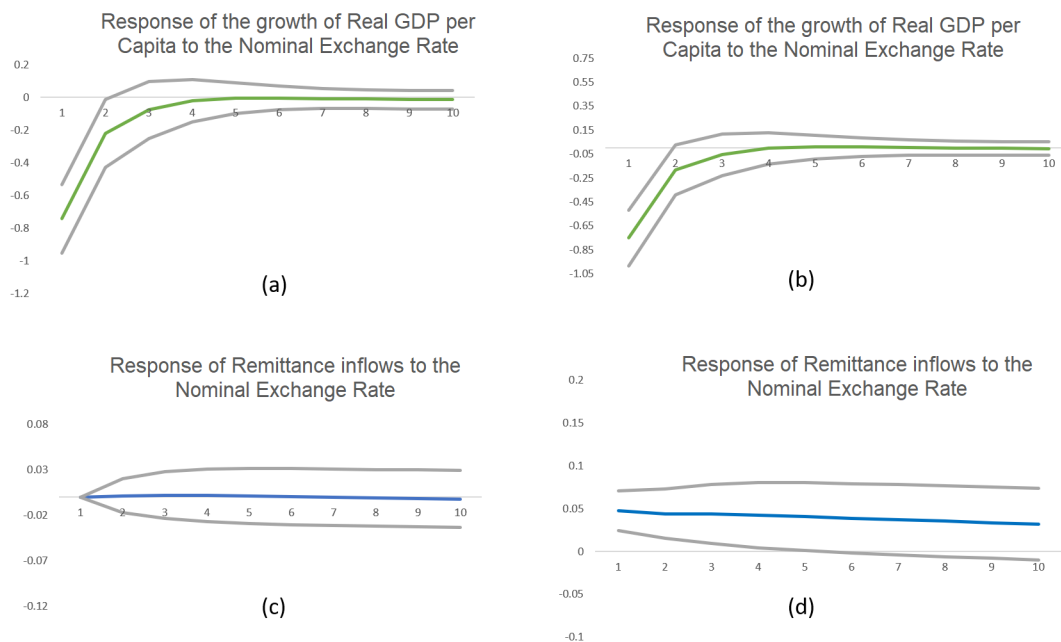


Figure 5.1: Shocks to the nominal exchange rate - Model 1 (Full sample)

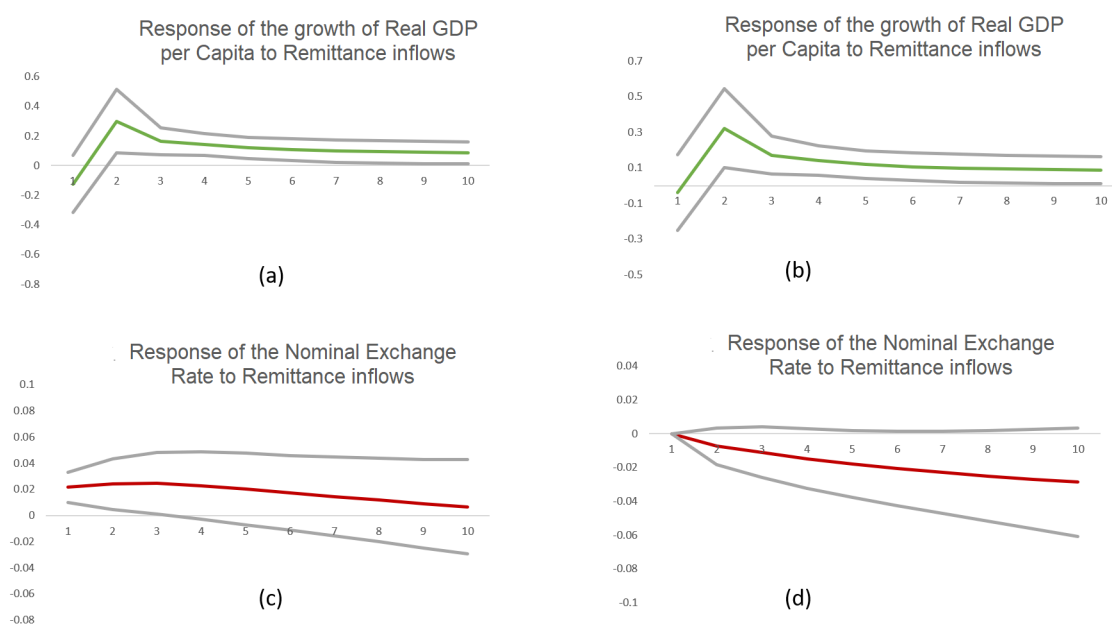


Figure 5.2: Shocks to remittance inflows - Model 1 (Full sample)

Model 2: Endogenous variables: LNREM, LNB, RGDP

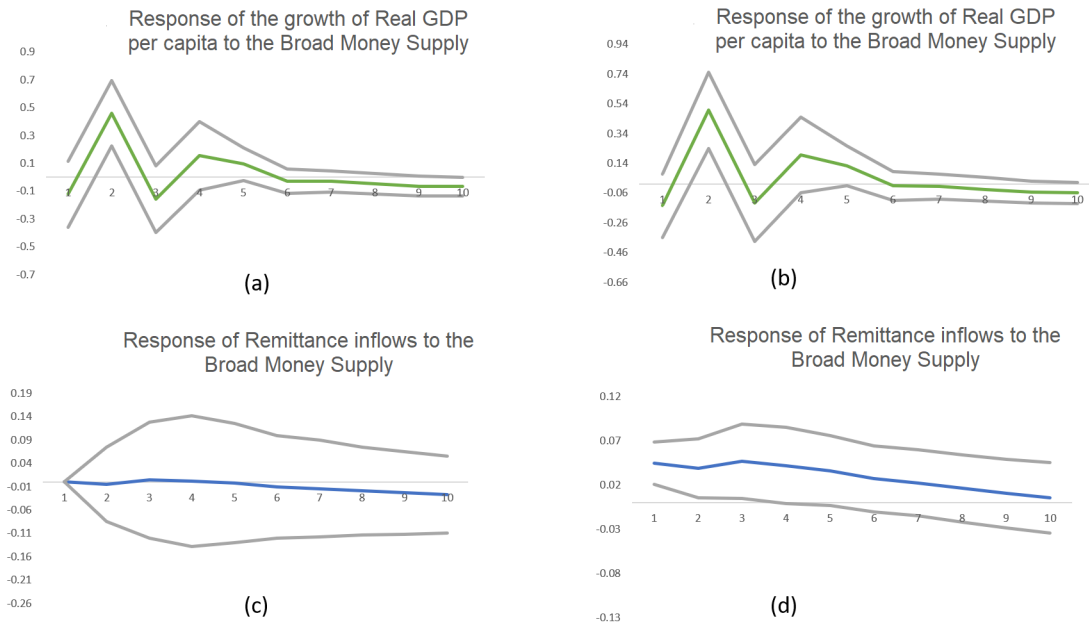


Figure 5.3: Shocks to the broad money supply - Model 2 (Full sample)

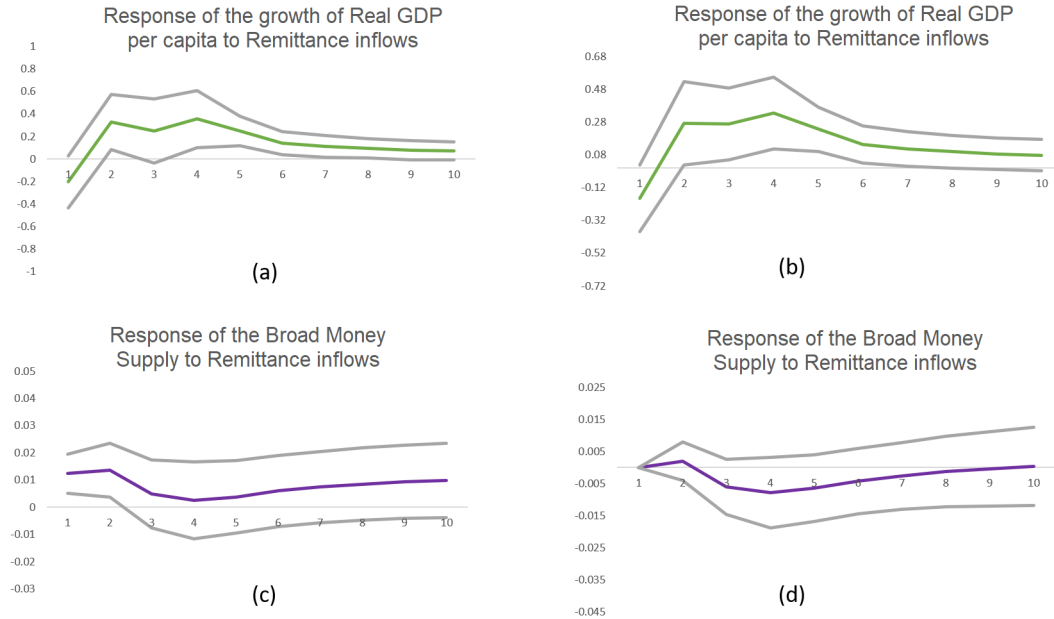


Figure 5.4: Shocks to remittance inflows - Model 2 (Full sample)

Model 3: Endogenous variables: LNREM, LNCBPR, RGDP

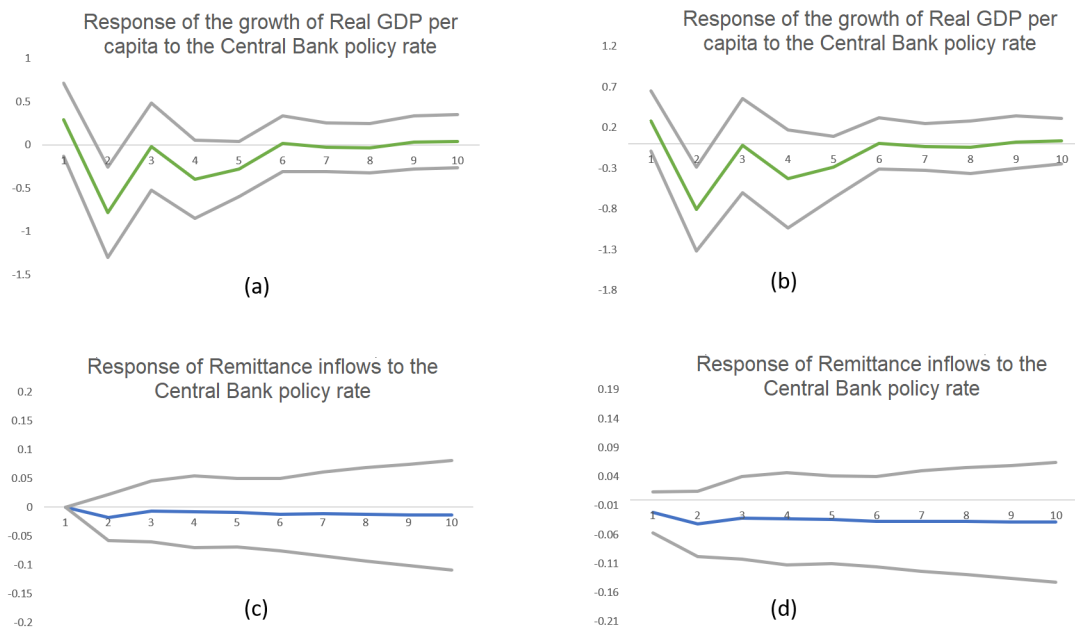


Figure 5.5: Shocks to the central bank policy rate - Model 3 (Full sample)

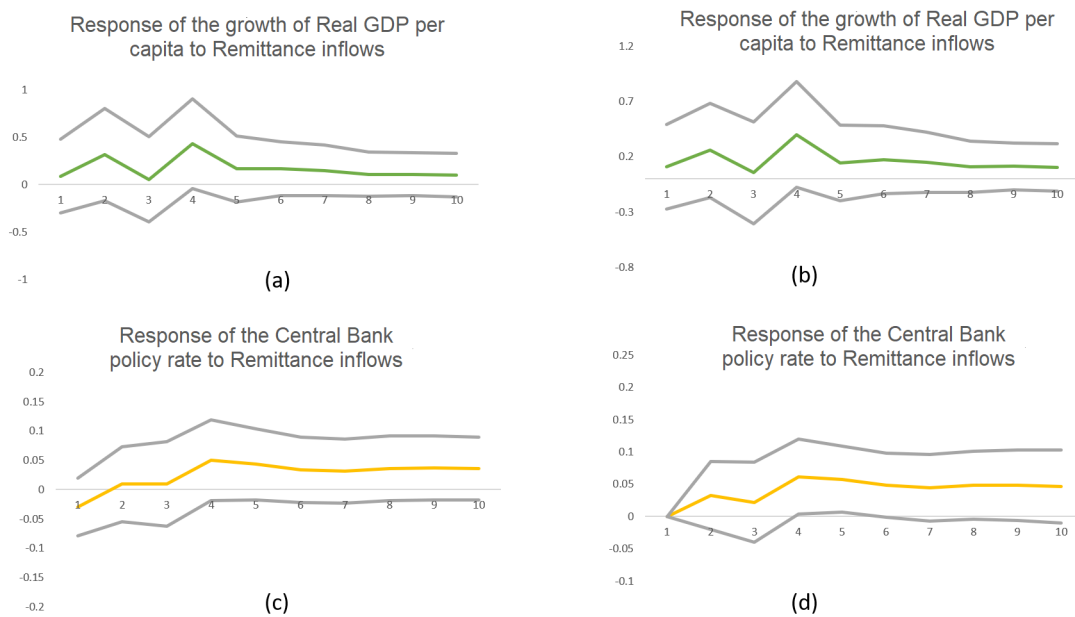


Figure 5.6: Shocks to remittance inflows - Model 3 (Full sample)

Model 1: Endogenous variables: LNREM, LNNEE, RGDPCG

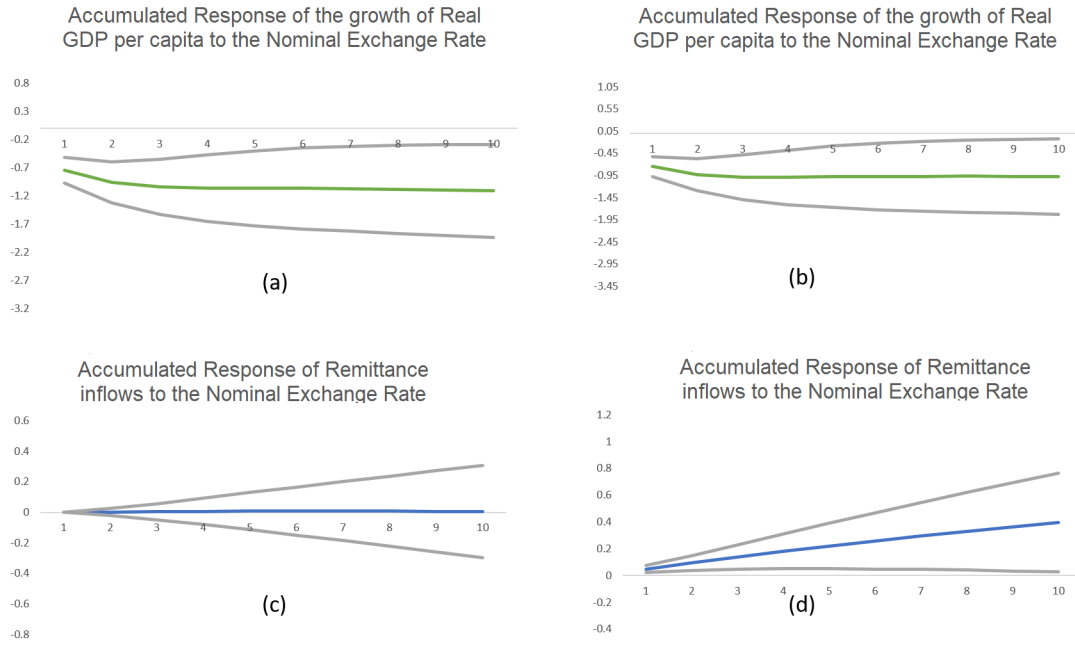


Figure 5.7: Shocks to the nominal exchange rate (Accumulated responses) - Model 1 (Full sample)

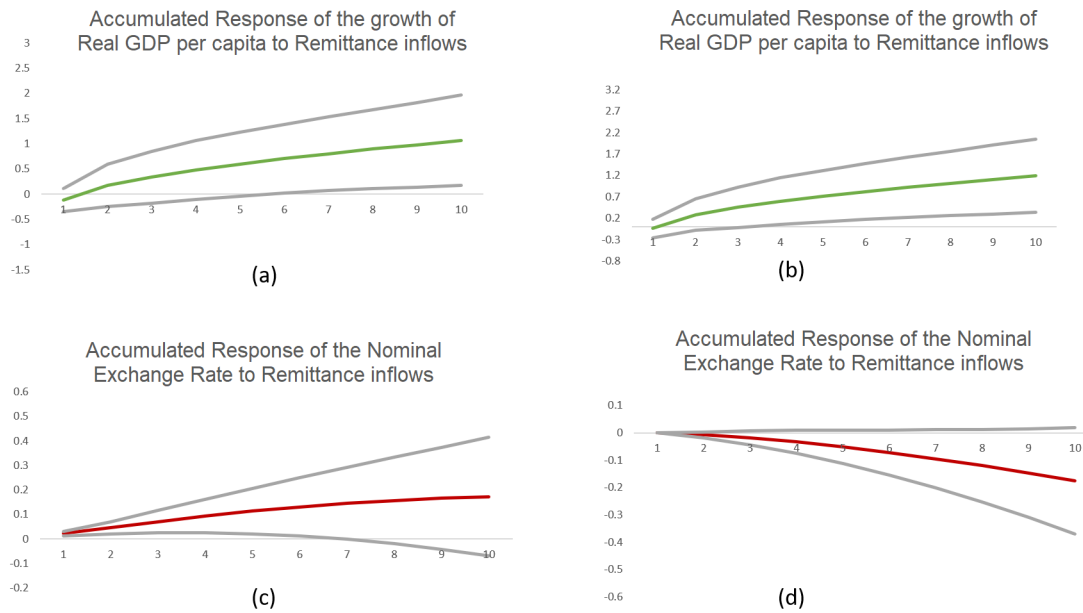


Figure 5.8: Shocks to remittance inflows (Accumulated responses) - Model 1 (Full sample)

Model 4: Endogenous variables: SDREM, LNNEE, RGDPG

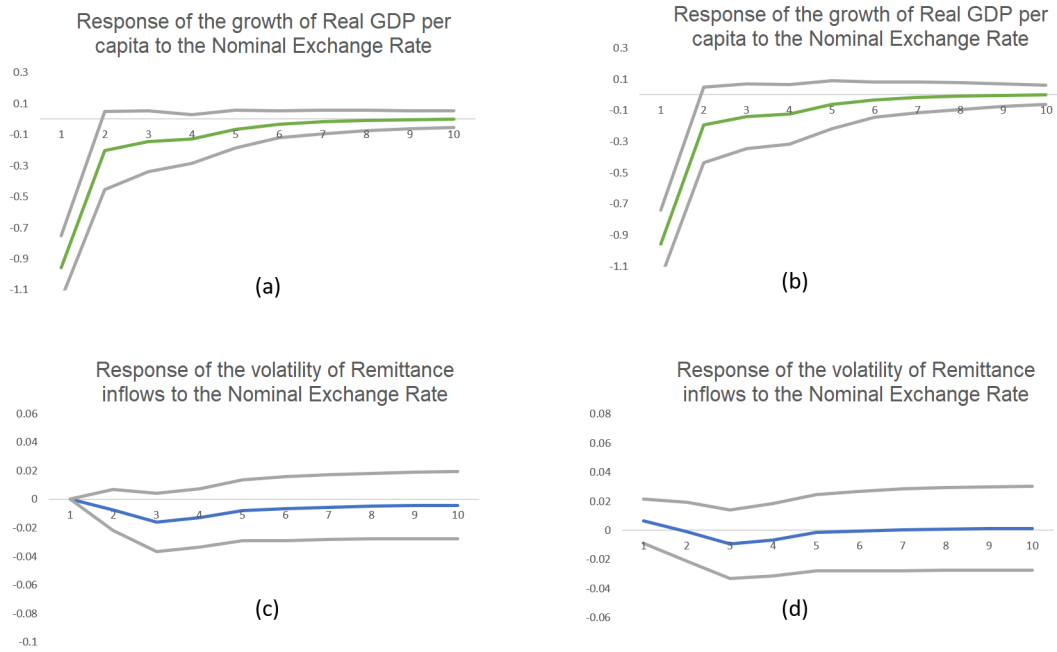


Figure 5.9: Shocks to the nominal exchange rate - Model 4 (Full sample)

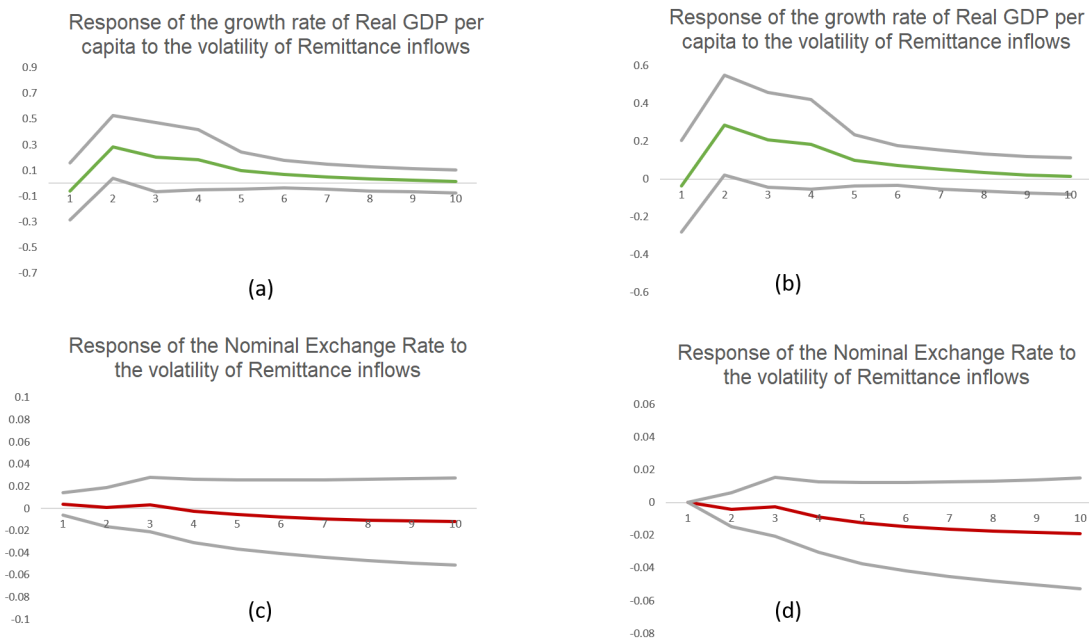


Figure 5.10: Shocks to the volatility of remittance inflows - Model 4 (Full sample)

5.4.4.2 Regional results

5.4.4.2 (a) Asia

Model 1: Endogenous variables: LNREM, LNNEE, RGDPG

Exogenous variables: CROIL

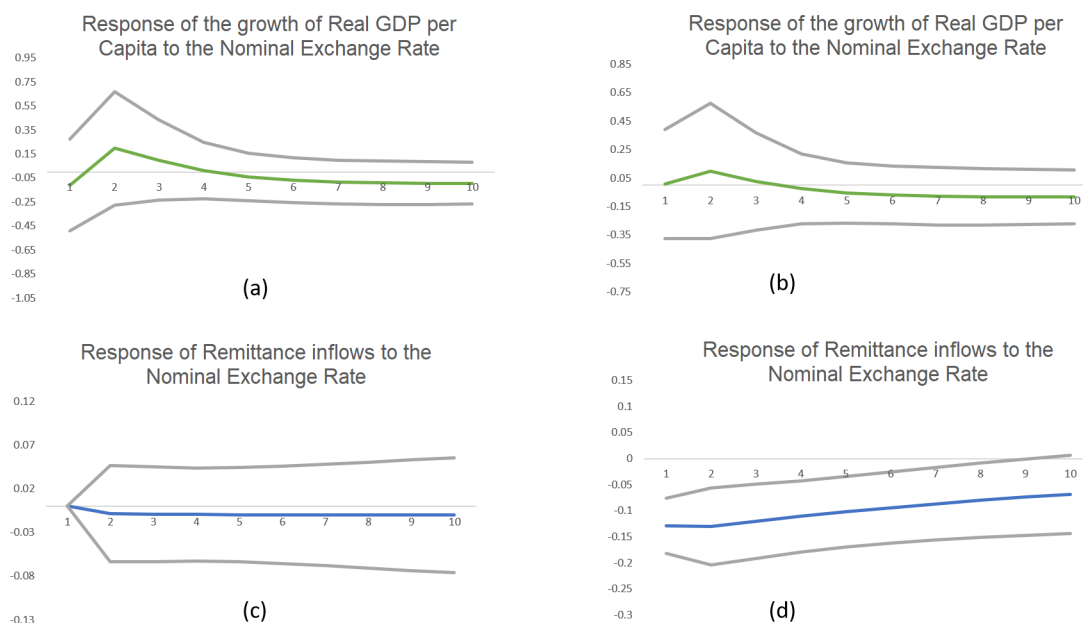


Figure 5.11: Shocks to the nominal exchange rate - Model 1 (Asia sample)

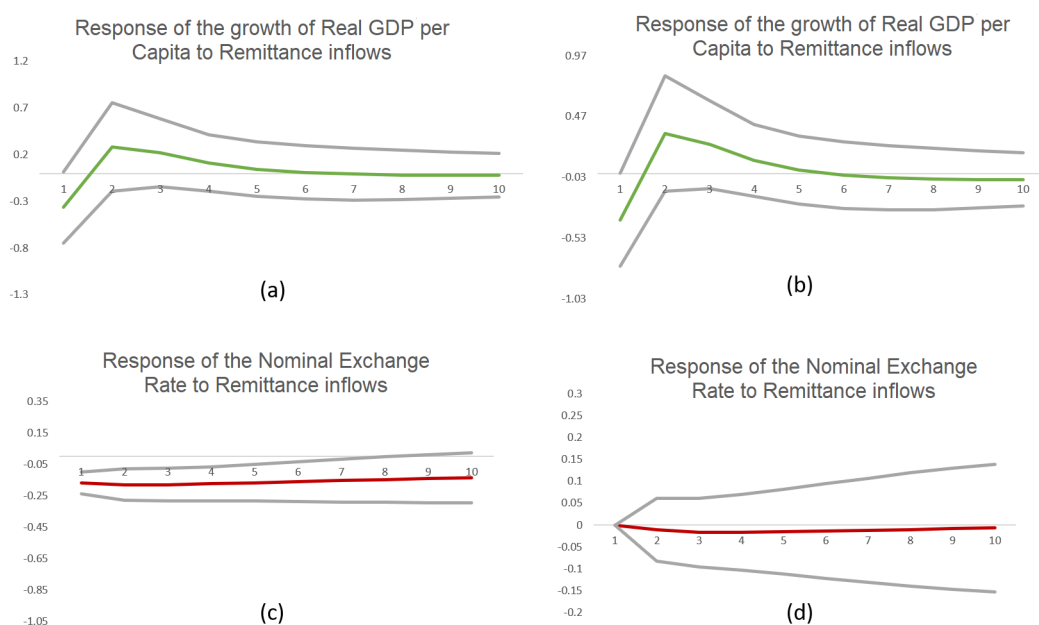


Figure 5.12: Shocks to remittance inflows - Model 1 (Asia sample)

Model 2: Endogenous variables: LNREM, LNBM, RGDP

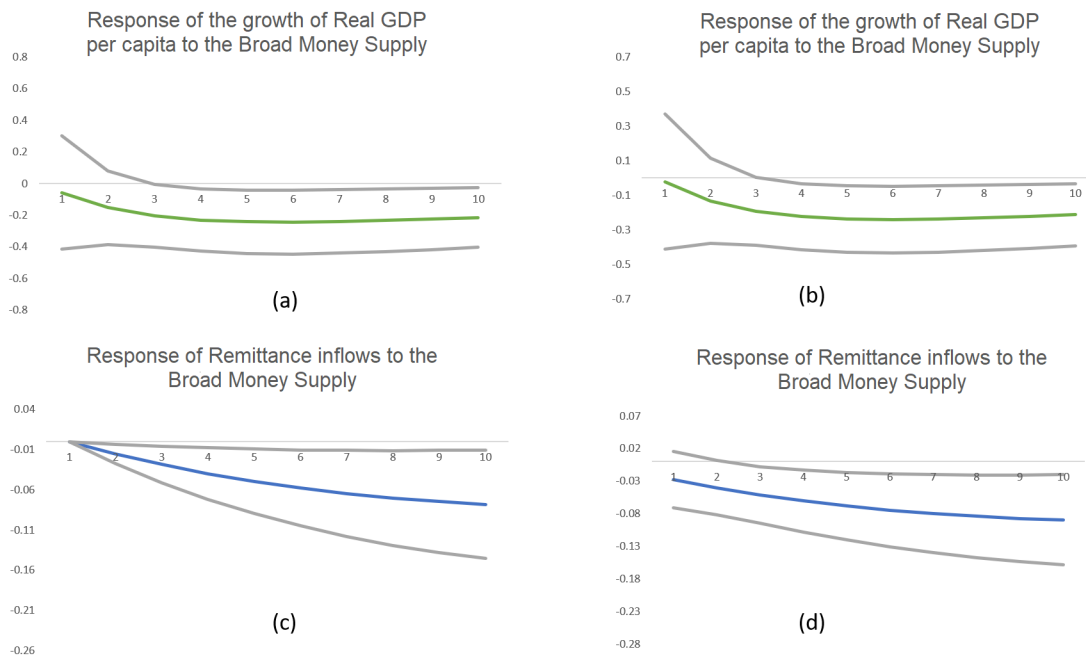


Figure 5.13: Shocks to the broad money supply - Model 2 (Asia sample)

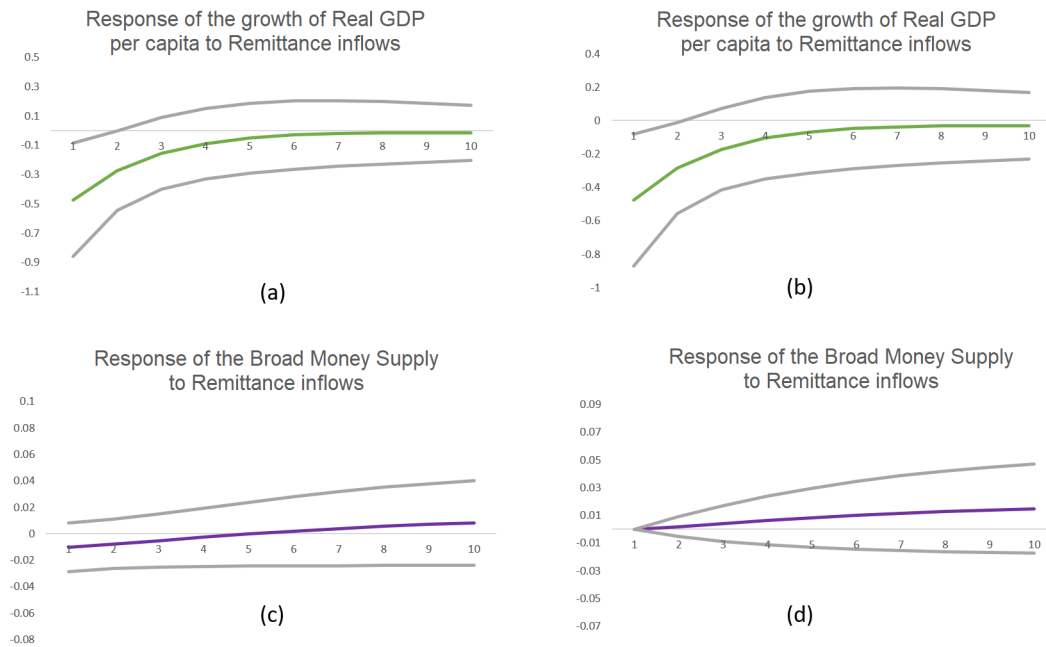


Figure 5.14: Shocks to remittance inflows - Model 2 (Asia sample)

Model 3: Endogenous variables: LNREM, LNCBPR, RGDP

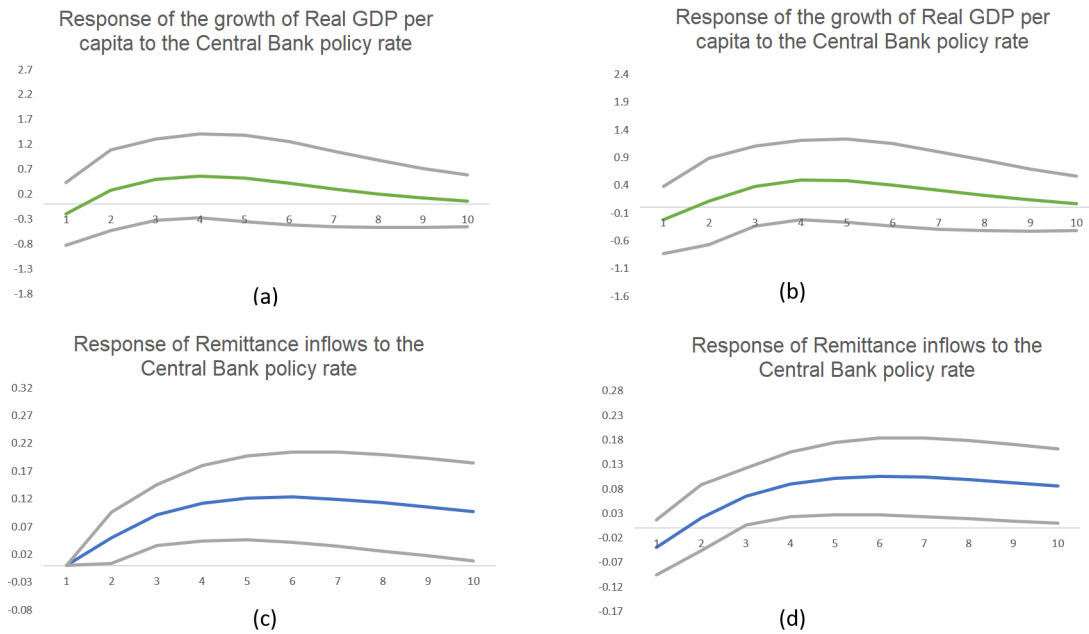


Figure 5.15: Shocks to the central bank policy rate - Model 3 (Asia sample)

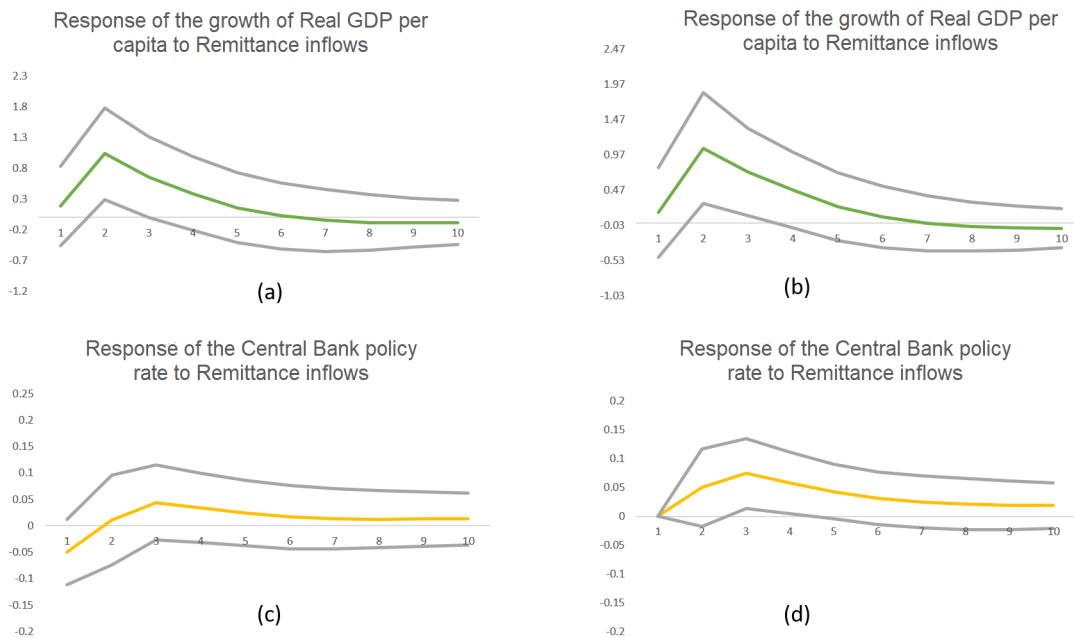


Figure 5.16: Shocks to remittance inflows - Model 3 (Asia sample)

Model 1: Endogenous variables: LNREM, LNNEE, RGDP

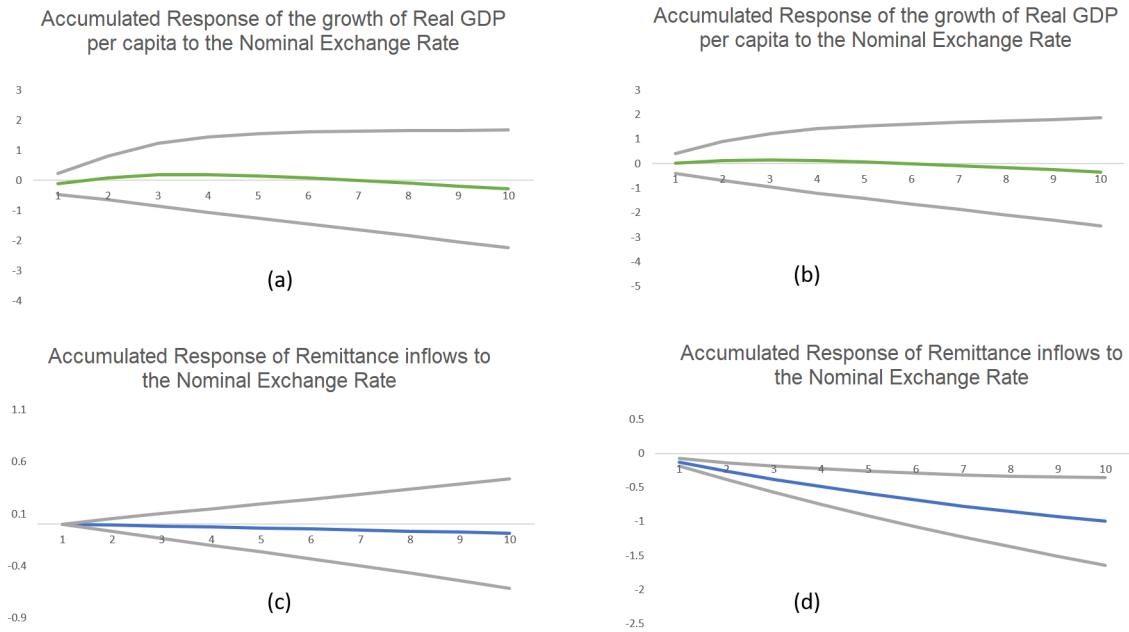


Figure 5.17: Shocks to the nominal exchange rate (Accumulated responses) - Model 1 (Asia sample)

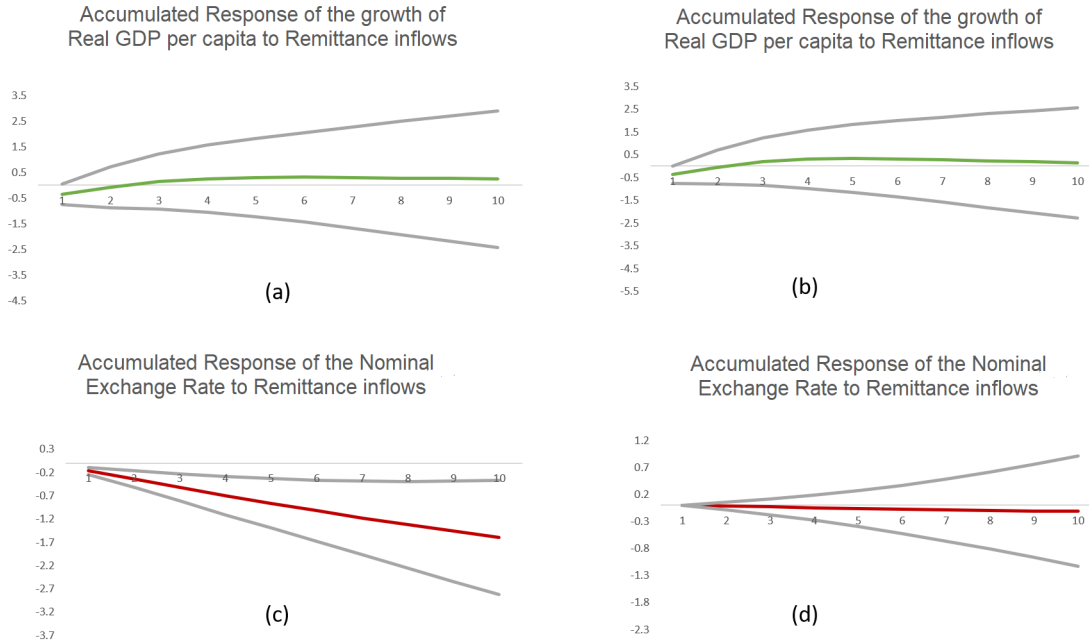


Figure 5.18: Shocks to remittance inflows (Accumulated responses) - Model 1 (Asia sample)

Model 4: Endogenous variables: SDREM, LNNEE, RGDPCG

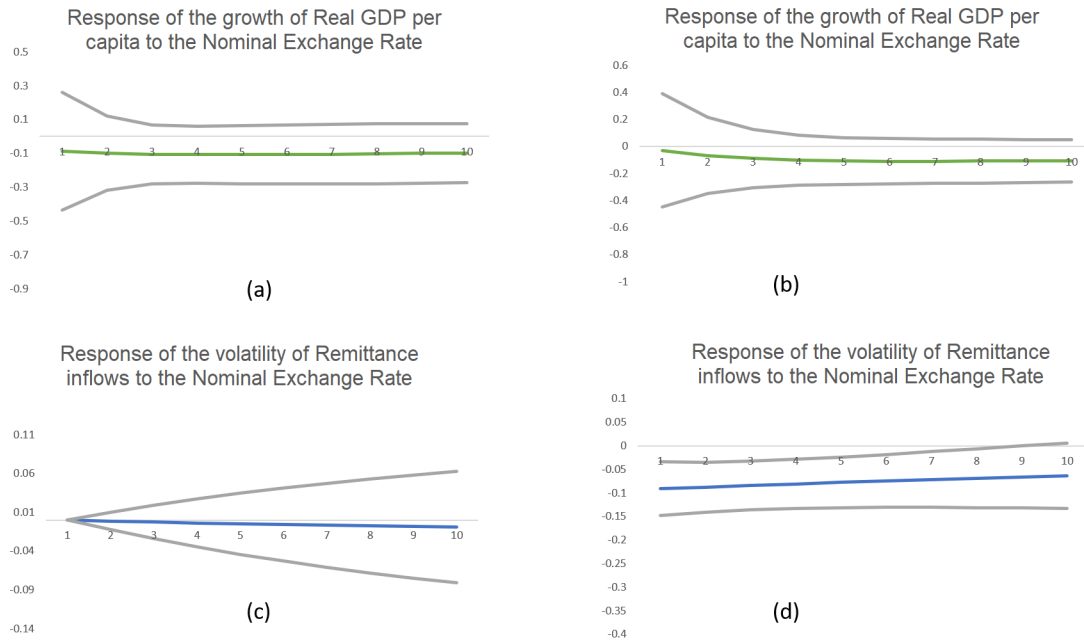


Figure 5.19: Shocks to the nominal exchange rate - Model 4 (Asia sample)

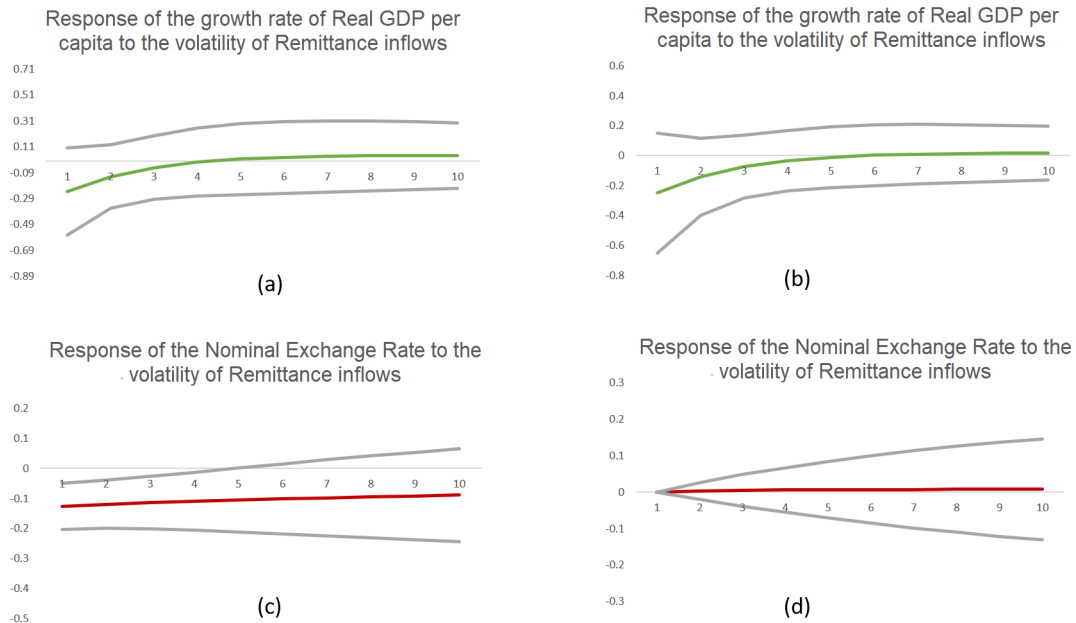


Figure 5.20: Shocks to the volatility of remittance inflows - Model 4 (Asia sample)

5.4.4.2 (b) Europe

Model 1: Endogenous variables: LNREM, LNNEE, RGDPCG

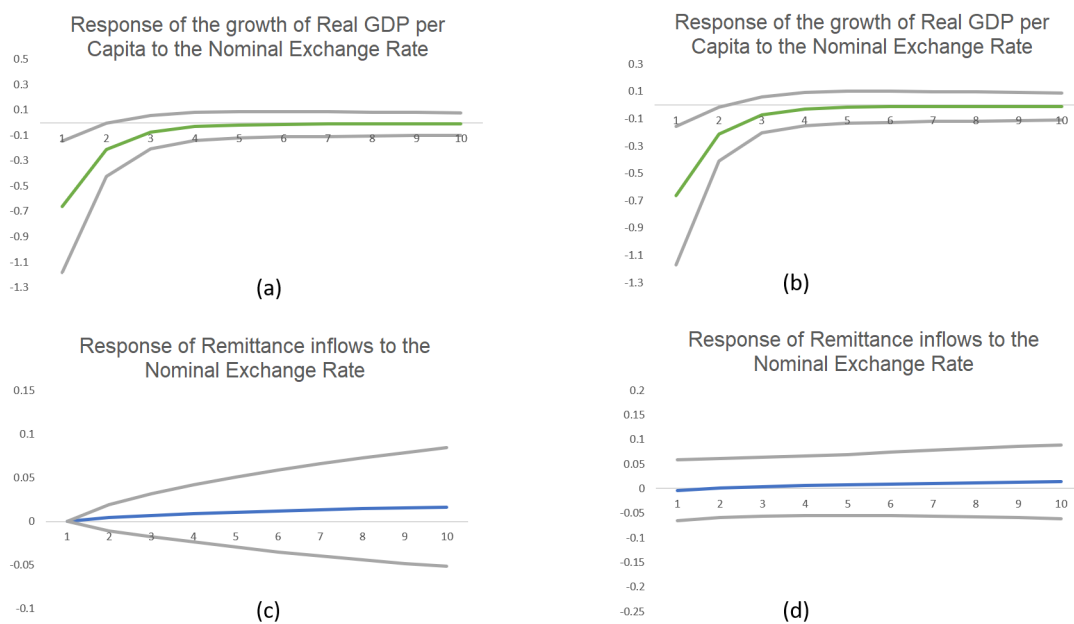


Figure 5.21: Shocks to the nominal exchange rate - Model 1 (Europe sample)

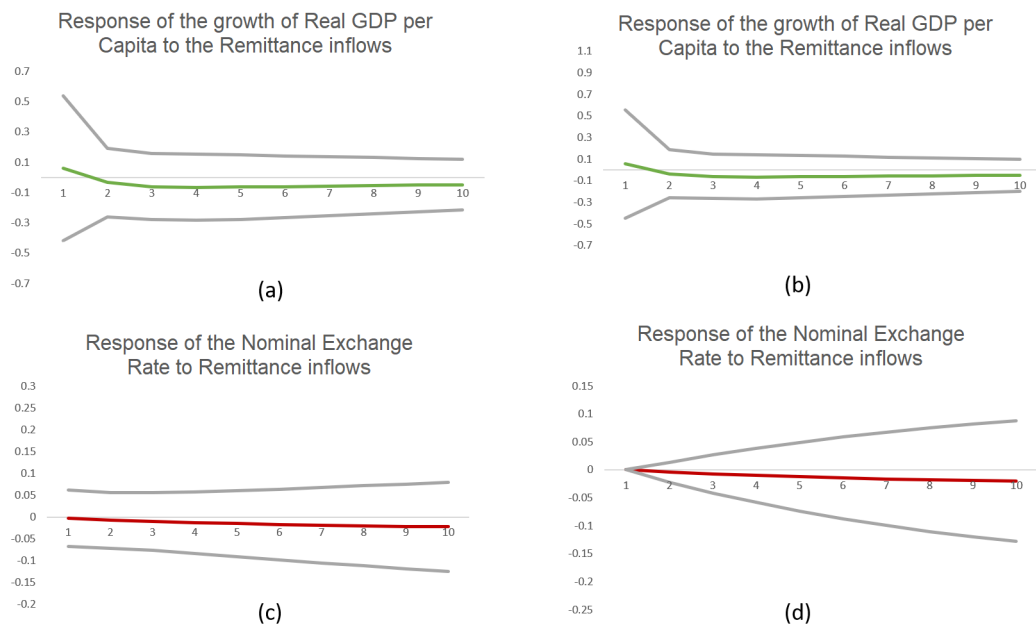


Figure 5.22: Shocks to remittance inflows - Model 1 (Europe sample)

Model 2: Endogenous variables: LNREM, LNBM, RGDPG

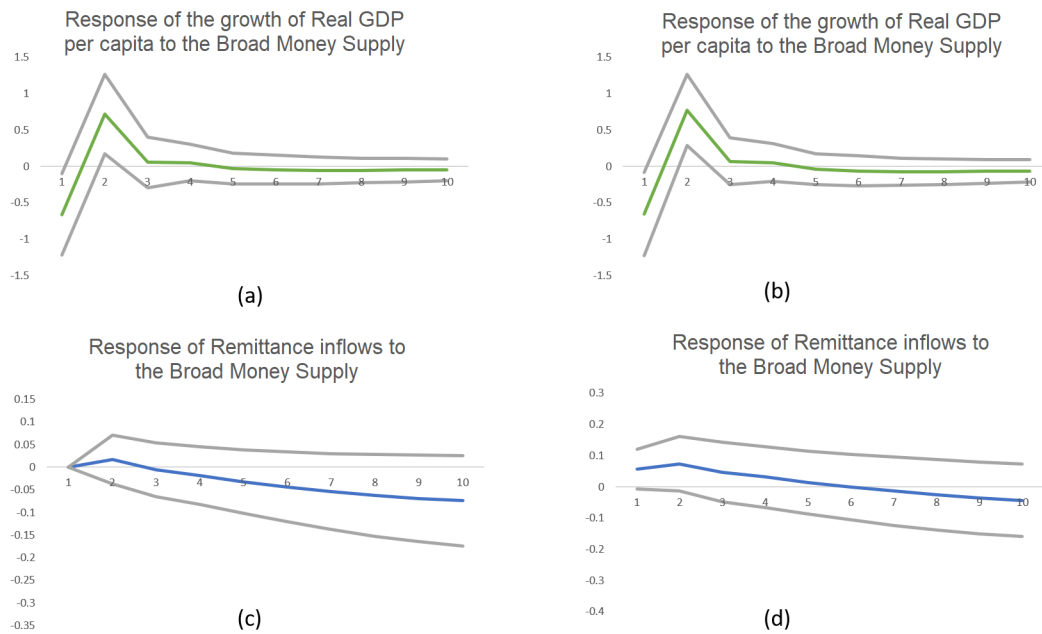


Figure 5.23: Shocks to the broad money supply - Model 2 (Europe sample)

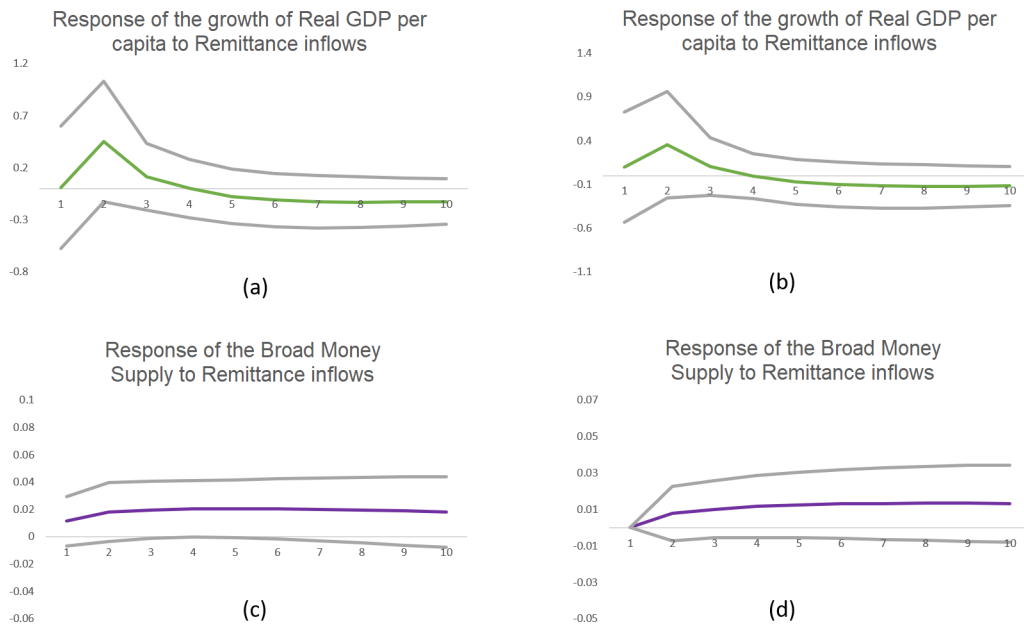


Figure 5.24: Shocks to remittance inflows - Model 2 (Europe sample)

Model 3: Endogenous variables: LNREM, LNCBPR, RGDP

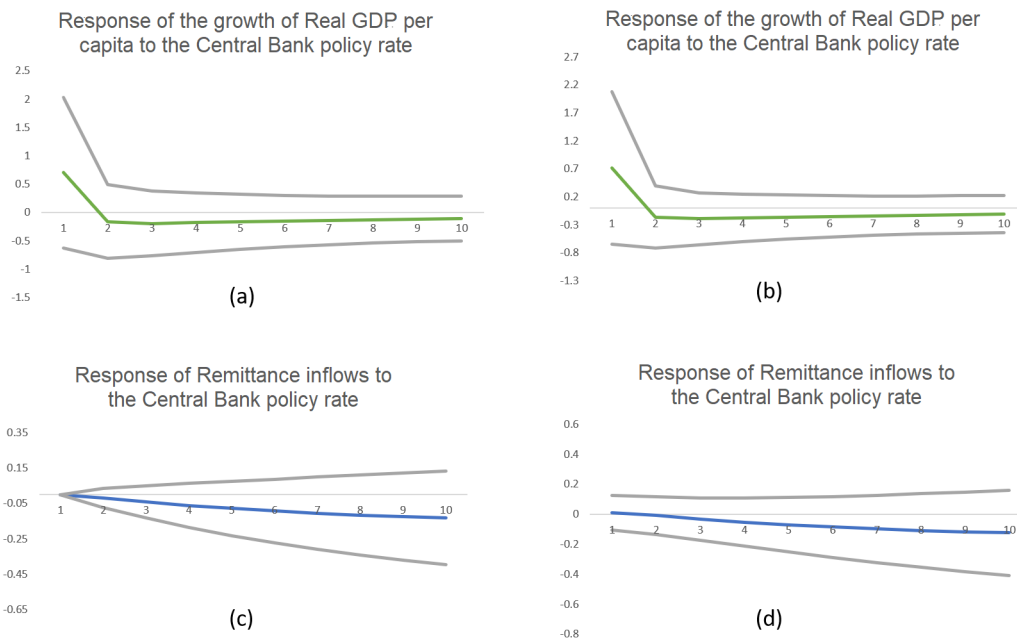


Figure 5.25: Shocks to the central bank policy rate - Model 3 (Europe sample)

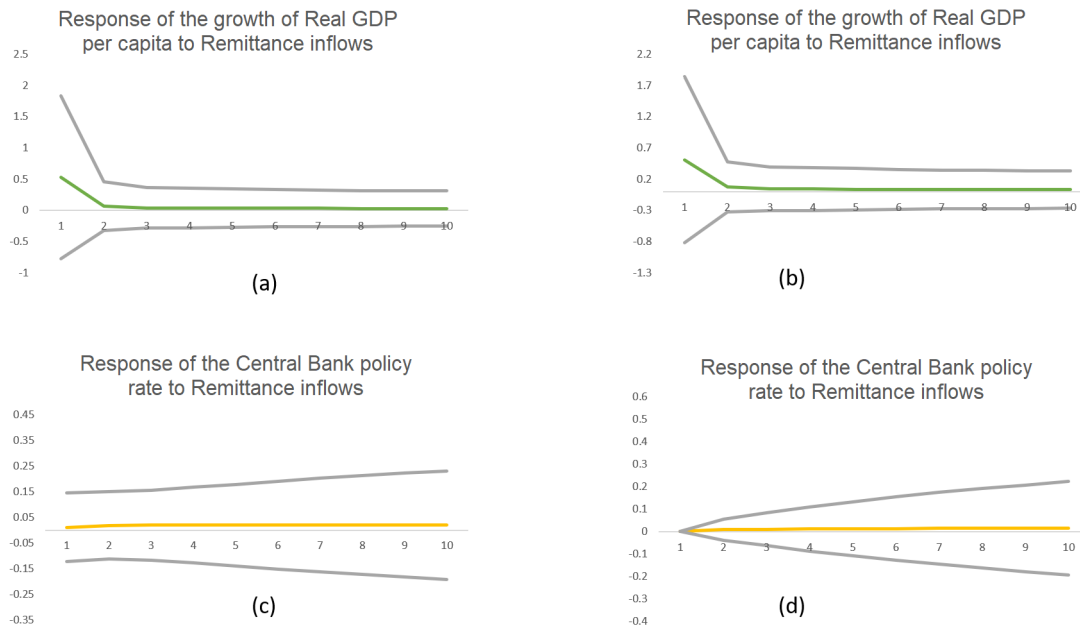


Figure 5.26: Shocks to remittance inflows- Model 3 (Europe sample)

Model 1: Endogenous variables: LNREM, LNNEE, RGDP

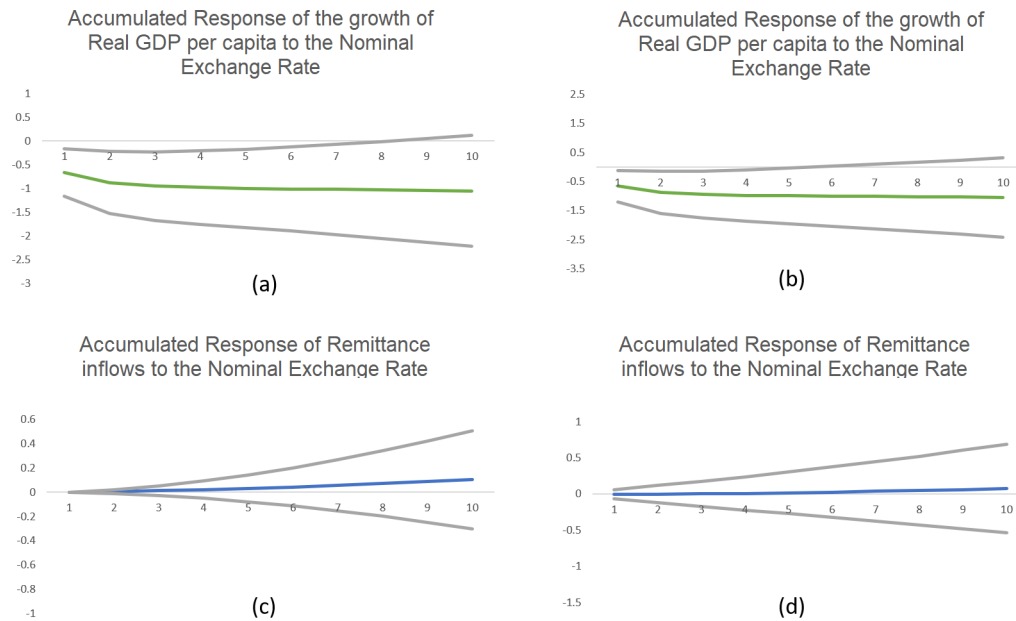


Figure 5.27: Shocks to the nominal exchange rate (Accumulated responses) - Model 1 (Europe sample)

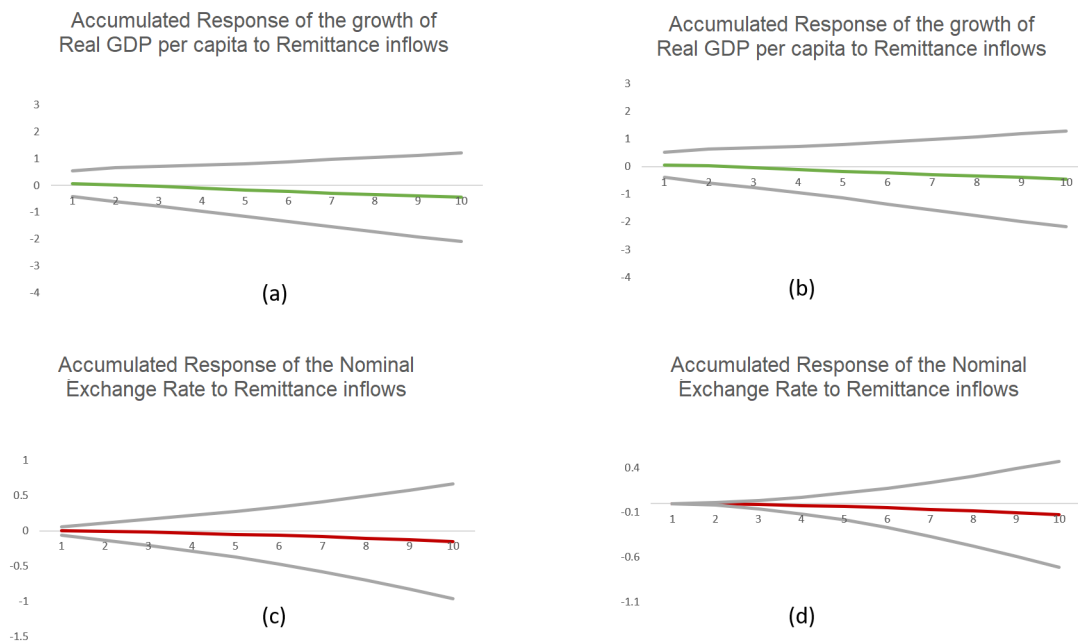


Figure 5.28: Shocks to remittance inflows (Accumulated responses) - Model 1 (Europe sample)

Model 4: Endogenous variables: SDREM, LNNEE, RGDP

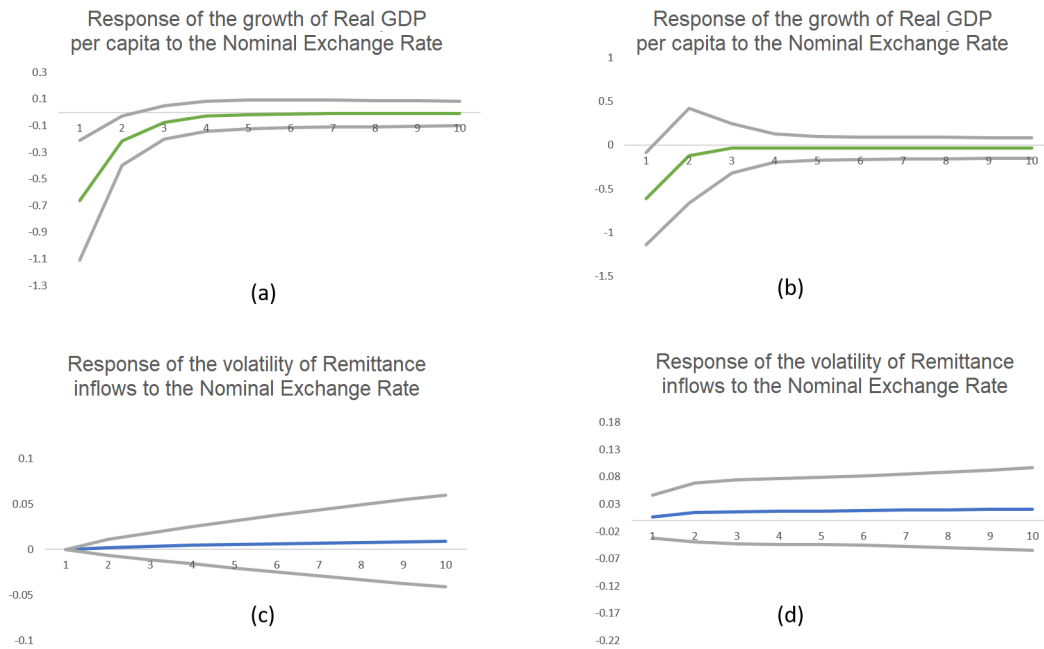


Figure 5.29: Shocks to the nominal exchange rate - Model 4 (Europe sample)

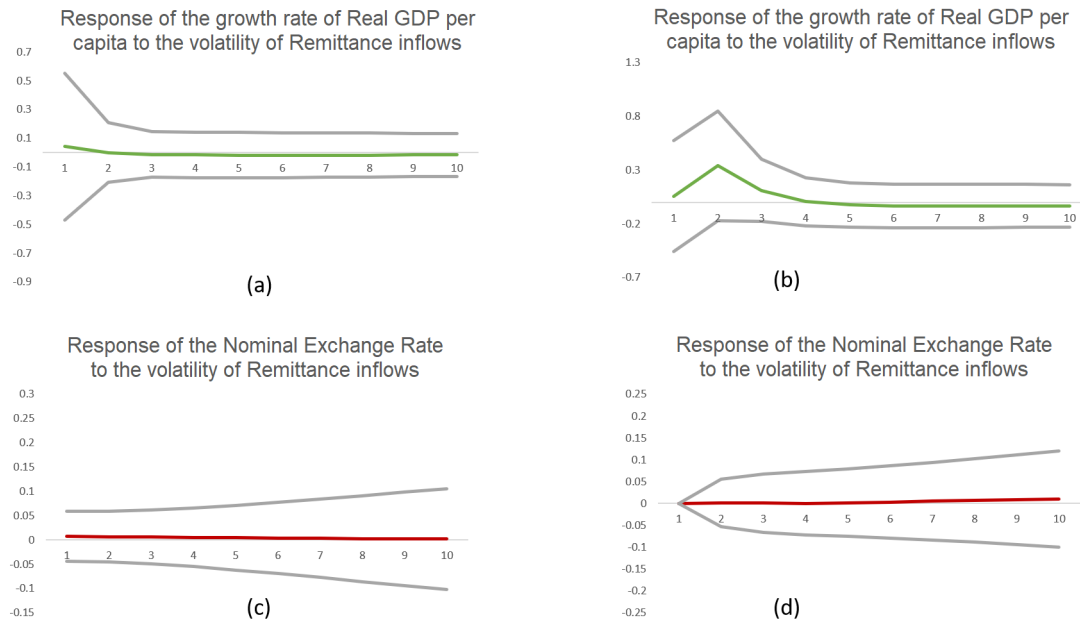


Figure 5.30: Shocks to the volatility of remittance inflows - Model 4 (Europe sample)

5.4.4.2 (c) Africa

Model 1: Endogenous variables: LNREM, LNNEE, RGDP

Exogenous variables: CROIL

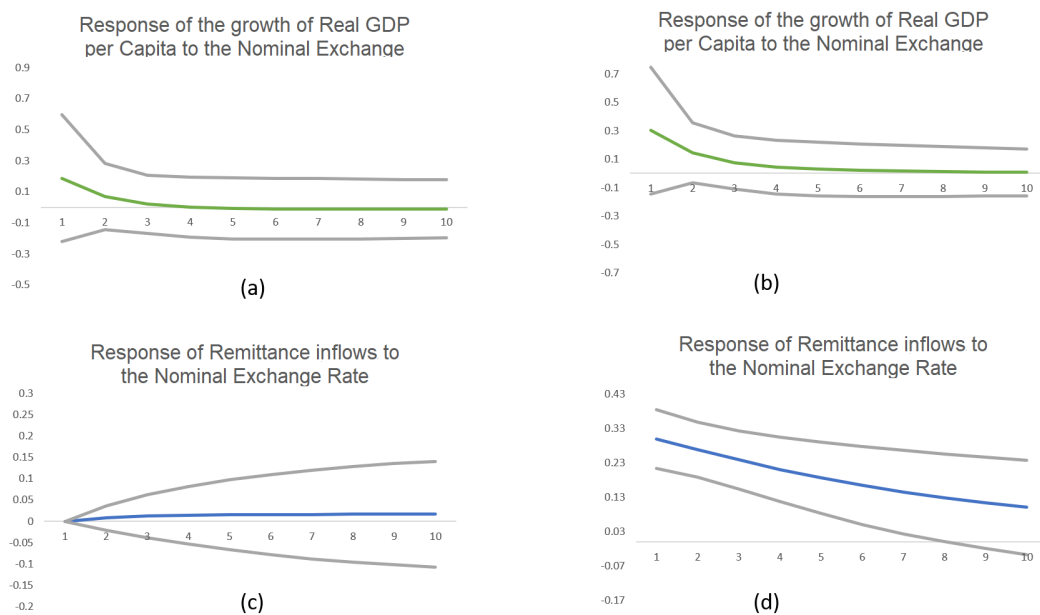


Figure 5.31: Shocks to the nominal exchange rate - Model 1 (Africa sample)

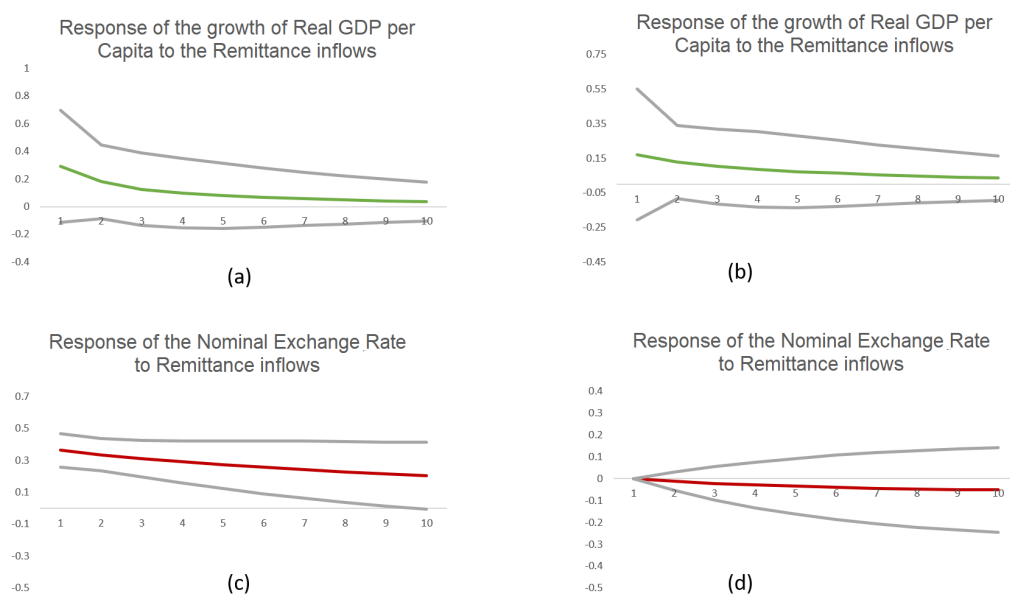


Figure 5.32: Shocks to remittance inflows - Model 1 (Africa sample)

Model 2: Endogenous variables: LNREM, LNB, RGDP

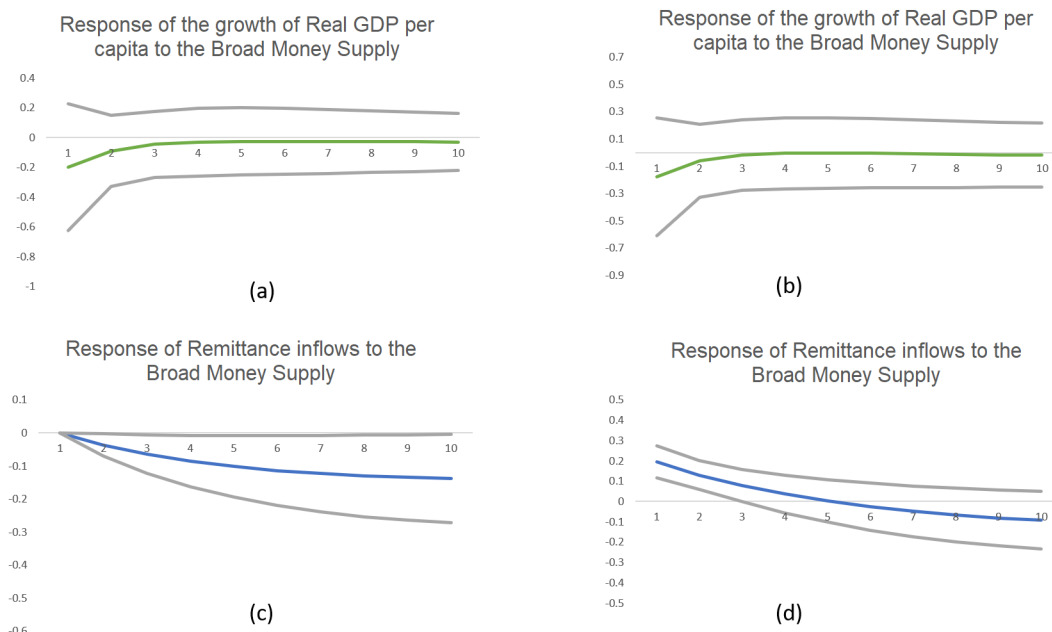


Figure 5.33: Shocks to the broad money supply - Model 2 (Africa sample)

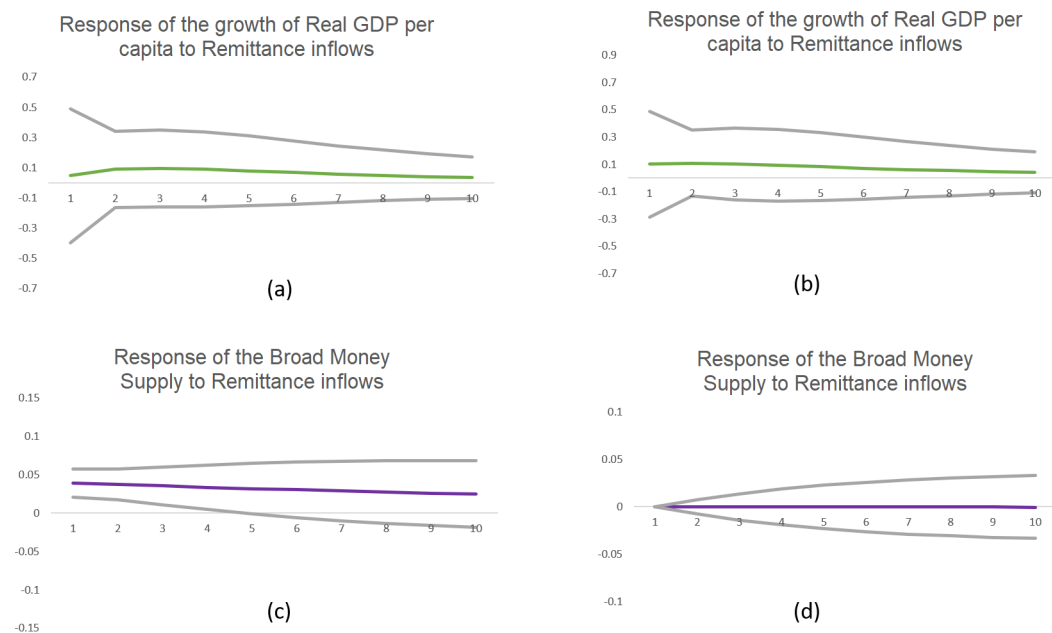


Figure 5.34: Shocks to remittance inflows - Model 2 (Africa sample)

Model 3: Endogenous variables: LNREM, LNCBPR, RGDPG

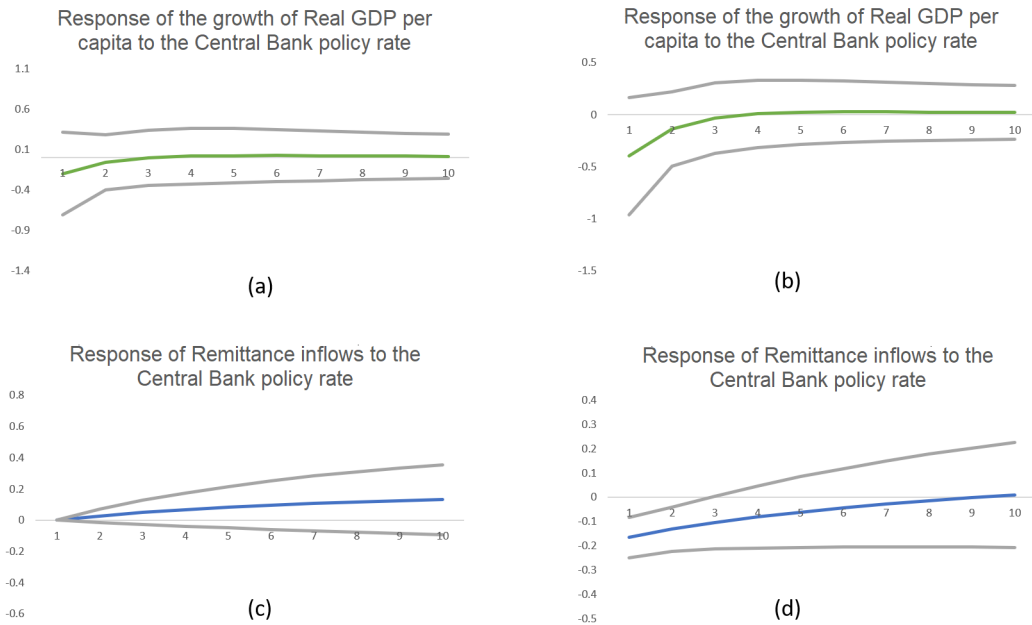


Figure 5.35: Shocks to the central bank policy rate - Model 3 (Africa sample)

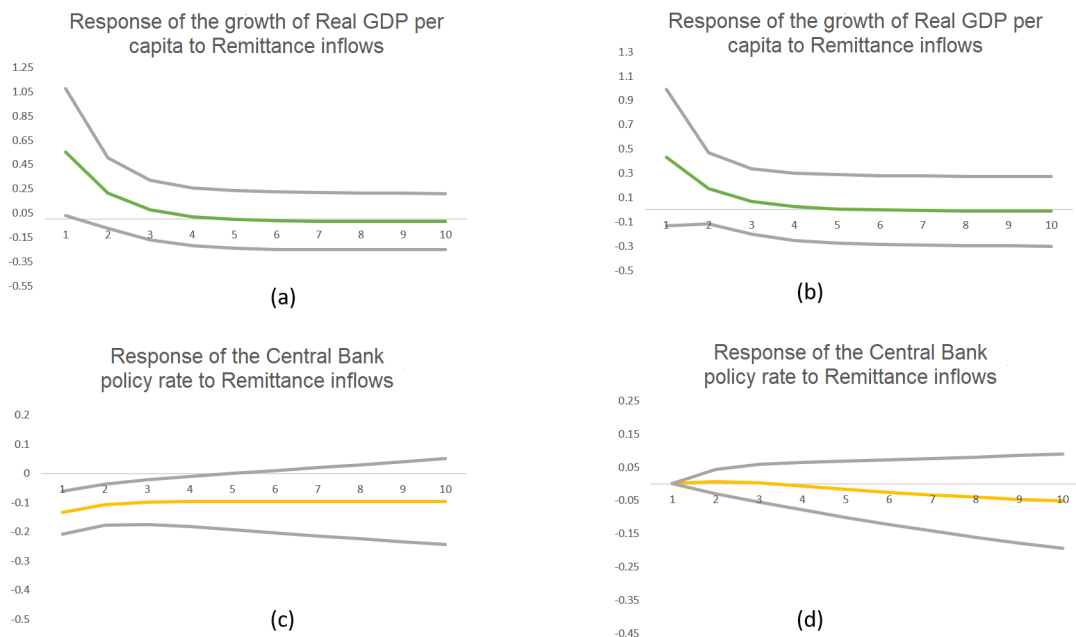


Figure 5.36: Shocks to remittance inflows - Model 3 (Africa sample)

Model 1: Endogenous variables: LNREM, LNNEE, RGDPCG

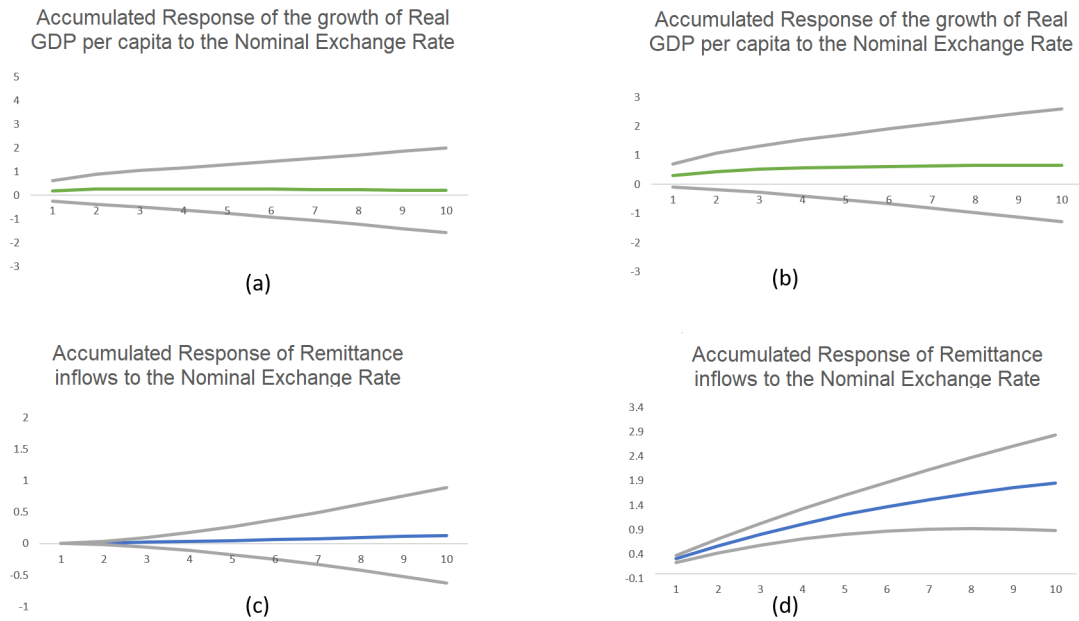


Figure 5.37: Shocks to the nominal exchange rate (Accumulated responses) - Model 1 (Africa sample)

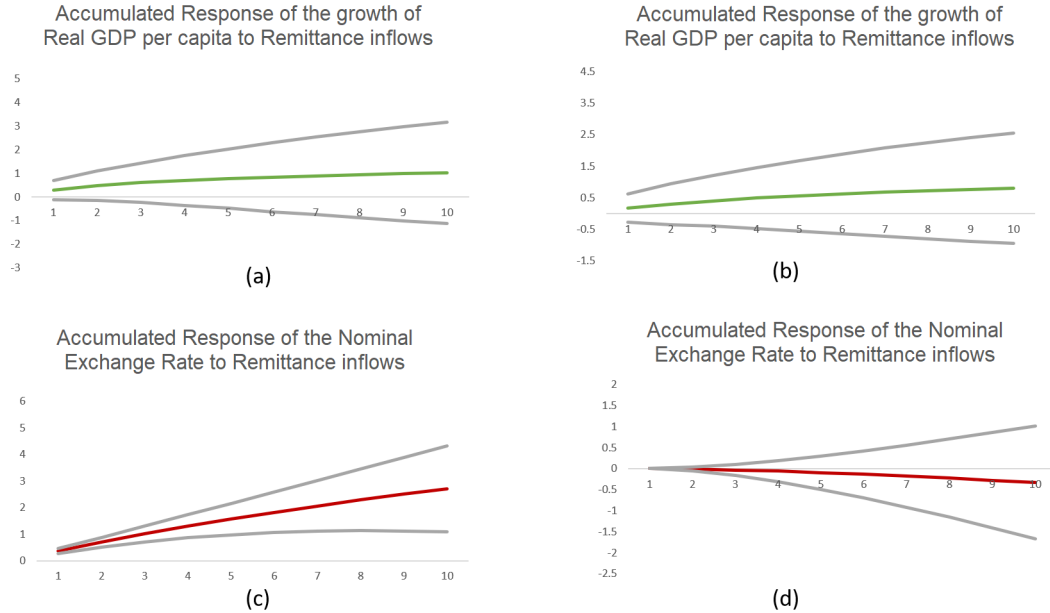


Figure 5.38: Shocks to remittance inflows (Accumulated responses) - Model 1 (Africa sample)

Model 4: Endogenous variables: SDREM, NEE, RGDPG

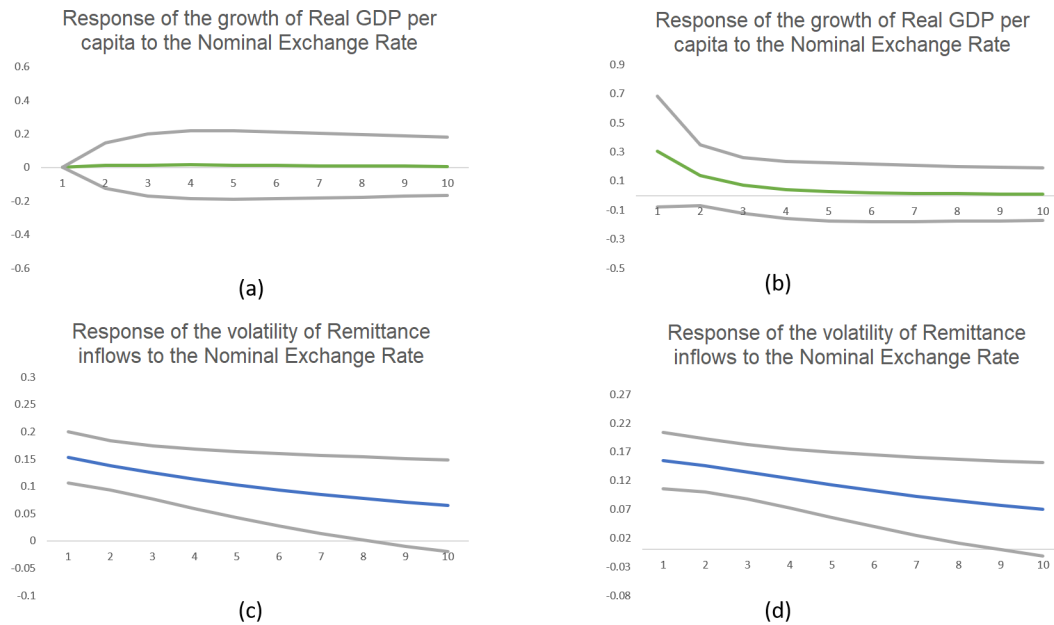


Figure 5.39: Shocks to the nominal exchange rate - Model 4 (Africa sample)

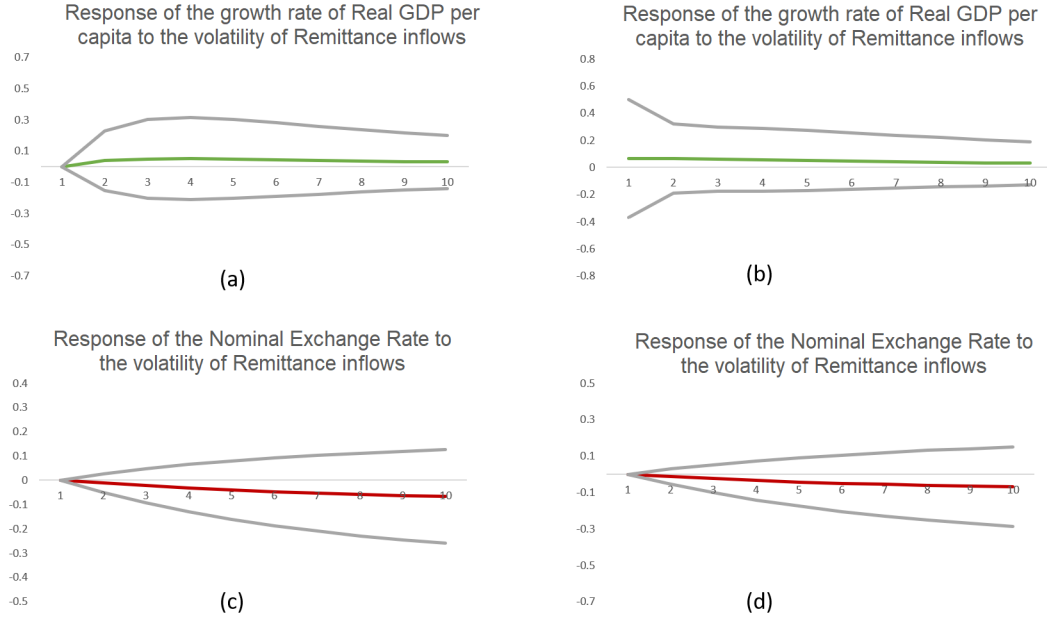


Figure 5.40: Shocks to the volatility of remittance inflows - Model 4 (Africa sample)

5.4.4.2 (d) MENA

Model 1: Endogenous variables: LNREM, LNNEE, RGDPCG

Exogenous variables: FD

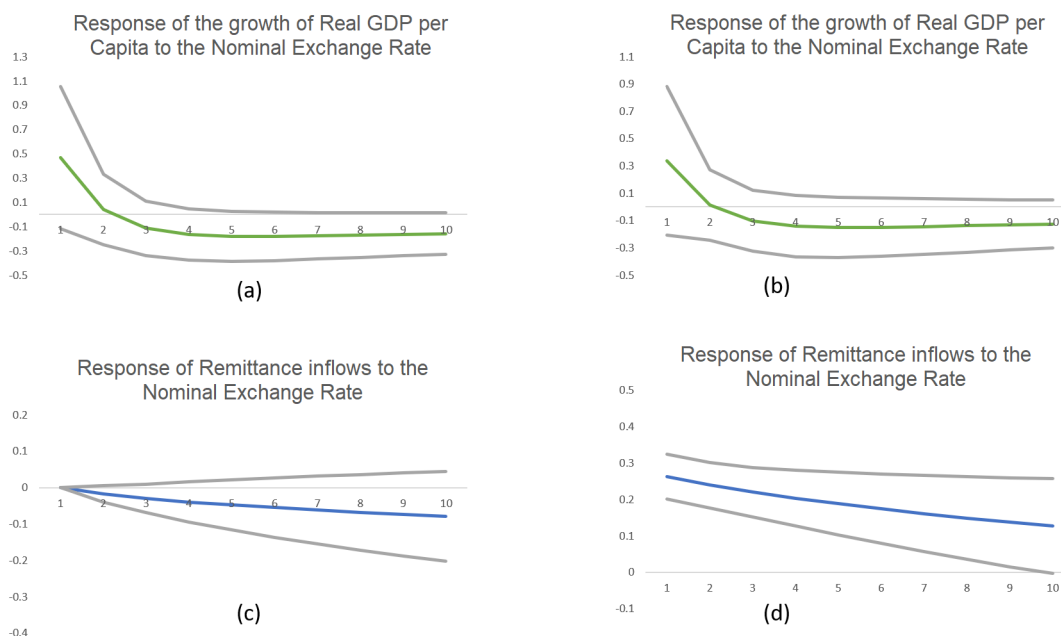


Figure 5.41: Shocks to the nominal exchange rate - Model 1 (MENA sample)

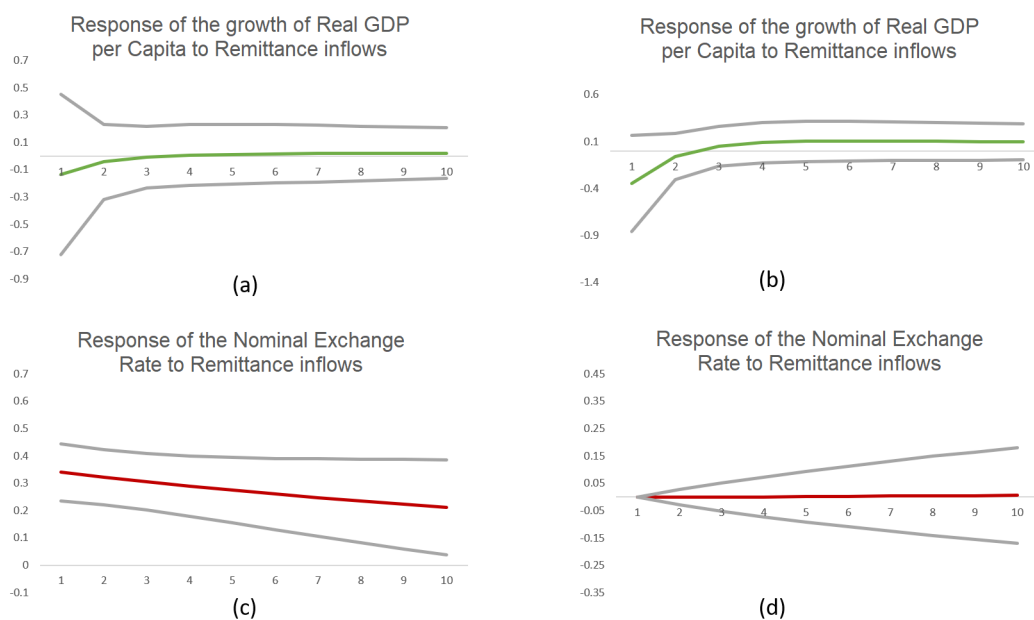


Figure 5.42: Shocks to remittance inflows - Model 1 (MENA sample)

Model 2: Endogenous variables: LNREM, LNBM, RGDP

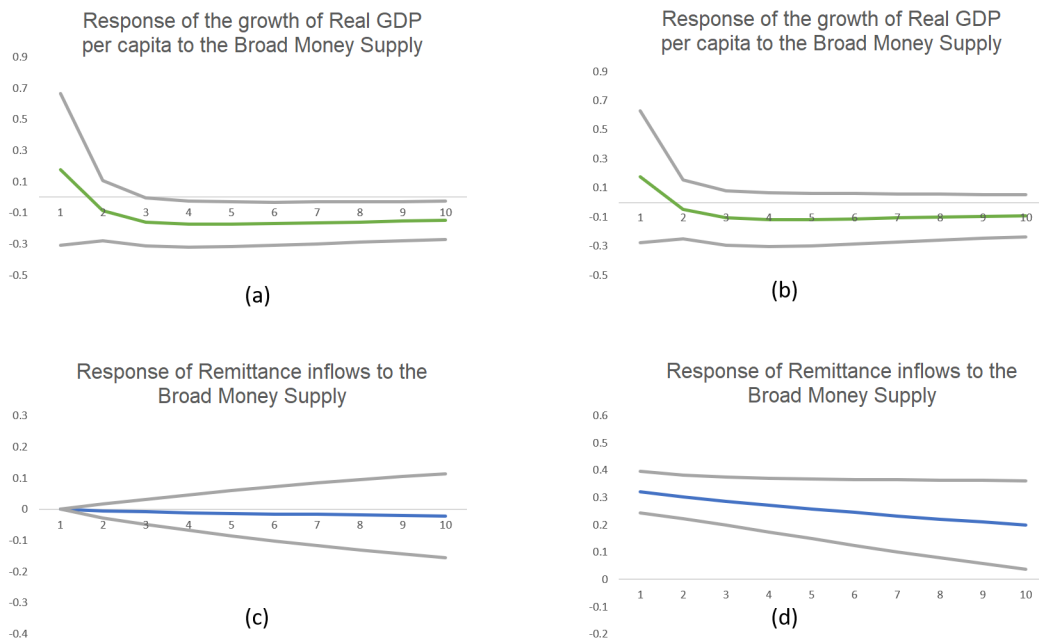


Figure 5.43: Shocks to the broad money supply - Model 2 (MENA sample)

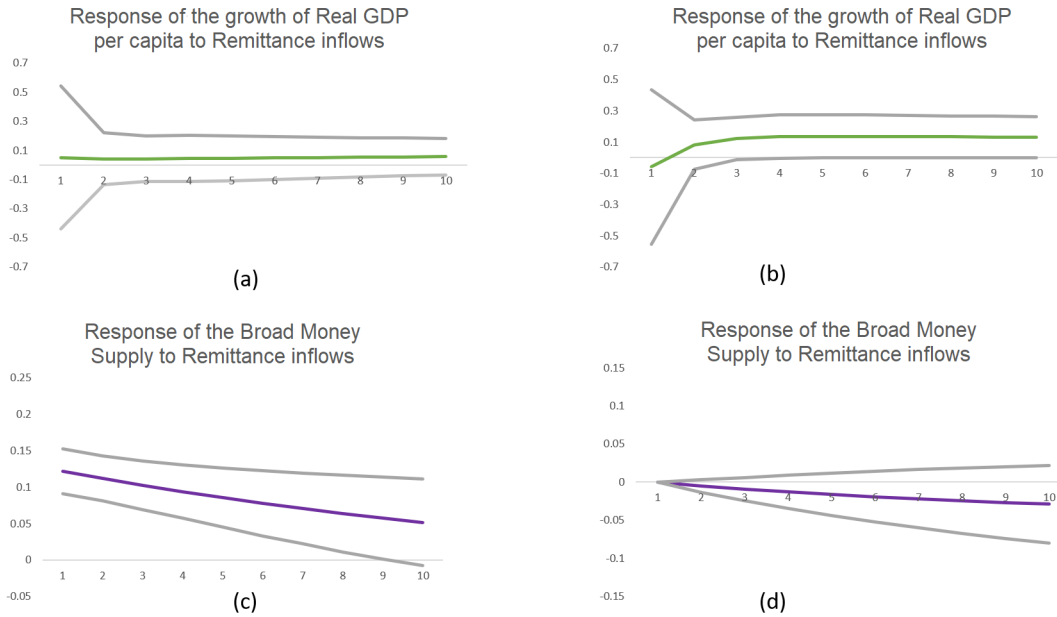


Figure 5.44: Shocks to remittance inflows - Model 2 (MENA sample)

Model 3: Endogenous variables: LNREM, LNCBPR, RGDPCG

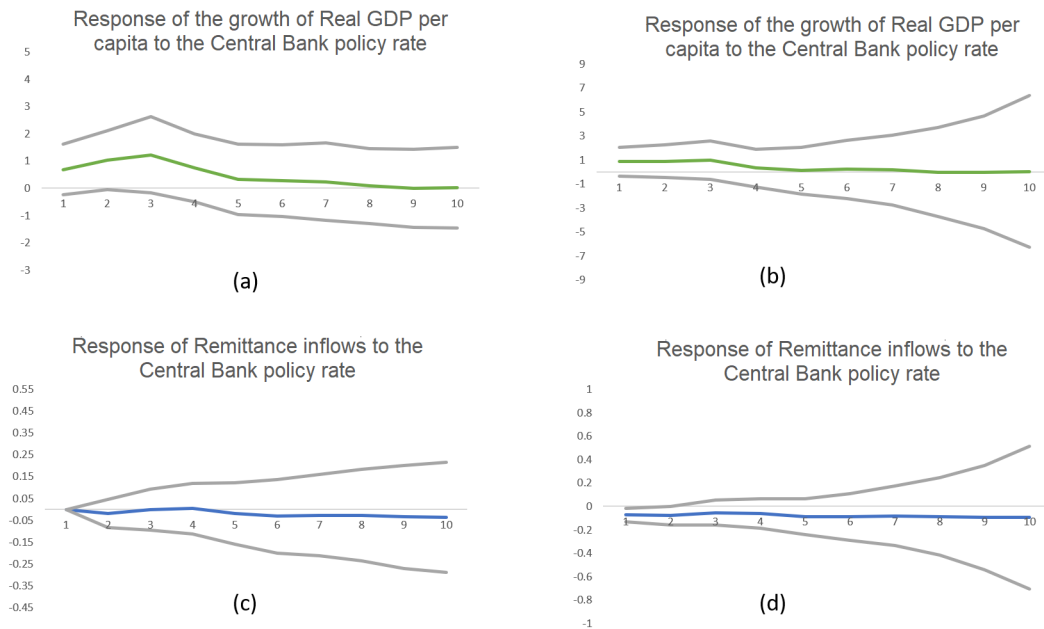


Figure 5.45: Shocks to the central bank policy rate - Model 3 (MENA sample)

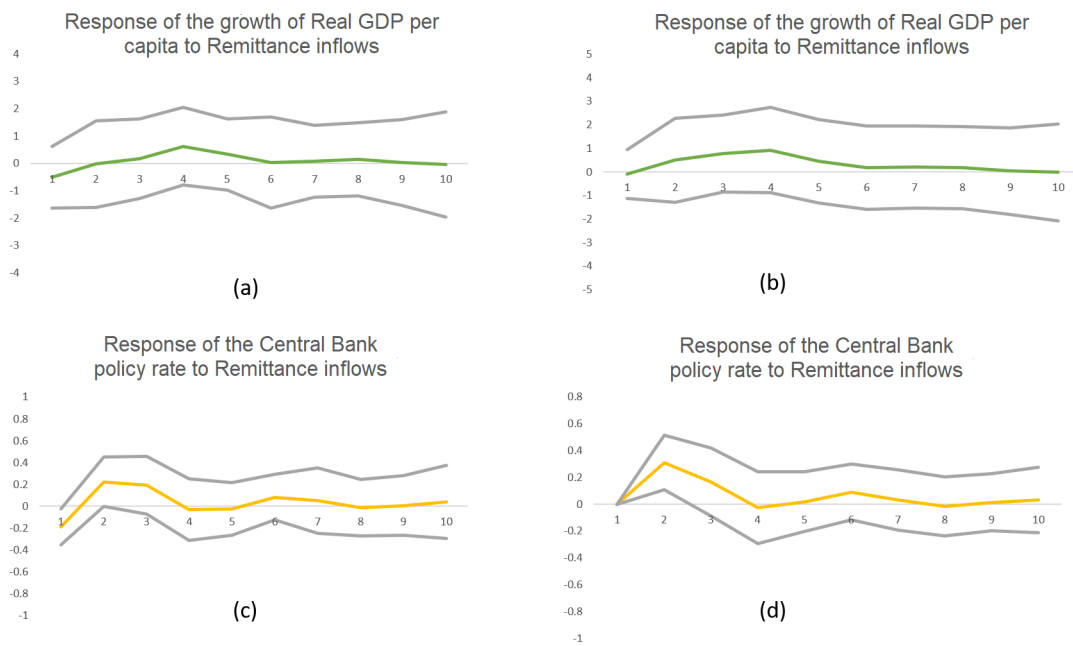


Figure 5.46: Shocks to remittance inflows - Model 3 (MENA sample)

Model 1: Endogenous variables: LNREM, LNNEE, RGDPG

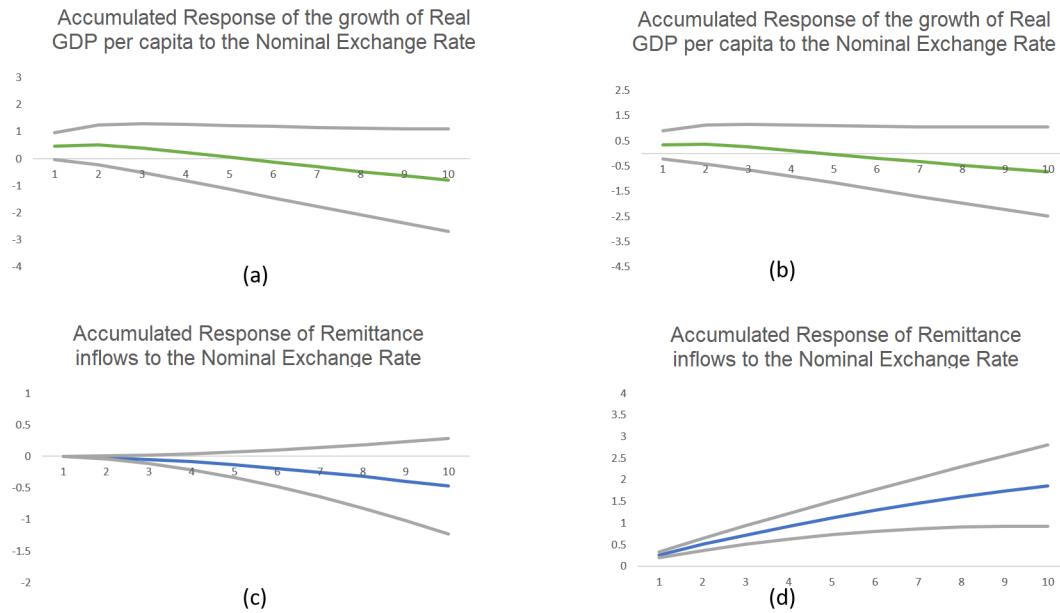


Figure 5.47: Shocks to the nominal exchange rate (Accumulated responses) - Model 1 (MENA sample)

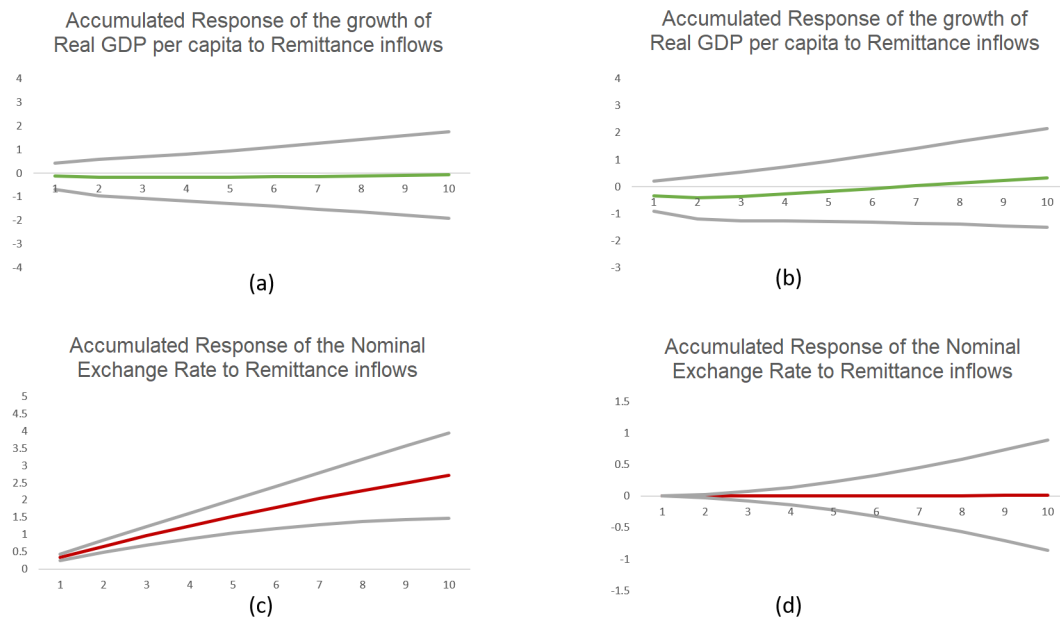


Figure 5.48: Shocks to remittance inflows (Accumulated responses) - Model 1 (MENA sample)

Model 4: Endogenous variables: SDREM, LNNEE, RGDPCG

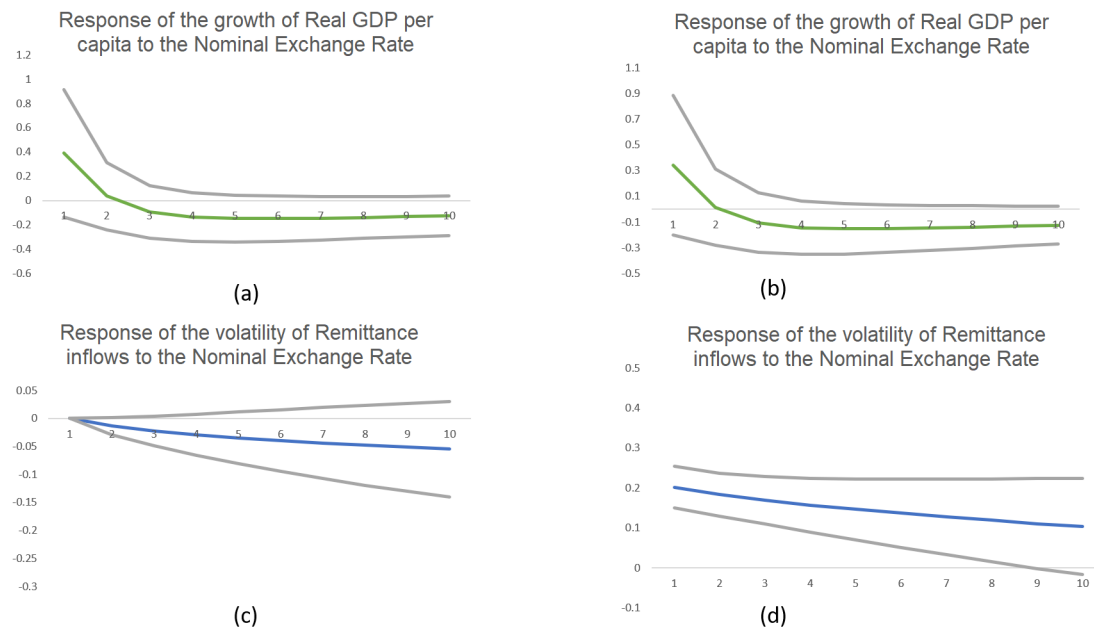


Figure 5.49: Shocks to the nominal exchange rate - Model 4 (MENA sample)

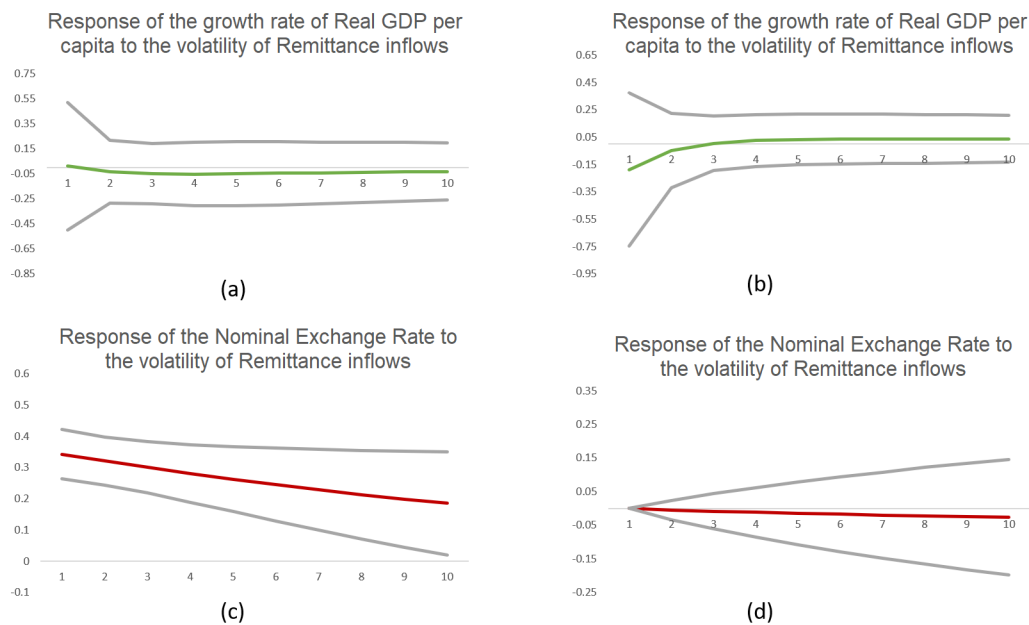


Figure 5.50: Shocks to the volatility of remittance inflows - Model 4 (MENA sample)

5.4.4.2 (e) Latin America

Model 1: Endogenous variables: LNREM, LNNEE, RGDPG

Exogenous variables: USRG

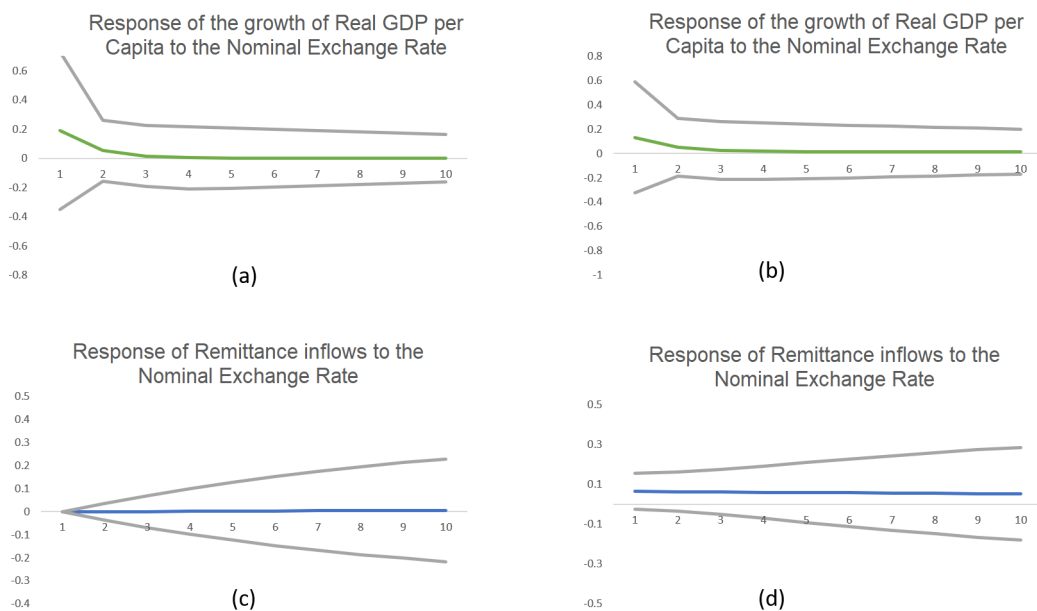


Figure 5.51: Shocks to the nominal exchange rate - Model 1 (Latin America sample)

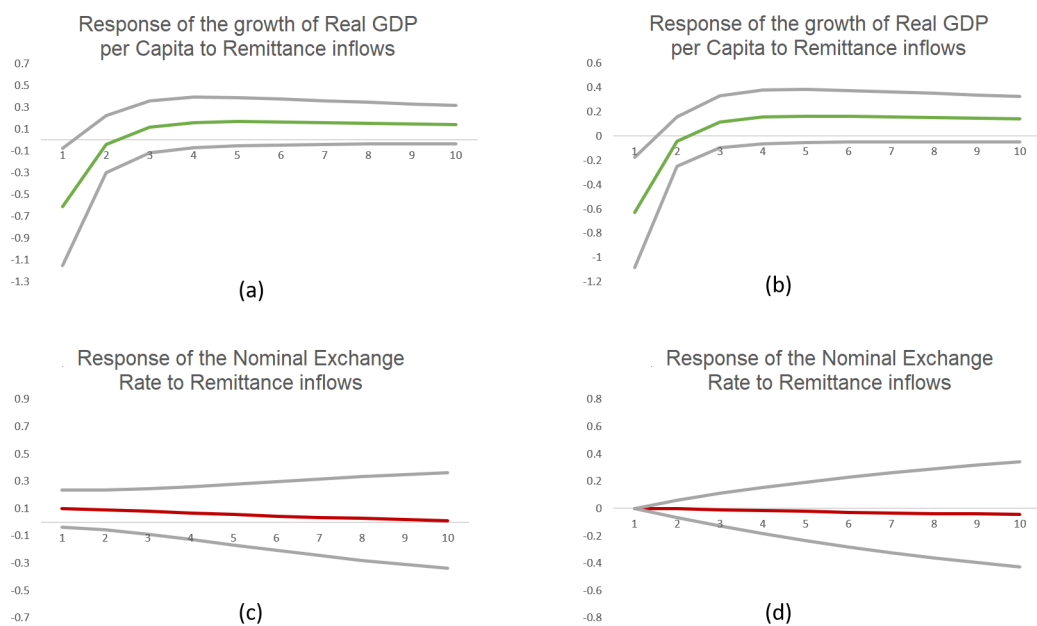


Figure 5.52: Shocks to remittance inflows - Model 1 (Latin America sample)

Model 2: Endogenous variables: LNREM, LNBM, RGDPG

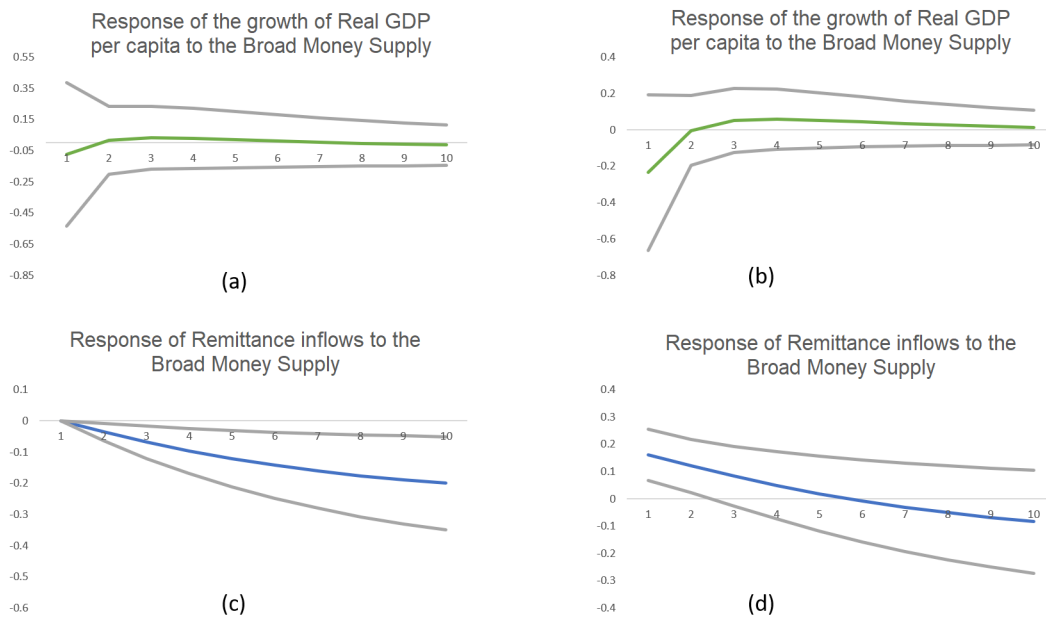


Figure 5.53: Shocks to the broad money supply - Model 2 (Latin America sample)

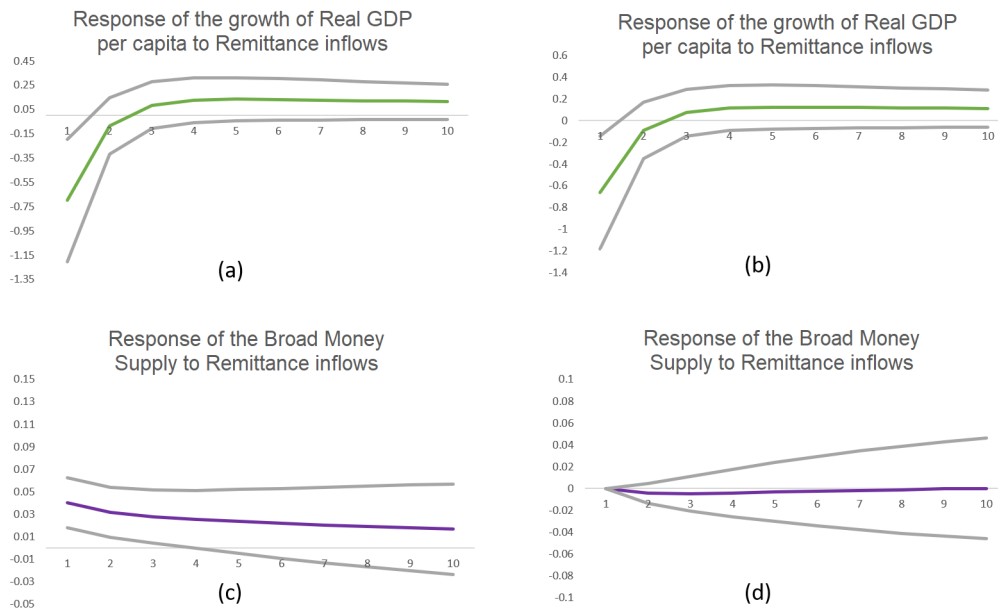


Figure 5.54: Shocks to remittance inflows - Model 2 (Latin America sample)

Model 3: Endogenous variables: LNREM, LNCBPR, RGDPG

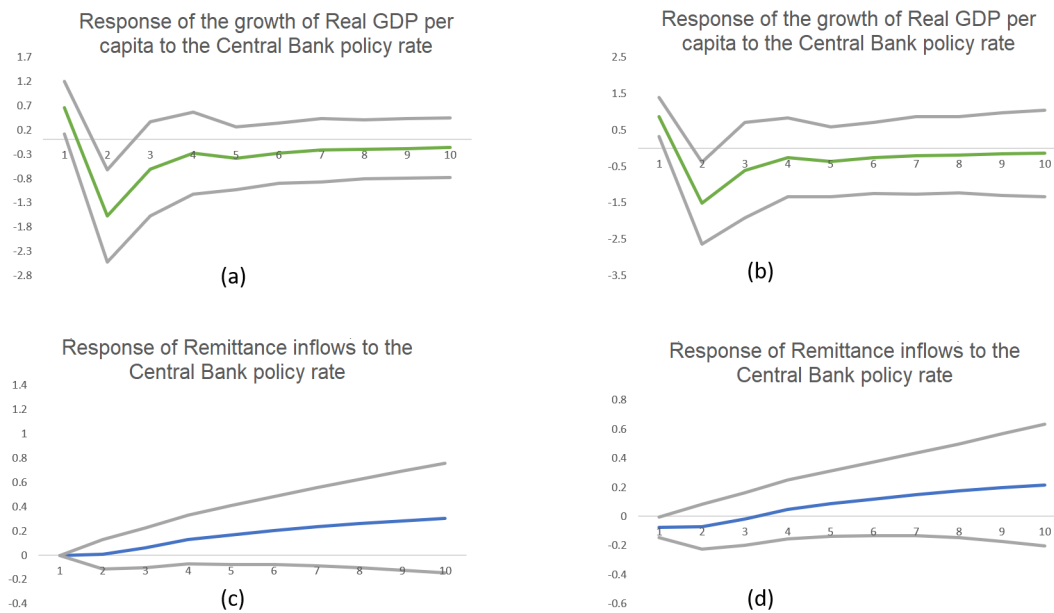


Figure 5.55: Shocks to the central bank policy rate - Model 3 (Latin America sample)

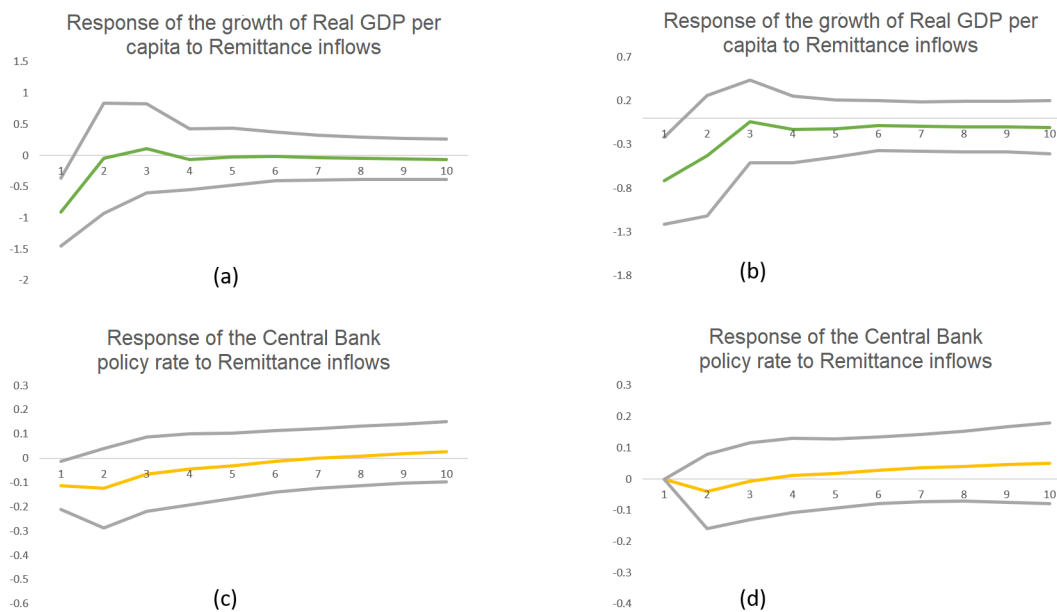


Figure 5.56: Shocks to remittance inflows - Model 3 (Latin America sample)

Model 1: Endogenous variables: LNREM, LNNEE, RGDPCG

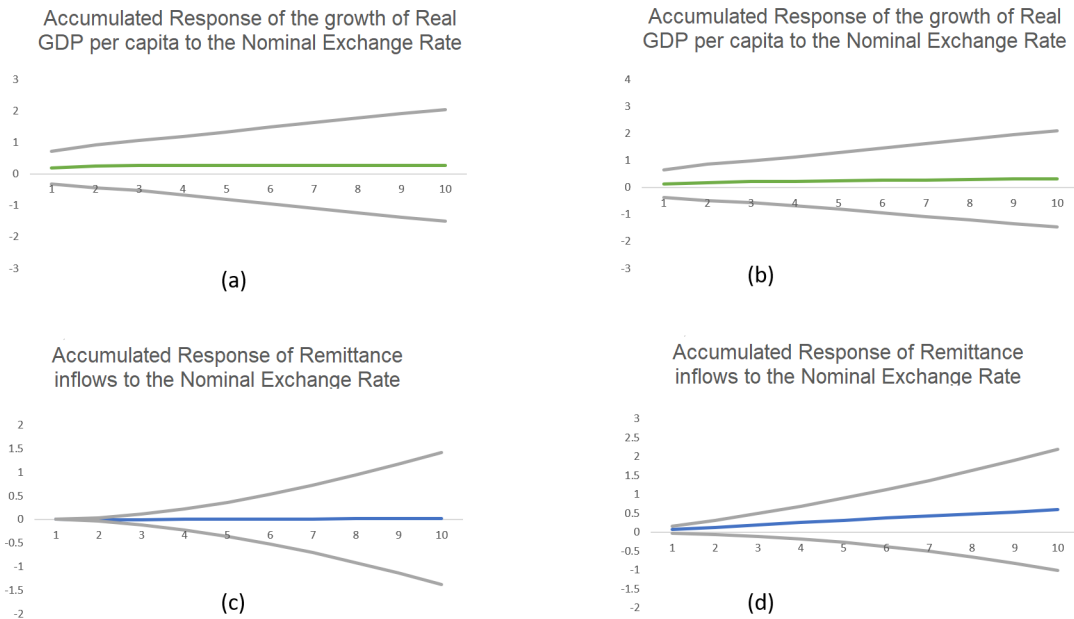


Figure 5.57: Shocks to the nominal exchange rate (Accumulated responses) - Model 1 (Latin America sample)

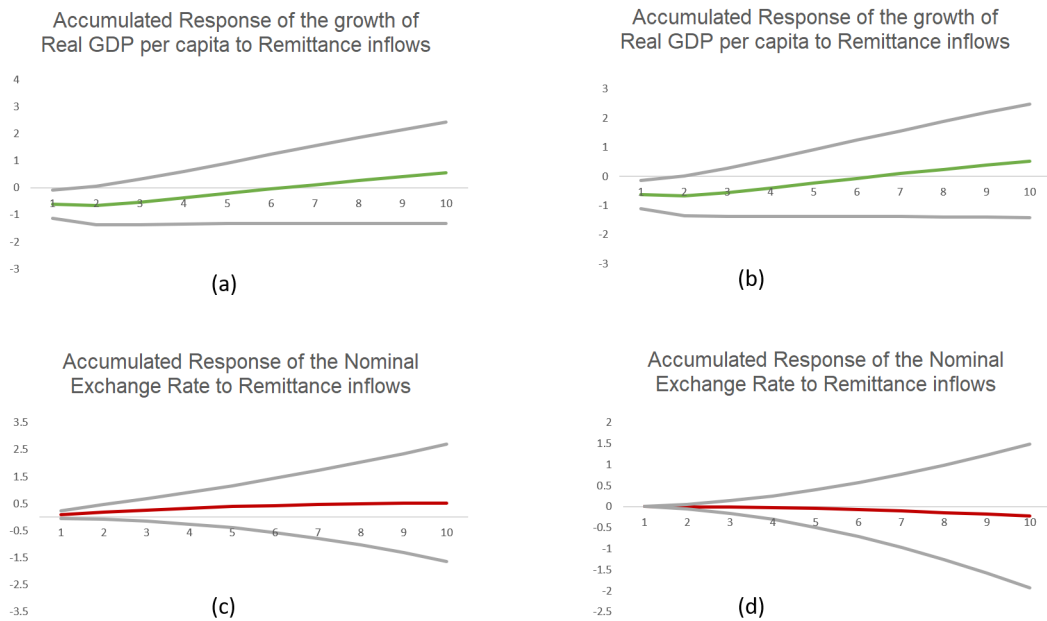


Figure 5.58: Shocks to remittance inflows (Accumulated responses) - Model 1 (Latin America sample)

Model 4: Endogenous variables: SDREM, LNNEE, RGDPCG

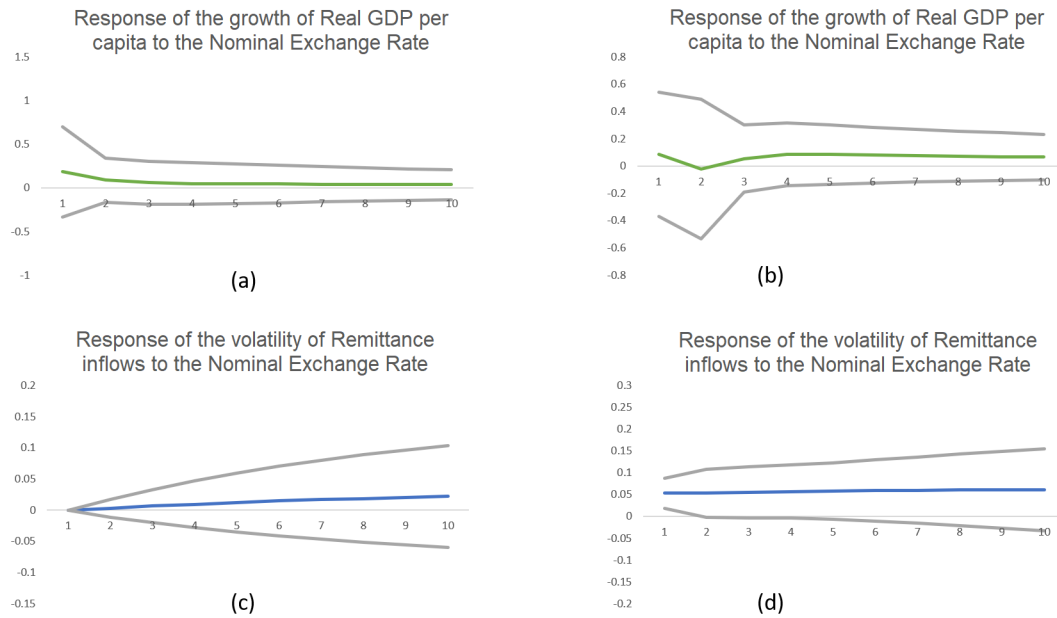


Figure 5.59: Shocks to remittance inflows - Model 4 (Latin America sample)

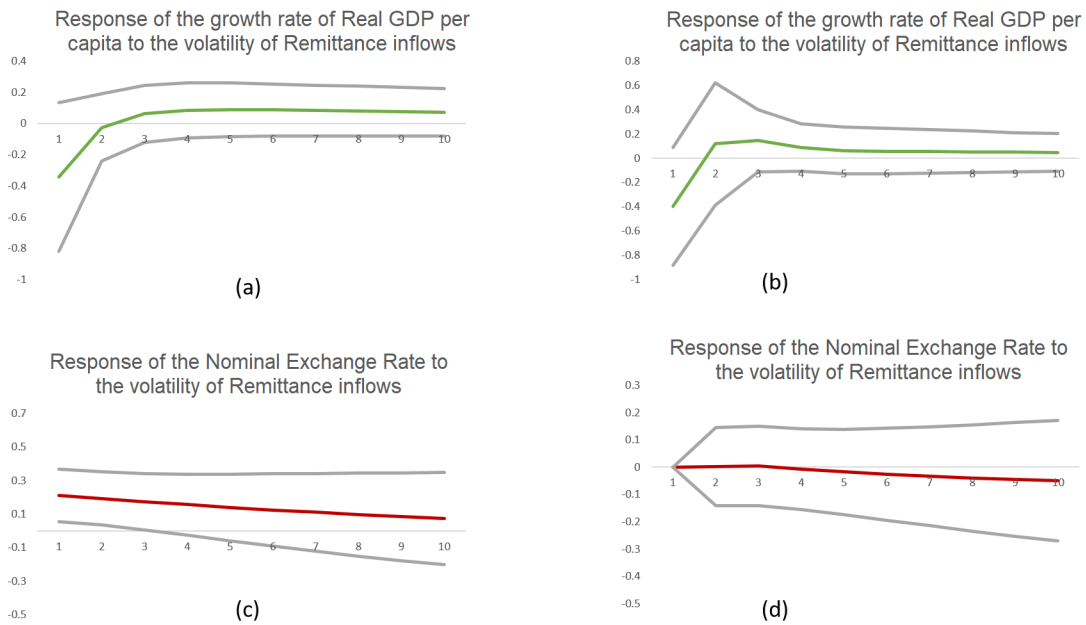


Figure 5.60: Shocks to the volatility of remittance inflows - Model 4 (Latin America sample)

5.4.5 Analysis and Discussion

The empirical analysis consists of results from the full sample and the other regional samples ranging from Figure 5.1 to Figure 5.60. Each Figure contains four IRF panels corresponding to alternating variables. Panels (a) and (c) refer to the first Cholesky ordering system whilst panels (b) and (d) refer to the second Cholesky ordering system as described in Section 5.3.3.

The full sample and other regional results provide comprehensive graphical analysis from Figure 5.1 to Figure 5.60 using the same model with exclusively the three endogenous variables (LNREM, LNNEE, RGDPCG) and the regional results use different exogenous variables (USRG, CROIL and FD). The PVAR IRF's cover the shocks of the three alternative monetary policy rate variables (LNNEE, LNBM and LNCBPR), LNREM and SDREM (Remittances volatility variable). Panels (a) and (c) in Figure 5.1 show the Cholesky Impulse Response functions for the full sample for the real GDP per capita growth rate and remittance inflows variables in response to a one-unit positive shock to the nominal exchange rate which is a nominal depreciation in the domestic currency. Similarly, panels (b) and (d) correspond to the same variables but with the use of the second Cholesky ordering system.

The accumulated response functions are shown from Figures 5.7 and 5.8 to provide the accumulated impact of the variables over the full-time period. Panels (a) and (b) in Figure 5.1 provide similar results and show the positive response of the growth of real GDP per capita to a shock in the nominal exchange rate. These findings imply that a nominal depreciation in the exchange rate will provide a more competitive economy in the world whilst remittances will improve over time only if properly anticipated. If properly anticipated, remittances can serve as automatic stabilisers and be used as a potential substitute for monetary policy. This result corroborates the findings by Singer (2010) who argues that in a trilemma policy framework, remittances can act as a substitute for monetary independence by performing the countercyclical and stabilising properties whilst allowing economies to implement fixed exchange rate regimes. Panels

(c) in Figure 5.1 shows there is a small impact on the IRF whilst panel (d) shows a greater positive impact over the short. However if we focus on Figure 5.7 (panel (d)) the accumulated impulse response function for remittances displays a positive trend over time with the standard confidence intervals showing there is more error in the values as the time period increases. This scenario shows that the nominal depreciation in the currency could be beneficial for the country in the long run as is evident by focusing on panels (a) and (b).

Figure 5.2 shows the impulse response functions of a positive shock to remittance inflows on the nominal exchange rate and the growth rate of real GDP per capita. Firstly, from observing Figure 5.2 we can see that the nominal exchange rate (panels (c) and (d)) reacts negatively to a positive shock in the short run whilst fluctuating up and down in the medium to long term. The decrease in the value of the nominal exchange rate is the equivalent to an appreciation of the exchange rate. The accumulated response function in Figure 5.8 only partially supports this result with respect to the second ordering system in panel (d) which could result in the increase in remittance inflows to cause a Dutch Disease effect. Panels (a) and (b) in Figure 5.2 shows the evolution of the output of the economy which illustrates that remittances provide a sharp increase in economic growth whilst the curve continues to increase in the 10 year period.

Figures 5.3 and 5.4 employ Model 2 which uses a different monetary policy rate in the form of broad money supply. As it is expansionary monetary policy scenario the results for the PVARs partially corroborate the results for the results of Model 1. However, If we focus on Figure 5.3 we can see the variable response of RGDPCG to the money supply (LNBM) is fluctuating with the graph experiencing positive and negative spikes from period 1 to period 4 and only stabilising after period 6. The results in panels (c) and (d) reveal that a positive shock to the money supply will lead to a short term increase in remittance inflows. Figure 5.4 shows the effects on RGDPCG and LNBM to a positive shock on remittance inflows. Panels (a) and (b) provide similar results to those in Model 1, whilst we see a rise in money supply in panels (c) and (d) in the short term but a subsequent balance to normal levels in the medium to long run. This result

does follow the results obtained through the regional analysis as is evident from Asia (Figure 5.14), Europe (Figure 5.24), Africa (Figure 5.34), with the exception of MENA (Figure 5.44) and Latin America (Figure 5.54). The impact of remittance inflows in these regions is likely to promote the availability of finance to the private sector, increase deposits and money supply.

Figures 5.5 and 5.6 use Model 3 which uses the Central Bank policy rate as the different monetary policy rate variable. The one-unit positive shock to the Central Bank policy rate variable is termed as a contractionary monetary policy simulation. Figure 5.5 shows there is a negative response of remittances following a positive shock to LNCBPR. However if we focus on Asia (Figure 5.15), Africa (Figure 5.35) and Latin America (Figure 5.55) we see that there is a positive response of remittances following a positive shock to LNCBPR. A higher interest rate policy could be more prevalent in developing economies who suffer from high inflation. Siegfried and Schiopu (2006) stipulate that a larger real interest rate differential between foreign and home rates should attract more remittance inflows as migrants consider borrowing more risky and are more likely to seek finance via remittances. Figure 5.6 shows that a shock to remittance inflows on the Central Bank policy rate is positive and this is more pronounced with Asia, MENA and Latin America.

Model 4 uses the volatility of remittance inflows as alternative endogenous variable and gathers information from the PVARs in Figures 5.9 and 5.10 regarding the effects on the volatility of remittance inflows following a shock in the monetary policy rate. Figure 5.9 shows that the volatility of remittance inflows is stable following a nominal depreciation of the exchange rate which is a realistic scenario since we expect remittances to increase when there is a nominal depreciation of the domestic currency. This is in line with the standard theory of remitting behaviour of households following a nominal depreciation of the exchange rate. This finding is consistent with the coefficient results that remittance volatility tends to reduce monetary policy riskiness. The ability of remittances to dampen macroeconomic risk originates from its low procyclical nature, increasing stability and size relative to other forms of private capital flows (Craigwell

et al., 2010). Thus, it can be deduced that remittances expressed in the sending country currency increases with the depreciation of the currency located in receiving country. The stable IRF in Figure 5.9 (Panels (c) and (d)) can also be explained by other factors such as capital flows which are more sensitive to drastic currency changes for a dollarised economy. Remittances can negate the short-term exchange rate movements which affect capital flow movements between countries which are pegged to the dollar likewise for the dataset used in the analysis. South Asian economies primarily are the most responsive in the developing world to take advantage of depreciating currencies as is evident by the IRFs in Figure 5.19 Figure 5.20 represents the effects of a positive shock in the volatility of remittance inflows on the nominal exchange rate in the Asian sample. The IRF shows that there is a nominal appreciation of the currency in the receiving country in panel (c) which verifies the evolution of the IRF reported in Figure 5.9 for the full sample. Given that this trend is observed it can be concluded that an increase in remittance volatility can put an upward pressure on the domestic nominal exchange rate which may cause a loss in international competitiveness. Moreover, Figure 5.10 shows the response function of the growth rate of real GDP per capita that shows an increase in the volatility of remittance inflows is more positive and significant for panel (a) in comparison to panel (b).

The PVAR IRF's for the Asian and African regions uses additional variables to the baseline specification. The exogenous variable (CROIL) used is the world Brent crude oil price. The reasoning for the inclusion is based on the selection of countries like Nigeria who produce around 1.5 million barrels per day as of September 2016. Therefore, to account for dependencies on the price of crude oil it is important to reflect these changes in the PVAR model specification. The MENA sample considers financial development (FD) as an exogenous variable to account for the growing financial sector within countries like Oman and its neighbouring countries like the United Arab Emirates where many migrants are located. Model 1, for the Latin American region uses the growth rate of U.S. real GDP per capita (USRG) as the exogenous variable in the model. The USRG is applicable in this case because the

primary destination for migrants in the Latin American region is the United States which can determine the existing endogenous variables in the model. The results show variability between regions as Asia, MENA, Africa and Latin America show a small increase in the level of remittance inflows following a nominal depreciation of the exchange rate which is line with the current literature.

In order to interpret these results, the mechanisms through which remittances affect key macroeconomic variables like output and the nominal exchange rate need to be fully understood. Moreover, the effect of remittances in developing economies should be analysed through the spending effect. This is explained by the Salter-Swan-Corden-Dornbusch paradigm which offers insight into the relationship between the price level, remittances and the real exchange rate in developing economies. The model shows that an increase in remittances (as in the PVAR IRFs) could cause an appreciation of the real exchange rate, via rising domestic prices. Lartey et al. (2012) develop a micro-founded dynamic stochastic general equilibrium model which aims to explain the rise in the price level when remittances increase. They consider a transmission mechanism which follows that an increase in household income (due to the rise in remittance inflows) results in a decrease in the labour supply. The effect of a diminishing labour supply is linked with higher wages in terms of the price of the tradable output. Furthermore, this leads to higher production costs, resulting into further contraction of the tradable sector. What we can observe whilst examining the cross regional differences are that Asia, Africa and Latin America are less affected by changes in the nominal exchange rate. The results within these regions could be explained by the large amount of altruistic remittances sent by migrant workers to their home country.

5.5 Conclusion

Remittance continue to provide a crucial role in the global economy where developing countries are ever more reliant on these alternative sources as a means for the development and the eradication of poverty. The implications for macroeconomic policy are widespread and this chapter aims to shed further light on the interactions of monetary policy on the level of remittances and economic growth.

This chapter finds a complex web of relationships between remittances, monetary policy and economic growth. Notably, a depreciation in the domestic currency causes an increase in the level of remittances for the full dataset and for the other regional sub samples with the exception of MENA. Furthermore, an increase in remittance volatility is associated with a stable response of the monetary policy rate and an increase in the value of remittances is associated with an appreciation of the domestic currency. Moreover, the African and Latin American results reveal that the presence of remittances causes the central bank policy rate (LNCBPR) to become downward biased; in other words, this resonates that an increase in the inflows of remittances causes reductions in domestic policy rates, thereby reducing financial costs. This result is significant for governments in the developing world since it is important to acknowledge that remittances can reduce macroeconomic fluctuations. However, if a country is too dependent on them there could be loss in international competitiveness in the long run. These findings imply the positive response of economic growth following a rise in remittances in the short term which asserts that one of the ways that developing countries can reduce monetary policy riskiness is to pursue policies that facilitate greater flow of remittances. Likewise, such policies should be focused on reducing the costs of sending and receiving remittances. Innovative financial products like mobile phone based money like M-Pesa in Kenya and other African markets are a prime example.

The scenario of an expansionary monetary policy is conducted to provide a realistic simulation of a typical developing country macroeconomic policy. This type of policy

engineers a positive increase in the level of remittances as is evident from the accumulated impulse response functions. This result is of interest to policymakers and relevant to formulating monetary policy for governments in the developing world. Central banks in both the developing world should factor in the behaviour of remittances accordingly and may have to think about promoting other sources of incentives for workers to achieve their policy outcomes. The findings in this chapter are robust to alternative specifications including the level of financial development whilst estimating separate PVARs for each regional sub sample. In conclusion, this chapter offers a different perspective on earlier findings, whilst offering newer insights into the link between macroeconomic stability and migrant remittances. Furthermore, this chapter extends the literature on international capital flows and macroeconomic stability by using a panel vector approach on domestic monetary phenomena.

Chapter 6

Conclusion

This chapter concludes the thesis and presents the author's final thoughts and summarises the contributions of the research; the findings of the empirical chapters; the originality of the work in the literature; the significance of the research and the key policy implications from the research. The thesis provides an extensive macroeconomic analysis of remittances in developing economies. A comprehensive outlook on the macroeconomic effects of remittances is investigated whilst capturing the impact of financial development in developing economies. Remittances continue to play a dominant role in developing countries and are increasingly becoming a source of development finance. Furthermore, the impact of remittances on fiscal policy and fiscal cyclicity is investigated in part to explain how remittance inflows are a factor for fiscal policy to be procyclical in these countries. A number of interesting features of developing markets have been revealed resulting from underdeveloped and noncompetitive financial systems and low institutional quality.

6.1 Summaries of Empirical Chapters

Chapter 3 addresses how remittances influence the cyclicity of fiscal policy in developing economies. The analysis from the chapter reveals that remittance inflows cause fiscal policy to be procyclical for every region including the full sample with the exception of Africa in the study. Moreover, the purpose of this chapter is to fill the gap in the literature in providing an alternative focus on how fiscal policy can be influenced over the fiscal cycle. Chapter 3 focuses on the relationship between remittance inflows, household decisions and the government.

The proceeding chapter analyses the relationship between remittances and financial development whilst exploring how these variables could influence economic growth in developing economies. The research questions addressed shows that in all regions

remittances and financial sector development complement each other with the exception of Europe and Asia. Furthermore, the results are robust to alternative specifications of the monetary policy variable and show that remittances promote economic growth with countries that are less financially developed. Moreover, the results are robust to a long-term specification of remittances on economic growth.

Chapter 5 investigates how the effectiveness of monetary policy influences remittance inflows in developing economies. The use of PVAR analysis enables this chapter to focus on the dynamics of monetary policy and remittances. The chapter finds that a nominal depreciation in the exchange rate has a positive impact on economic growth for the full sample. Furthermore, the results confirm that there is a positive response in economic output for the full sample following a rise in remittances in the short-term. Moreover, the Africa and Latin American regions reveal that the central bank policy rate is downwardly biased following a potential increase in remittances.

6.2 Contributions and Implications of the Study

This research examines how developing economies can understand the significance of remittance inflows with the use of empirical models presented in the previous chapters of this thesis. The purpose of this chapter is to shed light on potential policy implications for countries that receive significant flows of remittances based on the various models, facts and empirical evidence presented in the preceding chapters.

The specific findings of the previous chapters are widespread and show the variability of results depending on each region. However, it should be noted that the results could be improved with better measurement of the remittances variable. The correct measurement of the remittances variable is essential when estimating their impact on macroeconomic policy. Regarding the measure used in this thesis, the variable known as workers' remittances in the data source obtained from the World Bank's World Development Indicators database is currently the best measure of remittances. The complexities of remittances as a variable has added to the increasingly difficult task of policymakers in developing countries. It is clear that remittances from migrant

workers exert positive benefits to the welfare of households that receive them, and should be encouraged or at a minimum not discouraged. The primary challenge, in general terms, is to design policies that promote remittances and increase their benefits whilst limiting their costs or counterproductive side effects. There are several ways in which this objective can be achieved to overcome this challenge. First, in regards to tax policy, remittance inflows should not be taxed directly. In doing so this limits remittance activity and increases the transaction costs for the migrant worker whereby the next alternative would be to divert these flows from formal to informal channels. Furthermore, welfare losses are experienced when net transfers to recipients are reduced which dampens the ability of remittances to alleviate poverty. On the other hand, other measures including a consumption based-tax, already prominent in many developing countries is considered to be the most efficient way for governments to maximise the benefits of remittances. The benefits of remittance inflows extend to households whilst accounting for the government to finance its budgetary expenditures. The added benefit of a consumption tax is related to the fact that these flows are not exacerbating the labour-leisure trade-off incentives of remittances. This is why developing countries should move towards consumption based tax system rather than the labour based system in order to minimise the negative effects on economic growth and to minimise the distortions to fiscal and monetary policy.

6.3 Limitations of the Study

The contributions, the significance and the relevance of the research has been discussed in the preceding sections in this chapter. However, a few caveats need to be reviewed in regard to the whole study.

Firstly, the limited data on remittances has hindered the research in gaining a wider range of analysis by including more developing countries. Furthermore, it should be understood that the features of remittances which provide economic benefits are also potential pitfalls. These aspects of remittances need to be understood and managed correctly by developing economies. Moreover, the collection of primary data was

excluded due to the difficulty in obtaining enough funding for further data on the patterns of remittance inflows. In the case of all empirical chapters, the data series spans a long period of time (from 1990-2016), which in all likelihood could have been influenced by various policy regimes and governments in these developing countries. Thus, for Chapter 3 the robustness in the results could be improved by subsampling by using quarterly data. The use of quarterly data is not possible as the data on remittances is limited but this technique could have provided allowance of country specific conditions across the time period.

By investigating how remittances influences the relationship between financial development and economic growth the thesis evaluates several robustness tests in relation to the methodology. The use of four different regression models including the fixed effects or random effects model and three different D-GMM models. These models depend on the financial development variable to allow for more reliable results. However, the results could be improved by evaluating the effects of the financial crisis on the results by using structural breaks in the methodology.

Chapter 5 provides a comprehensive understanding of how remittances behave in the presence of domestic monetary policy shocks along with other macroeconomic shocks. With the use of impulse response analysis and the Cholesky innovations the study allows shocks to be generated which can vary according to the ordering of variables. However, to improve the effectiveness of this technique, cross country analysis needs to be researched between countries in the same region. This method would provide greater insight into the differences among these countries.

6.4 Areas for Further Research

The findings obtained in this research lend themselves to branches of further study in remittances. Remittance inflows provide a continued source of income for many households in developing economies. Therefore it is of utmost importance for policymakers in developing countries to continue research of remittances. The findings

presented in this research confirm that there is a significant association between remittance inflows and financial development. In particular there is a long run relationship between remittances, financial development and economic growth with the exception of the European and Asian results. This indicates that transaction costs of sending remittances should be lowered to encourage a larger share of remittances to flow through formal financial channels.

In future, policies should be designed to established more appropriate channels through which remittances are received in these countries which will enhance the functioning of their financial systems. The findings in this thesis, however, do not give insight into all channels through which remittances can influence the financial sector. Furthermore, this thesis does not explore other possible characteristics of the financial sector in greater detail. This includes the institutional aspects through which the financial sector can limit informal channels and hence transaction costs. The significance of this area of the financial sector has seen greater interest in recent years. For example, the introduction of cell phone encryption technology has enabled greater facilitation of low-cost money transfers between OECD countries, the recipient countries in Africa and the Philippines. This technology enables the reduction in transaction costs in terms of fees and time for both money transmission operators such as Western Union and Moneygram and other banks. Future research should aim to focus on this area in greater detail whilst assessing the various formal and informal channels of remittances in developing countries whilst evaluating the progress of financial development. The availability of the quality of remittances is a key feature in determining the individual characteristics of remittances and how these flows can lead to economic growth in some regions over other regions.

Appendices

Appendix A: Descriptive Statistics for the Regional Samples

Table A.1: Descriptive Statistics: Asia Dataset

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
Year	250	2002	7.23	1990	2014
Country	250	28.6	16.59	3	50
Output Gap	250	0.005	0.07	-0.25	0.34
Remittances (% of GDP)	220	5.97	8.58	0.098	49.59
Government consumption expenditure (% of GDP)	248	10.17	3.63	4.05	30.12
Tax Revenue (% of GDP)	150	12.20	3.29	0.04	25.56
Polity Democracy	248	1.10	6.17	-7	9
Net Barter terms of trade index	208	99.19	23.39	53.97	198.03
Net official development assistance and official aid received (NODA)	235	2.40	2.89	-0.69	16.05
Population ages 15-64 (%)	250	62.21	5.22	51.77	72.40
Real GDP per capita (ln)	250	6.76	0.65	5.33	8.15
Remittances x Outputgap	220	0.034	0.31	-0.55	2.18
Foreign Direct Investment	242	3.20	5.72	-2.76	45.15

Table A.2: Descriptive Statistics: Latin America Dataset

Variable	Obs	Mean	Std. Dev.	Min	Max
Year	250	2002	7.23	1990	2014
Country	250	19	14.60	2	49
Output Gap	250	0.001	0.04	-0.21	0.23
Remittances (% of GDP)	250	2.03	3.79	0.00013	21.56
Government consumption expenditure (% of GDP)	249	13.0072	3.33	2.98	20.34
Tax Revenue (% of GDP)	119	13.57	3.08	-0.19	22.30
Polity Democracy	250	6.32	4.50	-6	10
Net Barter terms of trade index	240	109.29	33.36	50.98	262.09
Net official development assistance and official aid received (NODA)	240	1.01	2.49	-0.60	16.04
Population ages 15-64 (%)	250	62.28	3.72	51.14	68.90
Real GDP per capita (ln)	250	8.31	0.53	7.036	9.20
Remittances x Outputgap	250	-0.00075	0.13	-0.48	1.17
Foreign Direct Investment	246	3.44	2.74	-0.78	17.13

Table A.3: Descriptive Statistics: Africa Dataset

Variable	Obs	Mean	Std. Dev.	Min	Max
Year	225	2002	7.23	1990	2014
Country	225	27.44	14.81	7	48
Output Gap	225	0.003	0.03	-0.14	0.17
Remittances (% of GDP)	205	2.09	2.76	0.016	13.043
Government consumption expenditure (% of GDP)	223	13.55	3.62	4.83	20.89
Tax Revenue (% of GDP)	101	14.35	6.05	0.91	27.60
Polity Democracy	225	2.18	5.42	-8	9
Net Barter terms of trade index	216	115.63	31.64	43.88	225.96
Net official development assistance and official aid received (NODA)	212	7.41	5.89	0.21	30.22
Population ages 15-64 (%)	225	53.42	3.74	47.91	65.45
GDP per capita (ln)	225	6.62	0.80	5.29	8.71
Remittances x Outputgap	205	0.0096	0.091	-0.26	0.61
Foreign Direct Investment	218	2.15	2.012	-2.07	10.83

Table A.4: Descriptive Statistics: Europe Dataset

Variable	Obs	Mean	Std. Dev.	Min	Max
Year	325	2002	7.22	1990	2014
Country	325	27.85	10.74	6	47
Output Gap	281	0.001	0.06	-0.26	0.34
Remittances (% of GDP)	240	4.05	6.70	0.058	34.50
Government consumption expenditure (% of GDP)	275	18.70	3.11	10.25	27.84
Tax Revenue (% of GDP)	158	22.06	13.03	8.41	65.90
Polity Democracy	315	7.64	3.62	-7	10
Net Barter terms of trade index	178	100.75	7.12	87.13	136.52
Net official development assistance and official aid received (NODA)	203	1.62	2.91	0.003	17.34
Population ages 15-64 (%)	301	67.62	2.41	59.20	74.32
Real GDP per capita (ln)	281	8.59	0.85	6.35	9.95
Remittances x Outputgap	238	0.022	0.36	-1.19	2.35
Foreign Direct Investment	266	4.62	6.61	-20.21	50.97

Table A.5: Descriptive Statistics: MENA Dataset

Variable	Obs	Mean	Std. Dev.	Min	Max
Year	225	2002	7.23	1990	2014
Country	225	26.78	15.31	1	51
Output Gap	210	-0.001	0.04	-0.29	0.16
Remittances (% of GDP)	184	7.34	7.90	0.0015	26.68
Government consumption expenditure (% of GDP)	209	16.78	7.64	4.84	76.22
Tax Revenue (% of GDP)	135	12.53	9.00	-0.01	45.25
Polity Democracy	225	-4.36	3.78	-10	6
Net Barter terms of trade index	164	125.33	43.85	50.93	252.81
Net official development assistance and official aid received (NODA)	189	2.86	3.48	-0.04	24.12
Population ages 15-64 (%)	225	59.68	6.97	45.71	76.36
Real GDP per capita (ln)	210	7.89	1.21	6.085	10.49
Remittances x Outputgap	182	-0.067	0.38	-2.31	1.17
Foreign Direct Investment	197	2.65	4.096	-5.11	23.54

Appendix B: Kalman Filter Weights and MLE

The financial development index has been obtained by applying the Kalman filter to the panel dataset. The procedure is described in greater detail below and shows the Kalman Filter weights assigned to the various financial development measures. The primary purpose of the Kalman filter is to use observable variables of a temporal series to reconstitute the value of the non-observable variables. The Kalman filter is used within a state space model as described in Equations (7) and (8). The Kalman Filter is used for two main purposes. Firstly, to estimate the unobservable state $fd_{i,t}$ as in Equation (7). Secondly, to evaluate the likelihood function associated with a state space model as in Equations (7) and (8). The estimation is done using the STATA software:

B.1 Filtering

Equations (7) and (8) are represented in vector form:

$$x_t = H_t \alpha_t + \xi_t \quad \xi_t \sim N(0, Z_t) \quad (24)$$

$$\alpha_{t+1} = T_t \alpha_t + I_t \eta_t \quad \eta_t \sim N(0, Z_t) \quad (25)$$

$$\alpha_t \sim N(\alpha_1, P_1) \quad (26)$$

Innovation term is represented by variable v_t in Equation (27):

$$v_t = x_t - E(x_t | X_{t-1}) \quad (27)$$

where α_t is a latent state vector, H_t ($n \times k$) and T_t ($k \times k$) are possible time-varying parameter matrices, and I_t ($k \times q$; $q \leq k$) denotes the identity matrix. The system is stochastic through the $n \times 1$ vector ξ_t and the $k \times 1$ vector η_t , which are serially and mutually uncorrelated with contemporary covariance matrices and zero mean \sum_η and \sum_ξ , respectively.

where $X_t = \{x_1, \dots, x_t\}$.

$$v_t = x_t - H_t \alpha_t \quad (28)$$

$$m_t = Cov(\alpha_t, v_t) = P_t H_t' \quad (29)$$

$$F_t = Var(v_t) = H_t P_t H_t' + Z_t \quad (30)$$

$$K_t = T_t M_t F_t = T_t P_t H_t' F_t^{-1} \quad (31)$$

$$L_t = T_t - K_t H_t \quad (32)$$

$$\alpha_{t+1} = T_t \alpha_t + K_t v_t \quad (33)$$

$$P_{t+1} = T_t P_t L_t' + R_t Q_t R_t' \quad (34)$$

For simplicity purposes, the state space model in matrix form is time-invariant in which the system matrices are constant over time, the Kalman recursion of P_{t+1} converges to a constant matrix \bar{P} which is the solution to the matrix equation.

$$\bar{P} = T \bar{P} T' - T \bar{P} H' \bar{F}^{-1} H P T' + R Q R' \quad (35)$$

where, $\bar{F} = H P H' + Z$

B.2 Kalman Filter Weight functions

The conditional variances and means obtained from the filtering estimates are all weighted sums of x_1, \dots, x_n . In effect, these weights can be regarded as kernel functions in the field of non-parametric regression. The seven variables which constitute the financial development index are listed below in order of weight preference for the Kalman filter weight function.

1. Liquid liabilities to GDP ratio (%)
2. Bank deposits to GDP ratio (%)
3. Interest rate spread (%)
4. Domestic credit to private sector to GDP ratio (%)
5. Deposit interest rate (%)
6. Bank capital to total assets ratio (%)
7. Private credit by deposit money banks and other financial institutions to GDP ratio (%)

The variables listed in above are organised under weight preference in the Kalman filter matrices. Therefore, the Liquid liabilities to GDP ratio, Bank deposits to GDP ratio and the Interest rate spread will have a greater impact on the financial development index in comparison to the later variables (Variables (4) - (7)). The variable weight function list is selected according to data availability in developing economies. Moreover, these variables are also selected on the ability of them to encapsulate the characteristics of the size of the financial system, financial institutional efficiency and financial institutional depth.

Appendix C: Financial Development Index

Table C.1: Ranking of countries by financial development and other measures

Country	Rank 1	Fin. dev.	Rank 2	Rank 3
Lebanon	1	4.98	1	26
Malta	2	4.83	2	48
Thailand	3	4.49	3	45
Jordan	4	3.55	4	41
Panama	5	3.06	7	36
Kuwait	6	2.48	5	49
Egypt	7	2.43	6	31
Algeria	8	2.22	22	22
South Africa	9	2.09	8	40
Slovakia	10	2.04	9	32
Slovenia	11	2.01	13	6
Chile	12	1.94	15	37
Philippines	13	1.83	12	38
Brazil	14	1.70	16	2
Hungary	15	1.59	14	42
Honduras	16	1.55	20	13
Bangladesh	17	1.52	18	35
Bulgaria	18	1.48	11	4
India	19	1.46	10	14
Macedonia	20	1.44	26	19
Poland	21	1.43	21	3
Indonesia	22	1.42	17	43
Oman	23	1.28	29	47
Kosovo	24	1.26	28	15
Kenya	25	1.23	24	11
Sri Lanka	26	1.18	27	51
Notes: Fin. dev. refers to the financial development index value. Rank 1 refers to the rankings of the financial development index estimated in this study. Rank 2 refers to rankings based on the Bank deposits to GDP ratio, and Rank 3 is the rankings based on the interest rate spread.				

Table C.1 continued

Country	Rank 1	Fin. dev.	Rank 2	Rank 3
Latvia	27	1.13	30	12
Serbia	28	1.06	34	8
Cameroon	29	1.04	46	7
Lithuania	30	1.01	31	30
Argentina	31	0.98	42	39
Moldova	32	0.97	32	25
Vietnam	33	0.96	50	44
Peru	34	0.96	35	1
Mexico	35	0.89	33	28
Pakistan	36	0.82	25	27
Colombia	37	0.76	37	20
Tanzania	38	0.73	40	9
Ecuador	39	0.72	39	18
Venezuela	40	0.72	38	24
Cote d'Ivoire	41	0.70	41	16
Yemen	42	0.66	44	29
Azerbaijan	43	0.62	48	21
Nigeria	44	0.59	45	23
Turkey	45	0.58	23	34
Senegal	46	0.48	36	16
Uganda	47	0.46	47	10
Ghana	48	0.31	43	33
Tajikistan	49	0.35	51	5
Sudan	50	0.31	49	50
Syria	51	0.31	19	46
Notes: Fin. dev. refers to the financial development index value. Rank 1 refers to the rankings of the financial development index estimated in this study. Rank 2 refers to rankings based on the Bank deposits to GDP ratio, and Rank 3 is the rankings based on the interest rate spread.				

Appendix D: Financial Development Index Figures

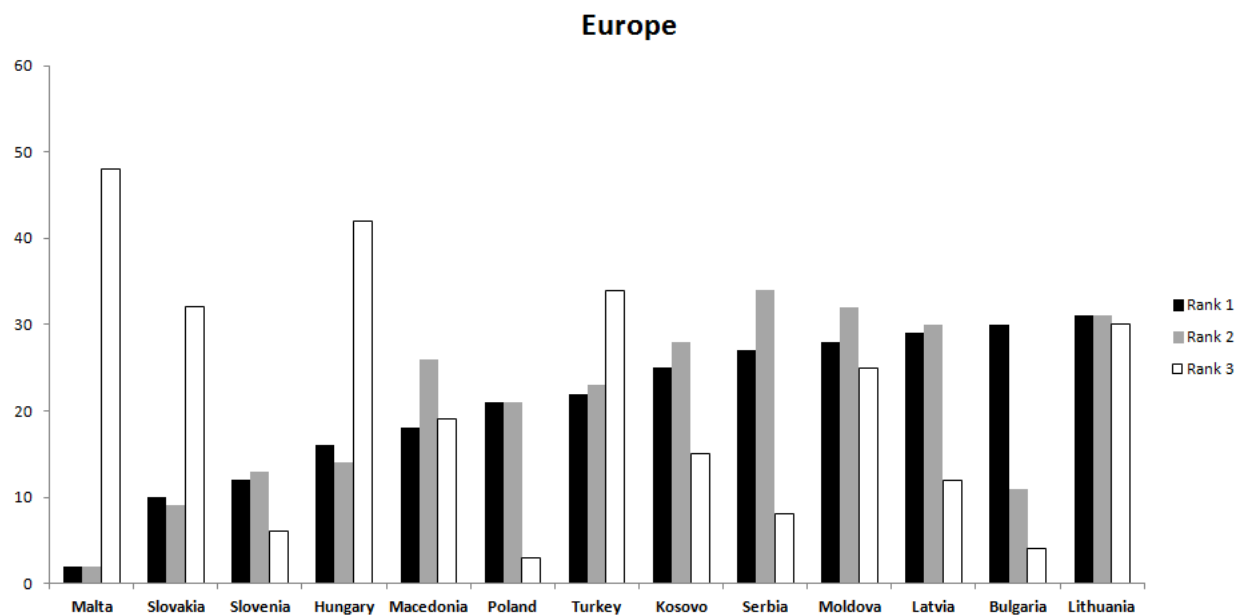


Figure D.1: Europe rankings by country

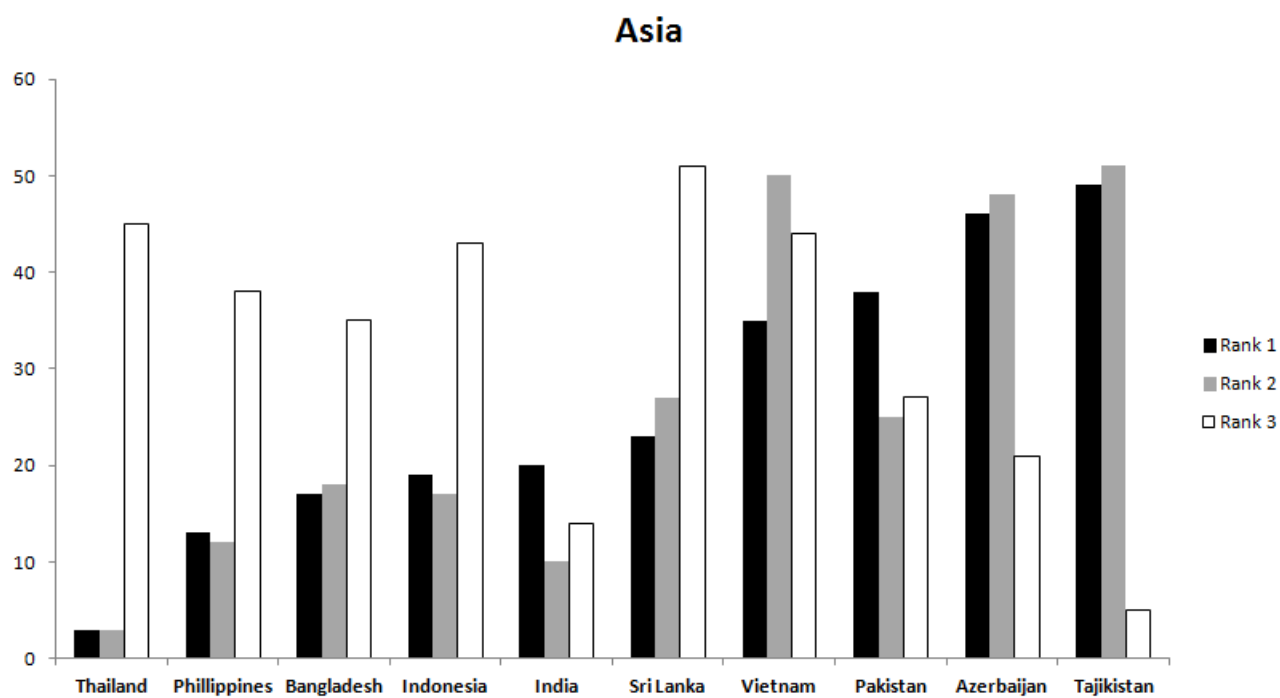


Figure D.2: Asia rankings by country

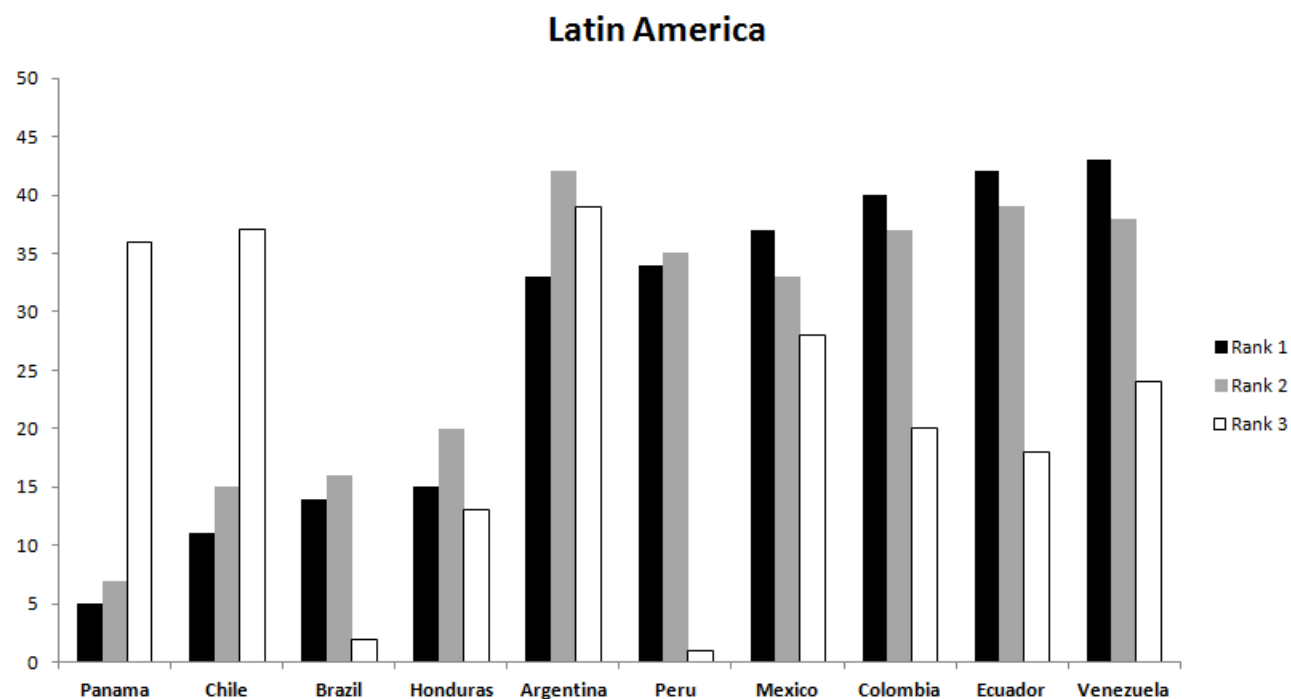


Figure D.3: Latin America rankings by country

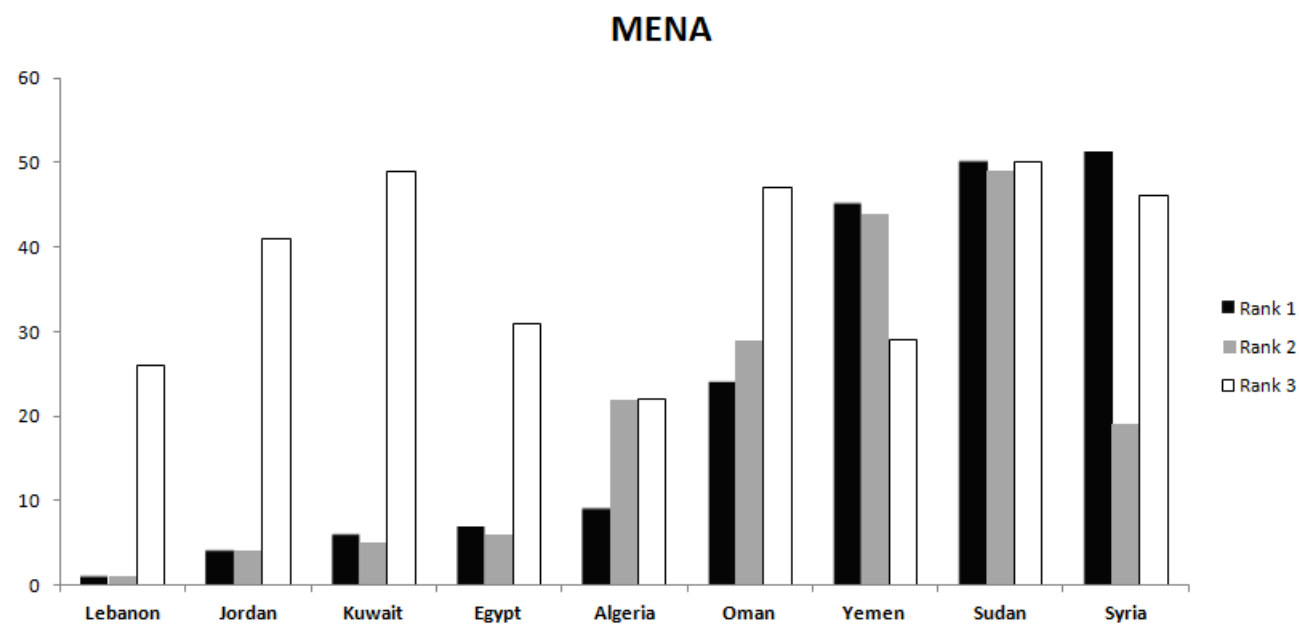


Figure D.4: MENA rankings by country

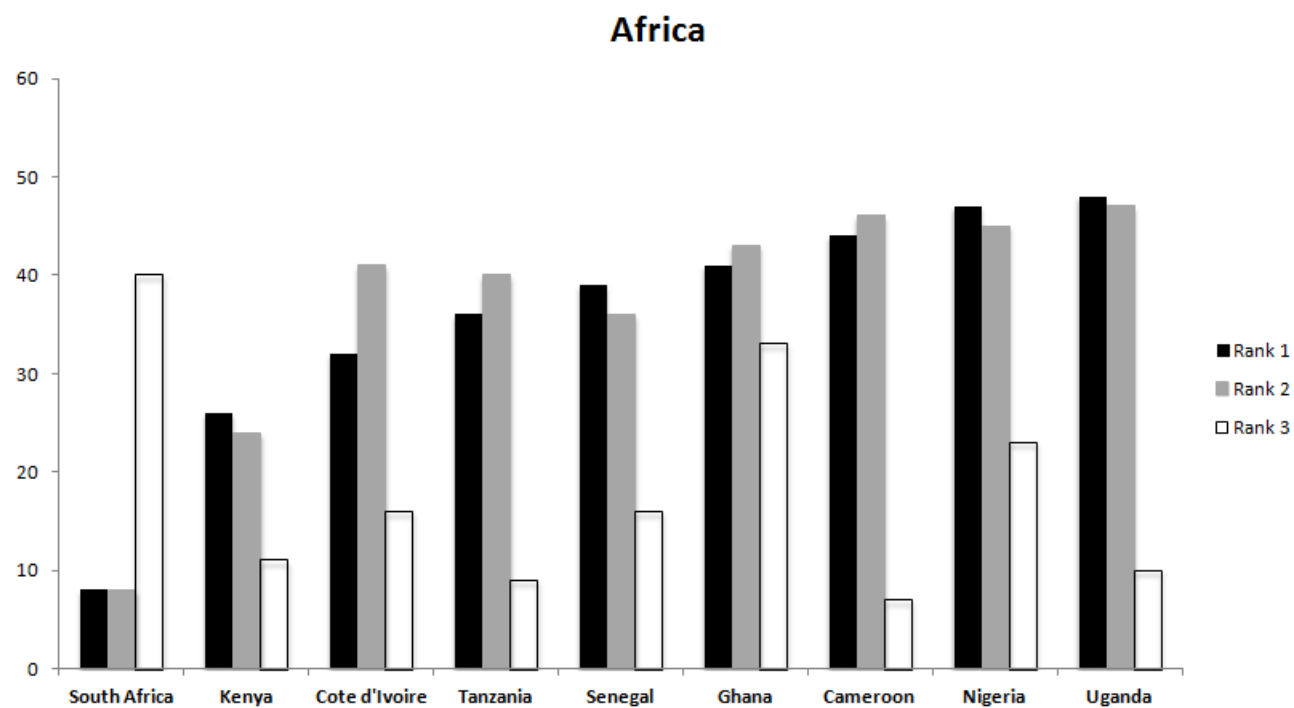


Figure D.5: Africa rankings by country

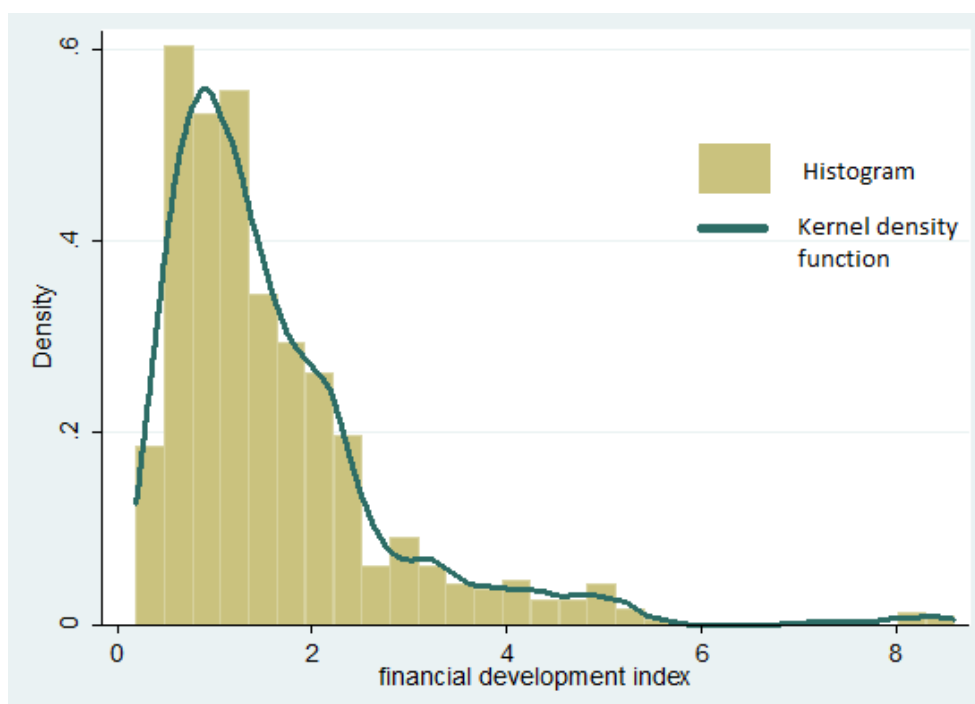


Figure D.6: Financial development index distribution (Full sample)

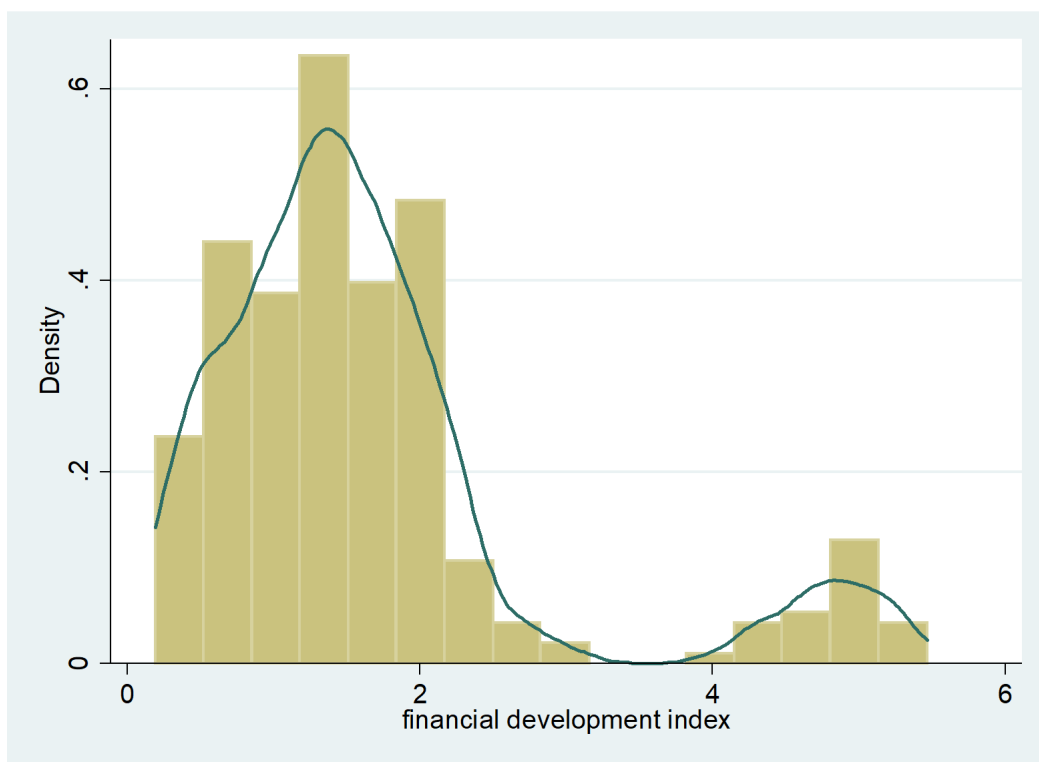


Figure D.7: Financial development index distribution (Europe sample)

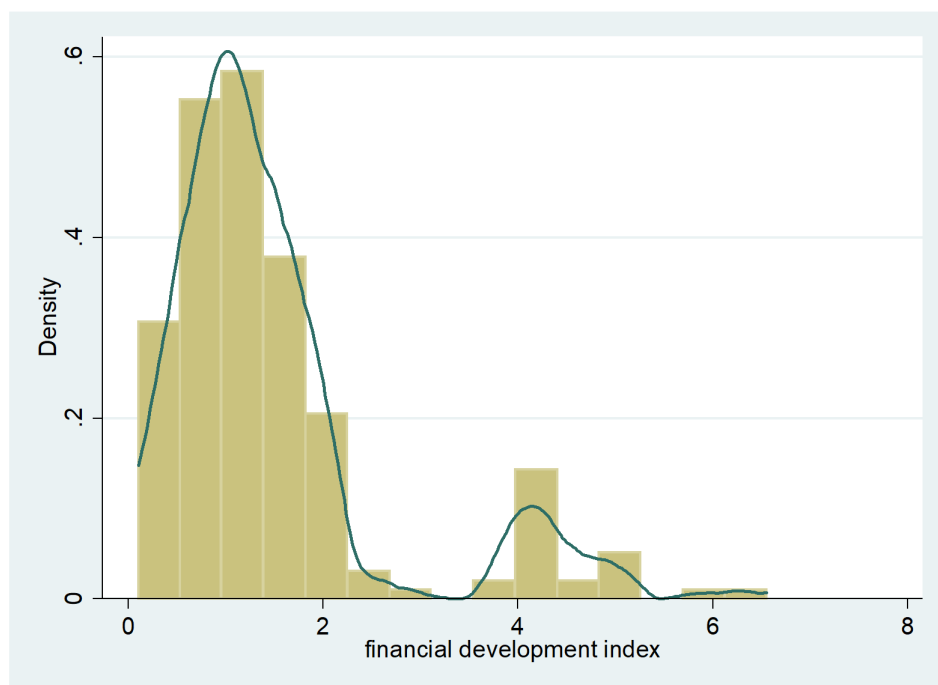


Figure D.8: Financial development index distribution (Asia sample)

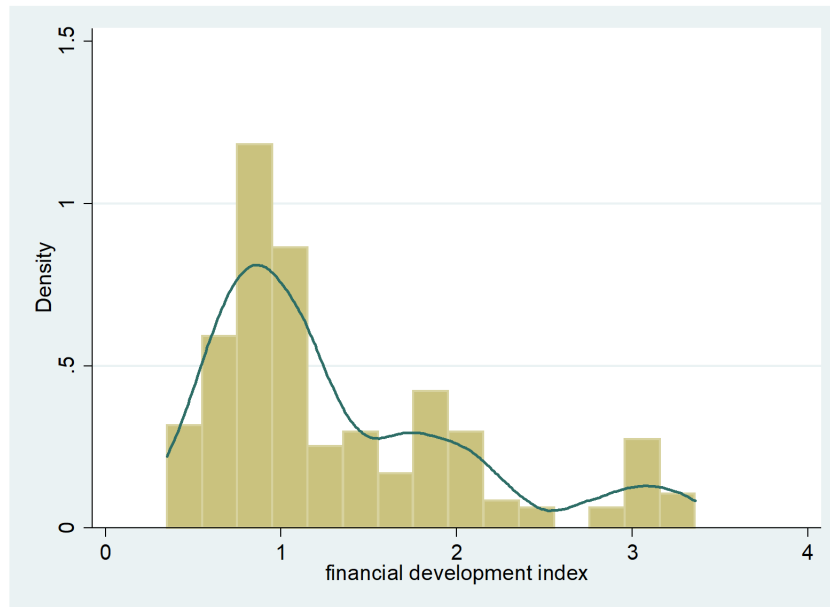


Figure D.9: Financial development index distribution (Latin America sample)

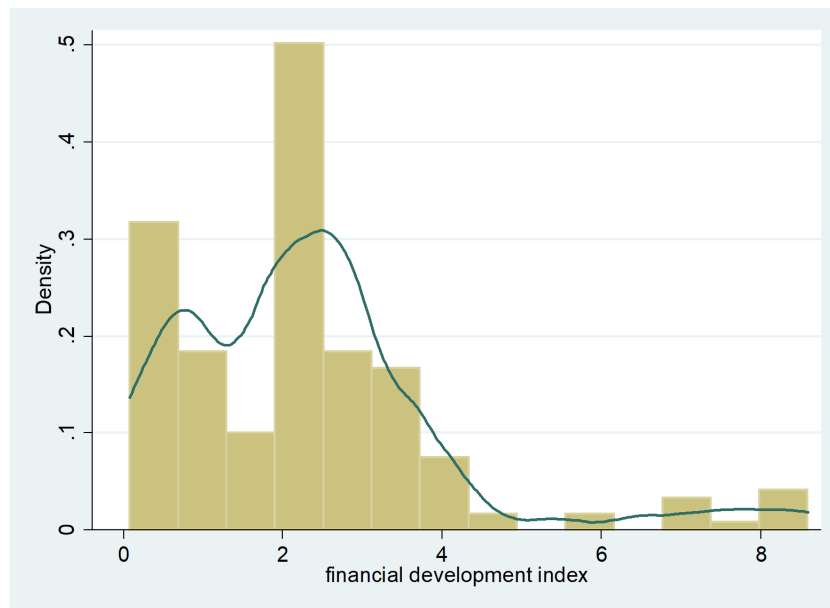


Figure D.10: Financial development index distribution (MENA sample)

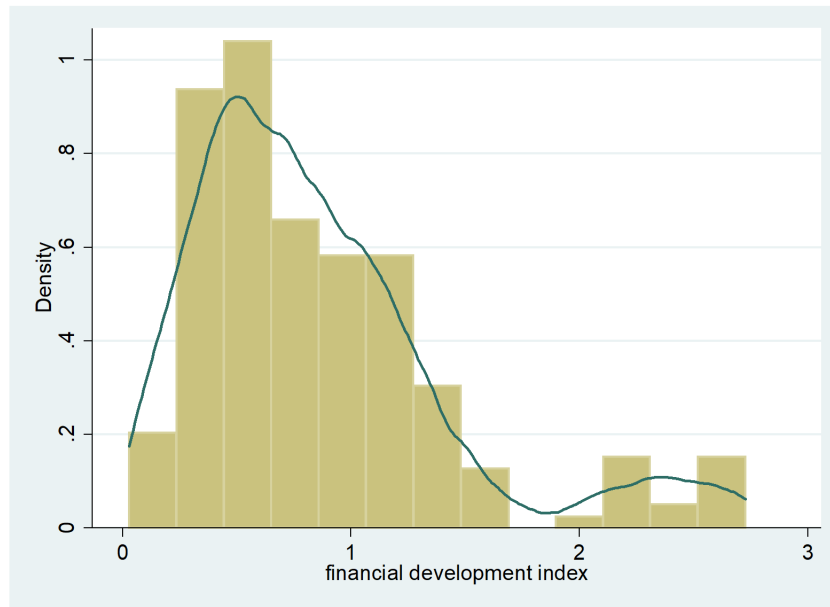


Figure D.11: Financial development index distribution (Africa sample)

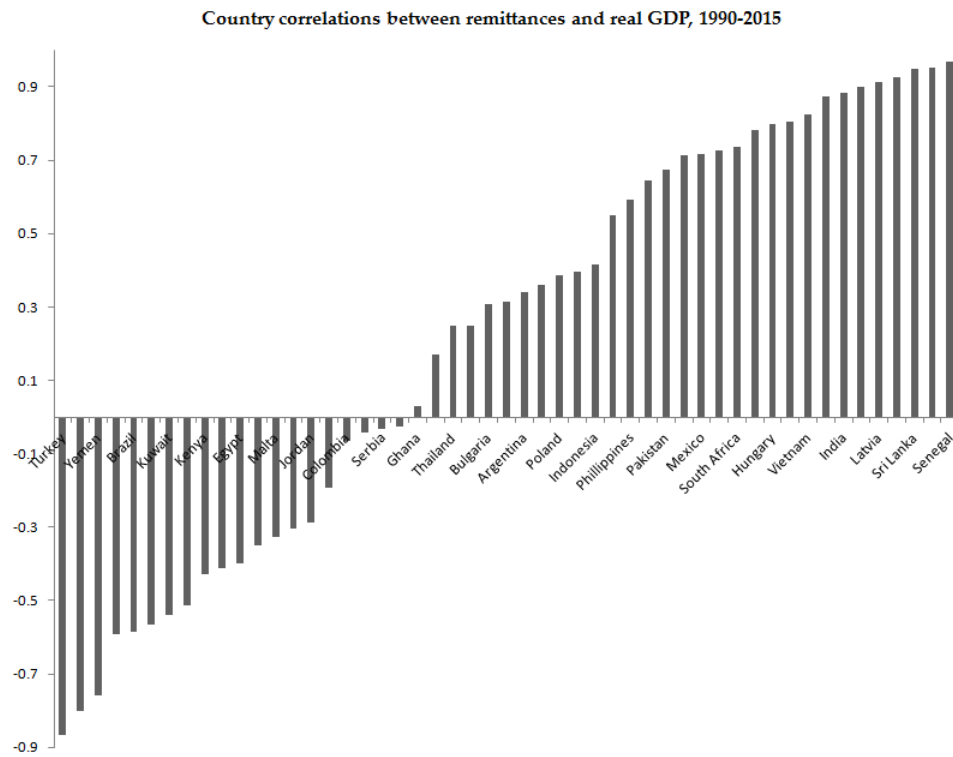


Figure D.12: Country correlations between remittances and real GDP, 1990-2015 (Full sample)

Appendix E: Variance decompositions

Table E.1: Variance decompositions of LNNEE and RGDPCG (order 1) - Full sample

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	98.928	0	1.072	1	2.244	97.542	0.214
	(0.735)	(0)	(0.735)		(0.902)	(0.936)	(0.343)
2	99.104	0.005	0.890	2	2.177	96.838	0.985
	(0.753)	(0.073)	(0.747)		(0.981)	(1.110)	(0.557)
3	99.151	0.011	0.838	3	2.124	96.347	1.529
	(0.866)	(0.135)	(0.859)		(0.980)	(1.344)	(0.908)
4	99.131	0.017	0.852	4	2.096	95.542	2.362
	(0.974)	(0.186)	(0.971)		(1.004)	(1.525)	(1.108)
5	99.116	0.068	0.816	5	2.086	95.335	2.579
	(1.041)	(0.266)	(1.032)		(1.014)	(1.587)	(1.179)
6	99.090	0.127	0.784	6	2.076	95.244	2.679
	(1.113)	(0.382)	(1.076)		(1.015)	(1.610)	(1.213)
7	99.073	0.172	0.755	7	2.072	95.191	2.737
	(1.176)	(0.489)	(1.107)		(1.017)	(1.627)	(1.235)
8	99.054	0.222	0.724	8	2.071	95.155	2.775
	(1.237)	(0.596)	(1.127)		(1.017)	(1.635)	(1.247)
9	99.040	0.269	0.692	9	2.073	95.132	2.796
	(1.298)	(0.697)	(1.141)		(1.018)	(1.641)	(1.255)
10	99.032	0.309	0.659	10	2.076	95.115	2.809
	(1.353)	(0.786)	(1.152)		(1.019)	(1.645)	(1.260)

Table E.2: Variance decompositions of LNREM (order 1) and LNNEE (order 2) - Full sample

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	0	0	100.000	1	100	0	0
	(0)	(0)	(0)		(0)	(0)	(0)
2	0.008	0.009	99.983	2	99.973	0.005	0.022
	(0.120)	(0.089)	(0.151)		(0.120)	(0.074)	(0.098)
3	0.056	0.046	99.898	3	99.962	0.011	0.027
	(0.214)	(0.160)	(0.278)		(0.216)	(0.148)	(0.171)
4	0.113	0.080	99.807	4	99.962	0.017	0.021
	(0.329)	(0.224)	(0.407)		(0.248)	(0.190)	(0.187)
5	0.125	0.073	99.803	5	99.906	0.068	0.026
	(0.390)	(0.226)	(0.466)		(0.321)	(0.268)	(0.229)
6	0.130	0.096	99.774	6	99.842	0.127	0.031
	(0.431)	(0.291)	(0.549)		(0.422)	(0.376)	(0.275)
7	0.133	0.130	99.738	7	99.791	0.172	0.036
	(0.464)	(0.390)	(0.649)		(0.506)	(0.464)	(0.313)
8	0.133	0.169	99.698	8	99.734	0.222	0.044
	(0.487)	(0.497)	(0.753)		(0.599)	(0.560)	(0.352)
9	0.132	0.211	99.657	9	99.678	0.269	0.053
	(0.506)	(0.604)	(0.856)		(0.687)	(0.649)	(0.393)
10	0.131	0.252	99.618	10	99.627	0.309	0.064
	(0.522)	(0.701)	(0.953)		(0.762)	(0.722)	(0.433)

Table E.3: Variance decompositions of RGDPCG and LNREM (order 2) - Full sample

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	2.365 (1.029)	97.542 (1.048)	0.093 (0.207)	1	1.072 (0.650)	0 (0)	98.928 (0.650)
2	2.178 (1.030)	96.838 (1.202)	0.984 (0.612)	2	0.950 (0.702)	0.009 (0.085)	99.041 (0.714)
3	2.114 (1.031)	96.347 (1.391)	1.539 (0.925)	3	0.774 (0.662)	0.046 (0.159)	99.180 (0.709)
4	2.057 (1.035)	95.542 (1.579)	2.401 (1.202)	4	0.654 (0.637)	0.080 (0.253)	99.266 (0.746)
5	2.034 (1.037)	95.335 (1.647)	2.631 (1.293)	5	0.606 (0.659)	0.073 (0.249)	99.322 (0.781)
6	2.024 (1.035)	95.244 (1.673)	2.732 (1.331)	6	0.578 (0.683)	0.096 (0.281)	99.326 (0.826)
7	2.020 (1.036)	95.191 (1.690)	2.789 (1.353)	7	0.559 (0.708)	0.130 (0.349)	99.312 (0.885)
8	2.020 (1.036)	95.155 (1.701)	2.825 (1.365)	8	0.548 (0.732)	0.169 (0.432)	99.283 (0.952)
9	2.024 (1.036)	95.132 (1.706)	2.844 (1.371)	9	0.542 (0.755)	0.211 (0.518)	99.247 (1.022)
10	2.030 (1.037)	95.115 (1.709)	2.855 (1.373)	10	0.538 (0.777)	0.252 (0.597)	99.210 (1.091)

ASIA

Table E.4: Variance decompositions of LNNEE and RGDPCG (order 1) - Asia

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	9.568	90.432	0	1	1.523	0.141	98.337
	(3.432)	(3.432)	(0)		(1.661)	(0.557)	(1.718)
2	10.176	89.516	0.308	2	1.621	0.387	97.992
	(4.083)	(4.053)	(0.650)		(1.286)	(0.878)	(1.602)
3	10.590	88.837	0.573	3	1.777	0.412	97.810
	(4.707)	(4.714)	(1.108)		(1.528)	(1.119)	(1.889)
4	10.800	88.429	0.772	4	1.799	0.399	97.802
	(5.180)	(5.245)	(1.525)		(1.643)	(1.194)	(2.015)
5	10.900	88.178	0.922	5	1.792	0.406	97.801
	(5.605)	(5.731)	(1.911)		(1.706)	(1.220)	(2.076)
6	10.940	88.023	1.034	6	1.785	0.437	97.778
	(6.017)	(6.197)	(2.251)		(1.769)	(1.237)	(2.129)
7	10.945	87.927	1.128	7	1.783	0.482	97.735
	(6.424)	(6.646)	(2.543)		(1.842)	(1.260)	(2.195)
8	10.930	87.871	1.199	8	1.783	0.536	97.682
	(6.825)	(7.077)	(2.789)		(1.922)	(1.293)	(2.273)
9	10.902	87.841	1.257	9	1.784	0.592	97.624
	(7.217)	(7.488)	(2.996)		(2.004)	(1.335)	(2.360)
10	10.866	87.830	1.304	10	1.786	0.648	97.566
	(7.597)	(7.879)	(3.171)		(2.083)	(1.385)	(2.450)

Table E.5: Variance decompositions of LNREM (order 1) and LNNEE (order 2) - Asia

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	100	0	0	1	0	100	0
	(0)	(0)	(0)		(0)	(0)	(0)
2	99.978	0.021	0.001	2	0.022	99.670	0.308
	(0.389)	(0.274)	(0.271)		(0.327)	(0.674)	(0.590)
3	99.965	0.034	0.001	3	0.050	99.377	0.573
	(0.571)	(0.405)	(0.431)		(0.470)	(1.245)	(1.121)
4	99.955	0.044	0.001	4	0.065	99.163	0.772
	(0.770)	(0.494)	(0.640)		(0.596)	(1.833)	(1.668)
5	99.947	0.053	0.001	5	0.072	99.006	0.922
	(1.005)	(0.571)	(0.885)		(0.728)	(2.376)	(2.161)
6	99.938	0.061	0.001	6	0.074	98.889	1.038
	(1.237)	(0.650)	(1.122)		(0.870)	(2.848)	(2.570)
7	99.930	0.069	0.001	7	0.073	98.799	1.128
	(1.444)	(0.734)	(1.328)		(1.027)	(3.253)	(2.900)
8	99.922	0.078	0.001	8	0.071	98.729	1.199
	(1.622)	(0.826)	(1.499)		(1.196)	(3.602)	(3.166)
9	99.913	0.086	0.001	9	0.069	98.674	1.257
	(1.774)	(0.926)	(1.637)		(1.376)	(3.908)	(3.382)
10	99.905	0.094	0.001	10	0.066	98.630	1.304
	(1.907)	(1.033)	(1.749)		(1.565)	(4.179)	(3.558)

Table E.6: Variance decompositions of RGDPCG and LNREM (order 2) - Asia

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	1.663 (1.692)	0.001 (0.552)	98.337 (1.818)	1	90.432 (3.162)	9.568 (3.162)	0 (0)
2	1.932 (1.246)	0.075 (0.894)	97.992 (1.478)	2	89.830 (4)	10.169 (4.035)	0.001 (0.288)
3	2.118 (1.532)	0.072 (0.956)	97.810 (1.746)	3	89.555 (4.506)	10.444 (4.546)	0.001 (0.433)
4	2.125 (1.660)	0.074 (0.965)	97.802 (1.870)	4	89.380 (4.798)	10.619 (4.817)	0.001 (0.643)
5	2.107 (1.700)	0.092 (0.986)	97.801 (1.916)	5	89.248 (5.020)	10.751 (5.004)	0.001 (0.884)
6	2.099 (1.718)	0.123 (1.024)	97.778 (1.945)	6	89.137 (5.217)	10.862 (5.165)	0.001 (1.111)
7	2.103 (1.740)	0.162 (1.075)	97.735 (1.979)	7	89.039 (5.406)	10.960 (5.319)	0.001 (1.307)
8	2.114 (1.772)	0.204 (1.136)	97.682 (2.022)	8	88.951 (5.591)	11.048 (5.475)	0.001 (1.469)
9	2.128 (1.813)	0.248 (1.201)	97.624 (2.071)	9	88.871 (5.775)	11.128 (5.635)	0.001 (1.601)
10	2.141 (1.858)	0.293 (1.269)	97.566 (2.126)	10	88.797 (5.957)	11.202 (5.800)	0.001 (1.706)

Europe

Table E.7: Variance decompositions of LNNEE and RGDPCG (order 1) - Europe

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	100	0	0	1	2.635	0.047	97.318
	(0.762)	(0.762)	(0)		(1.964)	(0.726)	(2.108)
2	99.896	0.002	0.102	2	2.479	0.584	96.937
	(1.130)	(1.054)	(0.436)		(2.028)	(1.232)	(2.418)
3	99.599	0.007	0.394	3	2.480	0.596	96.924
	(1.524)	(1.213)	(0.887)		(2.070)	(1.300)	(2.485)
4	99.349	0.013	0.638	4	2.487	0.620	96.893
	(1.932)	(1.314)	(1.356)		(2.088)	(1.297)	(2.500)
5	99.178	0.017	0.805	5	2.494	0.668	96.838
	(2.287)	(1.424)	(1.723)		(2.100)	(1.326)	(2.530)
6	99.062	0.019	0.919	6	2.500	0.717	96.783
	(2.583)	(1.567)	(1.997)		(2.112)	(1.382)	(2.575)
7	98.980	0.020	1.000	7	2.505	0.762	96.733
	(2.838)	(1.744)	(2.201)		(2.124)	(1.454)	(2.630)
8	98.920	0.020	1.060	8	2.511	0.801	96.689
	(3.070)	(1.953)	(2.356)		(2.136)	(1.532)	(2.689)
9	98.875	0.020	1.106	9	2.516	0.834	96.650
	(3.290)	(2.186)	(2.478)		(2.149)	(1.610)	(2.749)
10	98.839	0.019	1.142	10	2.521	0.862	96.617
	(3.505)	(2.436)	(2.574)		(2.162)	(1.685)	(2.808)

Table E.8: Variance decompositions of LNREM (order 1) and LNNEE (order 2) - Europe

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	0	100	0	1	100	0	0
	(0)	(0)	(0)		(0)	(0)	(0)
2	0.003	99.916	0.081	2	99.896	0.002	0.102
	(0.392)	(0.530)	(0.406)		(0.561)	(0.365)	(0.407)
3	0.005	99.935	0.060	3	99.599	0.007	0.394
	(0.590)	(0.884)	(0.621)		(1.161)	(0.587)	(0.973)
4	0.004	99.948	0.048	4	99.349	0.013	0.638
	(0.706)	(1.176)	(0.878)		(1.744)	(0.743)	(1.533)
5	0.004	99.954	0.042	5	99.179	0.017	0.805
	(0.792)	(1.381)	(1.068)		(2.170)	(0.889)	(1.918)
6	0.006	99.956	0.038	6	99.063	0.019	0.919
	(0.869)	(1.538)	(1.202)		(2.491)	(1.047)	(2.186)
7	0.010	99.954	0.036	7	98.981	0.019	1.000
	(0.945)	(1.670)	(1.303)		(2.754)	(1.224)	(2.383)
8	0.017	99.949	0.034	8	98.921	0.020	1.060
	(1.025)	(1.792)	(1.382)		(2.987)	(1.421)	(2.534)
9	0.027	99.941	0.032	9	98.875	0.019	1.106
	(1.112)	(1.911)	(1.443)		(3.202)	(1.636)	(2.654)
10	0.040	99.929	0.031	10	98.839	0.019	1.142
	(1.207)	(2.031)	(1.493)		(3.410)	(1.866)	(2.751)

Table E.9: Variance decompositions of RGDPCG and LNREM (order 2) - Europe

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	2.635	0.047	97.318	1	0	100	0
	(2.521)	(0.717)	(2.509)		(0.722)	(0.722)	(0)
2	2.480	0.584	96.937	2	0.003	99.916	0.081
	(2.518)	(1.611)	(2.863)		(1.134)	(1.221)	(0.489)
3	2.480	0.596	96.924	3	0.005	99.935	0.060
	(2.532)	(1.736)	(2.967)		(1.368)	(1.471)	(0.618)
4	2.488	0.619	96.893	4	0.004	99.948	0.048
	(2.533)	(1.745)	(2.980)		(1.499)	(1.652)	(0.801)
5	2.494	0.668	96.838	5	0.004	99.954	0.042
	(2.529)	(1.780)	(3)		(1.588)	(1.801)	(0.970)
6	2.500	0.717	96.783	6	0.006	99.956	0.038
	(2.526)	(1.821)	(3.024)		(1.660)	(1.923)	(1.097)
7	2.505	0.762	96.733	7	0.010	99.954	0.036
	(2.526)	(1.866)	(3.052)		(1.724)	(2.023)	(1.188)
8	2.511	0.800	96.689	8	0.017	99.949	0.034
	(2.527)	(1.911)	(3.082)		(1.787)	(2.110)	(1.255)
9	2.516	0.833	96.650	9	0.027	99.941	0.032
	(2.531)	(1.954)	(3.113)		(1.851)	(2.189)	(1.304)
10	2.522	0.861	96.617	10	0.040	99.929	0.031
	(2.536)	(1.995)	(3.142)		(1.920)	(2.265)	(1.340)

Africa

Table E.10: Variance decompositions of LNNEE and RGDPCG (order 1) - Africa

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	74.407	25.593	0	1	0.356	1.540	98.104
	(4.696)	(4.696)	(0)		(1.166)	(2.177)	(2.502)
2	73.143	26.497	0.360	2	0.815	1.545	97.640
	(5.663)	(5.747)	(0.691)		(2.006)	(2.137)	(2.927)
3	72.810	25.994	1.195	3	0.830	1.584	97.586
	(5.966)	(5.987)	(1.649)		(2.086)	(2.246)	(3.128)
4	72.441	25.464	2.095	4	0.841	1.581	97.577
	(6.390)	(6.202)	(2.634)		(2.156)	(2.315)	(3.245)
5	72.163	24.926	2.911	5	0.839	1.581	97.581
	(6.814)	(6.380)	(3.450)		(2.183)	(2.366)	(3.315)
6	71.955	24.431	3.613	6	0.837	1.579	97.584
	(7.234)	(6.567)	(4.091)		(2.206)	(2.406)	(3.363)
7	71.817	23.982	4.201	7	0.836	1.578	97.586
	(7.628)	(6.764)	(4.589)		(2.230)	(2.439)	(3.401)
8	71.733	23.576	4.691	8	0.837	1.577	97.586
	(7.995)	(6.972)	(4.978)		(2.258)	(2.469)	(3.437)
9	71.692	23.208	5.100	9	0.839	1.577	97.584
	(8.333)	(7.187)	(5.285)		(2.291)	(2.497)	(3.472)
10	71.683	22.873	5.444	10	0.841	1.577	97.582
	(8.645)	(7.405)	(5.530)		(2.329)	(2.523)	(3.508)

Table E.11: Variance decompositions of LNREM (order 1) and LNNEE (order 2) - Africa

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	0	100	0	1	100	0	0
	(0)	(0)	(0)		(0)	(0)	(0)
2	1.160	97.924	0.916	2	99.614	0.026	0.360
	(1.227)	(1.597)	(1.093)		(0.549)	(0.353)	(0.444)
3	1.183	98.063	0.754	3	98.786	0.018	1.195
	(1.336)	(1.675)	(1.002)		(1.163)	(0.405)	(1.108)
4	1.166	98.125	0.709	4	97.890	0.015	2.095
	(1.445)	(1.965)	(1.179)		(1.913)	(0.512)	(1.866)
5	1.108	98.232	0.660	5	97.070	0.019	2.911
	(1.510)	(2.180)	(1.312)		(2.598)	(0.649)	(2.557)
6	1.043	98.326	0.631	6	96.361	0.026	3.613
	(1.576)	(2.391)	(1.452)		(3.185)	(0.826)	(3.146)
7	0.982	98.406	0.612	7	95.761	0.038	4.201
	(1.651)	(2.576)	(1.570)		(3.677)	(1.034)	(3.633)
8	0.928	98.470	0.602	8	95.257	0.052	4.691
	(1.743)	(2.748)	(1.669)		(4.093)	(1.267)	(4.035)
9	0.884	98.517	0.599	9	94.831	0.069	5.100
	(1.856)	(2.912)	(1.752)		(4.451)	(1.519)	(4.367)
10	0.851	98.547	0.602	10	94.468	0.088	5.444
	(1.992)	(3.078)	(1.822)		(4.766)	(1.783)	(4.643)

Table E.12: Variance decompositions of RGDPCG and LNREM (order 2) - Africa

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	1.305 (1.355)	0.591 (1.289)	98.104 (1.647)	1	25.593 (5.205)	74.407 (5.205)	0 (0)
2	1.845 (1.756)	0.516 (1.336)	97.640 (1.943)	2	31.665 (5.906)	67.420 (6.058)	0.916 (1.192)
3	1.895 (1.850)	0.519 (1.356)	97.586 (2.029)	3	32.737 (6.393)	66.509 (6.529)	0.754 (1.213)
4	1.910 (1.896)	0.513 (1.392)	97.577 (2.103)	4	33.138 (6.768)	66.153 (6.941)	0.709 (1.476)
5	1.907 (1.913)	0.512 (1.413)	97.581 (2.153)	5	33.145 (7.047)	66.195 (7.260)	0.660 (1.696)
6	1.904 (1.931)	0.512 (1.437)	97.584 (2.208)	6	32.986 (7.307)	66.383 (7.565)	0.631 (1.911)
7	1.902 (1.956)	0.512 (1.460)	97.586 (2.269)	7	32.742 (7.558)	66.647 (7.855)	0.612 (2.094)
8	1.902 (1.986)	0.513 (1.486)	97.586 (2.334)	8	32.454 (7.804)	66.944 (8.132)	0.602 (2.250)
9	1.903 (2.021)	0.513 (1.513)	97.584 (2.402)	9	32.148 (8.041)	67.253 (8.393)	0.599 (2.380)
10	1.905 (2.059)	0.513 (1.541)	97.582 (2.470)	10	31.836 (8.266)	67.562 (8.635)	0.602 (2.488)

MENA

Table E.13: Variance decompositions of LNNEE and RGDPCG (order 1) - MENA

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	75.011	24.989	0	1	1.462	0.001	98.537
	(5.752)	(5.752)	(0)		(1.660)	(0.759)	(1.832)
2	75.227	24.750	0.023	2	1.295	0.050	98.655
	(6.335)	(6.301)	(0.467)		(1.762)	(1.041)	(2.043)
3	75.323	24.605	0.072	3	1.294	0.049	98.656
	(6.821)	(6.688)	(0.975)		(1.751)	(1.108)	(2.081)
4	75.373	24.509	0.117	4	1.388	0.056	98.556
	(7.158)	(6.918)	(1.523)		(1.757)	(1.136)	(2.118)
5	75.398	24.449	0.152	5	1.525	0.071	98.405
	(7.440)	(7.101)	(2.008)		(1.789)	(1.163)	(2.177)
6	75.409	24.412	0.178	6	1.676	0.089	98.235
	(7.709)	(7.289)	(2.402)		(1.845)	(1.191)	(2.253)
7	75.412	24.390	0.198	7	1.828	0.109	98.064
	(7.981)	(7.498)	(2.712)		(1.918)	(1.221)	(2.340)
8	75.410	24.378	0.212	8	1.975	0.129	97.896
	(8.262)	(7.733)	(2.951)		(2.002)	(1.253)	(2.435)
9	75.404	24.372	0.224	9	2.116	0.149	97.734
	(8.550)	(7.990)	(3.137)		(2.090)	(1.287)	(2.532)
10	75.396	24.372	0.232	10	2.250	0.170	97.581
	(8.845)	(8.266)	(3.282)		(2.179)	(1.323)	(2.630)

Table E.14: Variance decompositions of LNREM (order 1) and LNNEE (order 2) - MENA

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	0	100	0	1	100	0	0
	(0)	(0)	(0)		(0)	(0)	(0)
2	0.000	99.571	0.428	2	99.975	0.001	0.023
	(0.455)	(0.854)	(0.705)		(0.544)	(0.449)	(0.338)
3	0.046	99.053	0.901	3	99.925	0.003	0.072
	(0.622)	(1.323)	(1.225)		(1.033)	(0.601)	(0.876)
4	0.164	98.544	1.293	4	99.879	0.004	0.117
	(0.877)	(1.962)	(1.838)		(1.645)	(0.693)	(1.523)
5	0.348	98.047	1.604	5	99.843	0.005	0.152
	(1.199)	(2.595)	(2.369)		(2.167)	(0.775)	(2.053)
6	0.593	97.552	1.855	6	99.817	0.005	0.178
	(1.582)	(3.186)	(2.799)		(2.575)	(0.866)	(2.456)
7	0.891	97.049	2.061	7	99.797	0.005	0.198
	(2.015)	(3.741)	(3.146)		(2.894)	(0.974)	(2.761)
8	1.236	96.530	2.234	8	99.782	0.005	0.212
	(2.490)	(4.274)	(3.427)		(3.152)	(1.103)	(2.994)
9	1.624	95.994	2.382	9	99.771	0.005	0.224
	(2.999)	(4.798)	(3.657)		(3.368)	(1.254)	(3.173)
10	2.048	95.439	2.513	10	99.763	0.005	0.232
	(3.534)	(5.318)	(3.848)		(3.559)	(1.428)	(3.314)

Table E.15: Variance decompositions of RGDPCG and LNREM (order 2) - MENA

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	1.058 (1.548)	0.405 (1.252)	98.537 (1.872)	1	24.989 (5.640)	75.011 (5.640)	0 (0)
2	0.918 (1.429)	0.428 (1.408)	98.655 (1.834)	2	25.004 (6.479)	74.568 (6.472)	0.428 (0.826)
3	0.917 (1.421)	0.426 (1.375)	98.656 (1.861)	3	23.858 (7.007)	75.240 (6.898)	0.901 (1.472)
4	0.966 (1.440)	0.478 (1.372)	98.556 (1.916)	4	22.589 (7.299)	76.119 (7.122)	1.293 (2.313)
5	1.034 (1.491)	0.562 (1.401)	98.405 (1.999)	5	21.352 (7.473)	77.044 (7.308)	1.604 (3.023)
6	1.106 (1.569)	0.659 (1.458)	98.235 (2.104)	6	20.185 (7.586)	77.960 (7.498)	1.855 (3.584)
7	1.177 (1.655)	0.760 (1.537)	98.064 (2.223)	7	19.097 (7.666)	78.843 (7.690)	2.061 (4.023)
8	1.244 (1.744)	0.860 (1.633)	97.896 (2.351)	8	18.087 (7.725)	79.680 (7.876)	2.234 (4.369)
9	1.308 (1.831)	0.957 (1.739)	97.734 (2.482)	9	17.152 (7.769)	80.466 (8.051)	2.382 (4.642)
10	1.368 (1.914)	1.051 (1.850)	97.581 (2.613)	10	16.289 (7.798)	81.199 (8.211)	2.513 (4.859)

Latin America

Table E.16: Variance decompositions of LNNEE and RGDPCG (order 1) - Latin America

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	99.075	0.925	0	1	0.138	2.449	97.412
	(1.523)	(1.523)	(0)		(0.746)	(1.977)	(2.134)
2	98.990	1.009	0.002	2	0.137	2.225	97.638
	(2.030)	(1.999)	(0.351)		(1.103)	(1.950)	(2.301)
3	98.696	1.086	0.219	3	0.137	2.543	97.320
	(2.721)	(2.428)	(0.981)		(1.129)	(2.042)	(2.378)
4	98.459	1.085	0.456	4	0.140	2.838	97.022
	(3.360)	(2.737)	(1.630)		(1.147)	(2.091)	(2.405)
5	98.357	1.044	0.600	5	0.145	3.072	96.783
	(3.867)	(3.026)	(2.052)		(1.181)	(2.167)	(2.470)
6	98.325	0.990	0.685	6	0.149	3.276	96.575
	(4.274)	(3.313)	(2.328)		(1.226)	(2.269)	(2.566)
7	98.325	0.934	0.741	7	0.152	3.461	96.387
	(4.622)	(3.605)	(2.520)		(1.278)	(2.386)	(2.680)
8	98.338	0.880	0.781	8	0.155	3.631	96.214
	(4.937)	(3.907)	(2.659)		(1.332)	(2.510)	(2.803)
9	98.357	0.832	0.811	9	0.158	3.786	96.056
	(5.235)	(4.218)	(2.764)		(1.386)	(2.636)	(2.930)
10	98.377	0.790	0.833	10	0.161	3.927	95.912
	(5.525)	(4.540)	(2.844)		(1.438)	(2.762)	(3.058)

Table E.17: Variance decompositions of LNREM (order 1) and LNNEE (order 2) - Latin America

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	0	100	0	1	100	0	0
	(0)	(0)	(0)		(0)	(0)	(0)
2	0.017	99.748	0.235	2	99.995	0.004	0.002
	(0.448)	(0.894)	(0.792)		(0.588)	(0.534)	(0.309)
3	0.017	99.671	0.312	3	99.770	0.011	0.219
	(0.601)	(1.282)	(1.179)		(1.007)	(0.699)	(0.873)
4	0.016	99.659	0.326	4	99.533	0.010	0.456
	(0.725)	(1.487)	(1.387)		(1.444)	(0.808)	(1.373)
5	0.014	99.658	0.328	5	99.391	0.009	0.600
	(0.872)	(1.634)	(1.513)		(1.742)	(0.922)	(1.674)
6	0.012	99.657	0.331	6	99.303	0.012	0.685
	(1.061)	(1.777)	(1.595)		(1.968)	(1.063)	(1.865)
7	0.011	99.656	0.333	7	99.238	0.021	0.741
	(1.295)	(1.941)	(1.654)		(2.165)	(1.237)	(1.998)
8	0.010	99.655	0.335	8	99.183	0.036	0.781
	(1.566)	(2.137)	(1.697)		(2.357)	(1.444)	(2.095)
9	0.009	99.654	0.337	9	99.133	0.056	0.811
	(1.867)	(2.366)	(1.729)		(2.555)	(1.681)	(2.166)
10	0.009	99.652	0.339	10	99.084	0.082	0.833
	(2.191)	(2.625)	(1.754)		(2.765)	1.944	(2.219)

Table E.18: Variance decompositions of RGDPCG and LNREM (order 2) - Latin America

Horizon	LNNEE	RGDPCG	LNREM	Horizon	LNNEE	RGDPCG	LNREM
1	0.048 (0.494)	2.539 (1.966)	97.412 (2.052)	1	0.925 (1.272)	99.075 (1.272)	0 (0)
2	0.053 (0.958)	2.308 (1.899)	97.638 (2.075)	2	0.766 (1.184)	98.999 (1.357)	0.235 (0.532)
3	0.055 (0.989)	2.625 (1.970)	97.320 (2.178)	3	0.740 (1.238)	98.947 (1.624)	0.312 (0.838)
4	0.067 (1.022)	2.911 (1.985)	97.022 (2.204)	4	0.740 (1.340)	98.935 (1.925)	0.326 (1.090)
5	0.081 (1.074)	3.136 (2.008)	96.783 (2.245)	5	0.747 (1.489)	98.925 (2.207)	0.328 (1.251)
6	0.093 (1.123)	3.332 (2.044)	96.575 (2.295)	6	0.758 (1.680)	98.911 (2.478)	0.331 (1.356)
7	0.103 (1.170)	3.510 (2.093)	96.387 (2.354)	7	0.771 (1.905)	98.896 (2.750)	0.333 (1.430)
8	0.113 (1.217)	3.673 (2.150)	96.214 (2.420)	8	0.786 (2.162)	98.879 (3.030)	0.335 (1.484)
9	0.121 (1.263)	3.822 (2.211)	96.056 (2.489)	9	0.801 (2.444)	98.862 (3.319)	0.337 (1.523)
10	0.129 (1.306)	3.959 (2.274)	95.912 (2.558)	10	0.817 (2.747)	98.845 (3.620)	0.339 (1.554)

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