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Remittances and Credit Provided by the Banking Sector in Developing Countries

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This paper examines the effect of remittances on domestic credit provided by the banking sector in a large sample of developing economies. The empirical analysis adopts the fixed and random effects as well as the panel corrected standard errors estimation procedures. Our empirical results provide evidence that remittance inflows in the low and upper middle-income countries are positively and significantly related to domestic credit provided by the banking sector. The findings also confirm that when the samples of all of the low and middle-income countries are combined as part of the empirical analysis, the coefficient of remittances remains positive and statistically significant under the three estimation procedures. Our empirical findings also provide strong support that real interest rate and per capita incomes are negatively and statistically significantly related while economic growth and inflation are positively and statistically significantly related to domestic credit provided by the banking sector.

JEL Codes: F24, O16, F21.

1. Introduction

There have been an increasing number of people seeking employment as well as migrating for permanent settlement from the low and middle-income countries to the high-income countries over the last three decades. Robust economic growth experienced by the high-income countries until recently led to increased employment opportunities and this together with a better quality of life have been major pull factors, among others, for those moving to high-income countries. Available statistics indicate that the number of international migrants in the world increased from just over 75 million in 1960 to just over 190 million in 2005 or 3 percent of the world's population (United Nations, 2006). The pattern of international migration experienced in the past three to four decades has generally benefited the migrant sending as well as receiving countries. One direct benefit accrued to the migrant sending countries has been their receipts of large sums of remittances – the portion of international migrant (permanent migrants and workers) earnings sent back from the country of residence or employment to the country of origin (home country). For example, in monetary terms, in 2009, remittances totaled US$307 billion for developing countries (World Bank, 2010). Remittances as a percentage of gross domestic products on an annual average basis for the low and middle-income countries were 1.06 in 1985 and 2.01 in 2005. For high-income countries, the percentages were 0.22 in 1985 and 0.23 in 2005. As a percentage of gross domestic product, remittances rose from 1.2 in 1985 to 2.0 in 2005 for the low and middle-income countries, significantly higher than the average for high-income countries (World Bank, 2010).

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Another feature of the low and middle-income countries in the last three decades is that domestic credit provided by the banking sector as a percentage of gross domestic product (GDP) rose significantly. Domestic credit provided by the banking sector as a percentage of GDP increased from just over 45 in 1980 to over 75 in 2008 (World Bank, 2010). What is obvious from these statistics is that the world's poorer nations have benefited from the presence of the banking system, given its role in mobilizing savings.

Given the rising trend in remittances as well as domestic credit provided by the banking sector in the developing economies as described above, it is worthy to investigate if remittances are contributing towards higher levels of domestic credit provision by the banking system. For several years, developing countries' economic development has been constrained by lack of investment funds. The surge in remittances in the developing economies does provide a window of opportunity for them to tap into this financial inflow and direct it to productive use. The banking system plays an important role in mobilizing savings and it would be interesting to know if there are any links between domestic credit provided by the banking sector and remittances. Hence, the purpose of this paper is to investigate if remittances lead to increased credit provision by the banks in a sample of low and middle-income economies. The paper uses cross country data for several developing countries as part of the empirical analysis in order to better understand the relationships that exist. The next section presents a review of the relevant literature relating to remittances and credit provision by the banks. Section 3 posits a model together with a discussion of methodology, the choice of variables and data sources. Section 4 presents the empirical results. Section 5 concludes with a summary of the key findings of the study.

2. Literature Review

The discussion of remittances influencing national economic welfare dates back to the early works of Keynes (1929) and Ohlin (1929) who treated remittances as the transfer problem of the receiving economies. The current discussion on remittances in literature focuses on a range of effects: microeconomics and the households; macroeconomy; financial markets and social and human wellbeing. The microeconomic effects of remittances are discussed in Amuedo-Dorantes and Pozo (2004) while Balderas and Nath (2008) have analyzed macroeconomic impacts of remittances. Remittances can also have direct effects on investment (Edwards and Ureta, 2003) and financial markets (Calero, Bedi and Sparrow, 2009 and Gupta, Patillo and Wagh, 2009). Finally, remittances can also have an impact on the social and family welfare as noted by Liu and Reilly (2004) and Adams Jr (2009). Gupta, Pattillo and Wagh (2009) and Adams and Page (2005) found that remittances had a direct poverty-mitigating effect and promoted financial development in sub-Saharan Africa while Osili (2007) found that remittances sent to finance origin country investments are positively associated with migrant's country of origin household wealth.

Remittance inflows impact recipient countries. The first round effect of remittances in recipient countries is on the monetary side. In terms of monetary effects, theoretically remittances increase the supply of money in the recipient country. An expanded supply of money in circulation increases the availability of loanable funds, which

lowers the interest rates. This can aid investment as more liquidity in the banking sector encourages borrowing, which then gets invested. Since private investment is assumed to be inversely related to prevailing interest rates, investments expand as interest rates fall, and thereby contributing to higher levels of economic activity. From a neoclassical perspective, high interest rates (lending) increase the user cost of capital and so reduces investment. In their study on remittances, transaction costs and informality, Freund and Spatafora (2008) found that recorded remittances depend positively on the stock of migrants and negatively on transfer costs and exchange rate restrictions.

Secondly, remittances can matter for the financial markets. In theory, remittances reflect portfolio allocation decisions involving the relative rates of return on investment on financial and real assets in origin and destination countries. If returns are higher in home countries, workers will transfer their funds without hesitation. Even if workers choose to leave their savings in the country of residence or employment as a short-term portfolio allocation decision, they would certainly compare the rates of returns with that of their home country.

The real gains of remittances to home countries should be qualified as demonstration effect. That is, it is the type of consumption/investment patterns of migrants and workers that can positively influence demand-led economic growth in home country. For example, rezoning areas for residential living, development of public services (roads, schools, and health facilities), development of community services (recreational parks, community halls, places of worship) and establishment of business centers (shopping malls, gas stations and tourism services) lead to demand side effects. Such demand side effects can also induce some degree of inflationary pressures. Remittances can also be used to finance entrepreneurial activities that may generate multiplier effect that may lead to an increase in aggregate demand. Remittances can also affect income and wealth in home countries. For example, if workers remit large amounts of savings, they may in fact be better off financially than the non-migrant workers and this may create income and inequality gaps.

The role of the banking sector in terms of enhancing national welfare has been a subject of ongoing research for several years. Starting with the works of Schumpeter (1912), a growing body of literature has continued to demonstrate the importance of banking system and long-run economic growth. The role of credit as a factor contributing towards national economic welfare has continued to be a subject of an ongoing inquiry such as those by Hicks (1969), Shaw (1973) and McKinnon (1973). The financial sector is now regarded as a fundamental component of modern market led economies and its contribution to economic growth and development has been thoroughly explored by Levine (1997 and 2005). As noted by Levine (1997) in his theoretical framework, one of the primary roles of the financial system is to *mobilize savings* (Figure 1 in Levine, 1997) that can be invested. Through investment, capital gets accumulated and finally contributes to growth. Banks play an important role in mobilizing savings. Levine (1997) showed that specific market frictions motivate the emergence of financial contracts, markets and intermediaries and that these financial arrangements provide five financial functions that affect savings and allocations decisions in ways that influence economic growth.

Global capital markets are becoming more integrated as a result of liberalization, among other factors. Increased openness to capital flows (Moshirian, 2004) resulting

from the liberalization of the financial sector has promoted financial innovation (Hausler, 2002) and this has aided the development of banking and stock markets. Other than its role of pushing for industrialization in high-income countries, the banking systems in general are becoming increasingly global as a result of financial liberalization and economic integration. Moshirian (2004) analyzed various categories of international financial services and highlights those factors that contributed to an increase in the competitiveness of financial institutions and their role in increasing the supply of international financial services. However, Moshirian (2008) has argued that despite the removal of financial and other barriers in the past two decades, there are still a number of national, regional and global factors that are slowing the process of financial globalization from trickling down to all parts of the world.

The banking sector has an important role in facilitating investment capital to areas where returns are high together with providing special vital functions within the financial sector: alleviating information problems, reducing liquidity risk, reducing monitoring costs and channeling credit to certain class of borrowers that cannot access non-intermediated forms of credit. The importance of credit provided by the banking sector has been emphasized in previous studies. Much of the expansion of banking activities around the globe is attributable to a combination of factors: financial policy liberalization, use of new technologies, business models and risk management systems (Torre, Peria and Schmukler, 2010); quality of institutions (Lensink, Meesters and Naaborg, 2008), privatization and banking sector reforms and competition (Brissimis, Delis and Papanilolaou, 2008); political stability and societal openness (Aggarwal and Goodell, 2009) and increase in the degree of market power (Turk Ariss, 2010). Levine, Loayza and Beck (2000) have noted that legal and accounting reforms that strengthen creditor rights, contract enforcement and accounting practices can boost financial development and accelerate economic growth.

The banking system has contributed to the economic welfare of nations for decades and continues to do so in many countries around the globe. Beck and Levine (2004) have shown that stock markets and banks positively influence economic growth. Banks play an important role in mobilizing savings and that banking development and stock market liquidity are known to be good indicators of economic growth, capital accumulation and productivity growth (Levine, 1997). Financial sector can also deliver social side benefits, for example, by contributing to poverty reduction through growth enhancing effect.

3. Methodology

To empirically assess the effect of remittances on credit provided by the banking sector in developing countries, we use the following estimation model:

$$Credit = a + b_1Remit + b_2RIR + b_3Growth + b_4Inflation + b_5PCI + b_6Tec + e$$

Here, our measure of the dependent variable is domestic credit provided by the banking sector as a percentage of gross domestic products (Credit). Our core variable of interest is remittances and its measure is workers' remittances and compensation of employees, received as a percentage of GDP (Remit). Other than this core variable, we include other potential variables known in the previous

literature to influence credit provided by the banking sector. Thus, our right hand side variables include: economic growth (GDP per capita growth, annual percent); real interest rate (RIR); inflation (GDP deflator, annual percentage), per capita incomes--PCI (GDP per capita, constant 2000 US dollars); and technology (Tec)--internet users per 100 people. We hypothesize positive signs of Remit, Growth, Tec, Inflation and PCI and a negative sign of RIR. Rationales for these hypothesized relationships are provided next.

Economic growth is chosen as the first control variable. A growing economy attracts investors and therefore can lead to expansion of banking activities. It also signals the extent to which domestic economic environment may further the expansion of the banking sector. Good economic growth also indicates the extent to which factors favoring investment such as prudent regulations and other important policy measures (low interest rates and expansionary fiscal policy) are in place. A growing economy also offers greater opportunities for banks to effectively realize economies of scale. An economy whose economic and institutional infrastructure favors production encourages individuals to engage in the creation and transaction of goods and services. An economy in which economic policies and rules are changing frequently may indicate an unstable economic environment and may deter potential investors and weaken production.

The estimation phase also controls for *inflation.* A higher rate of inflation than expected would reduce the real cost of borrowing, and a lower rate of inflation than expected would increase the real cost of borrowing. Thus, by increasing uncertainty, high inflation could reduce investment. High and unstable inflation rates affect investment by increasing the degree of uncertainty about countries macroeconomic fundamentals. As a result firms have no incentive in pursing long-term and illiquid investment projects. Financial intermediaries also react to high inflation by avoiding long-term lending. McKinnon (1973) and Shaw (1973) argued that inflation can have an adverse effect on the level and quality of capital formation. Two aspects of their argument deserve attention. First is the effect of inflation on intermediation activities of the banking system. The banking system forms an important intermediary function by collecting deposits from individuals and making loans for productive investment. Anything, which reduces the volume of real bank deposits, will tend to reduce those types of investment, which are too large to be financed by individuals from their own resources. The second is the willingness of people to accumulate money holdings prior to buying capital goods. Savings may be held in currency or bank deposits. It is known that inflation acts as a deterrent to holding money, particularly for long periods of time.

Higher *interest rate* reduces the attractiveness of new investment projects, which do not have high enough returns and therefore are negatively affecting credit provided by the banks. The theoretical argument from a neoclassical perspective is that high interest rates (lending) increase the user cost of capital and so reduces investment. However, in contradiction, the McKinnon-Shaw hypothesis establishes a positive relationship between interest rate and investment but interest rate in question is the deposit interest rate. Higher interest rates on deposits will attract more real balances, which allow them to finance more investment. On the other hand, low or negative real interest rates discourage savings, which reduce the amount of funds available for investment. Although these arguments are perfectly valid, in modern market

economies, it is the investment with borrowed funds that is likely to have a significant impact and affects banks' lending policies.

The estimation phase also controls for the role of *technology*. The theoretical arguments relating to technology and the expansion of the banking sector can be traced from economic growth literature. Solow (1956) clarifies the role of the accumulation of physical capital and emphasizes the importance of technological progress as the ultimate driving-force behind productivity gains and sustained economic growth. Advances in communication technology have been a major driving-force in bringing about positive economic change in many countries. The argument here is that the information and communications technology plays a vital role in diffusing banking activities and services. The advances in digital information technology (mobile phones, wireless and fully digitized networks) are likely to have a profound impact on the banking sector, including the creation of new opportunities for individuals to speed business transactions and minimize costs of doing business. In a study involving 425 community banks in US, De Young, Long and Nolle (2007) find that internet adoption improved community bank profitability and associated with movements of deposits from checking accounts to money market deposit accounts, increased use of brokered deposits and higher average wage rates for bank employees.

The data source for all the variables indicated above is World Bank's *World Development Indicators*.

The number of countries for analytical procedure in this paper is largely dictated by availability of published data on core variables of concern. Our sample of countries includes countries from the low (9), lower middle-income (24) and upper middle-income categories (24), with a total of 57 countries. Classification of the sample countries into these three groups is done by following the approach taken by the World Bank for classification of countries by income levels. The time period of the study covers the years from 1999 to 2008 for low-income countries, from 1996 to 2008 for lower middle-income countries and from 1995 to 2008 for upper middle-income countries.

The low-income countries are Bangladesh; Comoros; Ethiopia; Gambia, the; Kenya; Lao PDR; Madagascar; Mozambique; and Sierra Leone.

The lower middle-income countries include Belize; Bolivia; Cameroon; China; Ecuador; Egypt, Arab Republic; Guatemala; Honduras; India; Indonesia; Jordan; Lesotho; Maldives; Morocco; Nigeria; Papua New Guinea; Paraguay; Philippines; Sri Lanka; Swaziland; Syrian Arab Republic; Thailand; and Vanuatu.

The upper middle-income categories of countries include Algeria; Argentina; Botswana; Brazil; Colombia; Costa Rica; Dominica; Dominican Republic; Fiji; Gabon; Grenada; Jamaica; Malaysia; Mexico; Namibia; Panama; Peru; Seychelles; South Africa; St. Kitts and Nevis; St. Lucia; St. Vincent and the Grenadines; Suriname; and Venezuela.

4. Empirical Results

Our empirical methodology follows the panel data estimation procedure. It combines the cross-country time-series data involving several countries and time periods. Our estimation procedure takes into account of the nature of development of the sample countries. As such, we separately estimate the equations for sample countries based on their income categories. Thus, we run regressions for three groups of the countries and finally for the total sample, that is, low, lower middle-income and upper middle-income countries combined. Our use of the panel data estimation technique accounts for the fixed and random effects as it is well-known that the use of OLS leads to biased estimates since it assumes a single set of slope coefficients and one intercept. As such, the fixed and random effects estimation procedures are adopted. The fixed effects models are usually based on the assumption that the slopes are common but that each cross-sectional unit has its own intercept. The random effects model assumes that the intercepts are drawn from a common distribution with a mean and constant variance.

The results of the fixed and random effects model are presented in Tables 1 to 4. We also adopt the panel corrected standard errors estimation procedure so as to complement the fixed and the random effects models and the results are presented in Tables 1 to 4. Tables 1, 2 and 3 include the empirical results of the low; lower middle-income; upper middle-income and combined sample in Table 4, respectively.

Table 1: Empirical Results for Low-Income Countries
(T-statistics are in parentheses beneath coefficient estimates.)

Variables	Fixed Effects Estimation	Random Effects	Panel Corrected Standard Error
Remittances	2.481 (5.474)*	2.535 (6.654)*	2.38 (5.665)*
Real interest rate	-0.995 (5.232)*	-0.774 (4.664)*	-0.870 (5.094)*
Economic growth	0.611 (1.659)***	0.348 (1.153)	0.382 (1.251)
Inflation	0.644 (4.226)*	-0.491 (3.928)*	-0.592 (4.393)*
Per capita income	-0.039 (2.053)**	-0.023 (1.441)	-0.054 (2.787)*
Technology	-0.324 (0.369)	-0.729 (1.176)	-0.505 (0.609)
Number of observations	90	90	90
F-statistics	65.6	14.6	8.6
Adjusted R-square	0.45	0.51	0.39
Sample years	1999-2008	1999-2008	1999-2008

*, **, and *** indicates statistically significant at the 1, 5 and 10 percent levels respectively

Table 2: Empirical Results for Lower Middle-Income Countries
(T-statistics are in parentheses beneath coefficient estimates.)

Variables	Fixed Effects	Random Effects	Panel Corrected Standard Errors
Remittances	-0.540 (2.174)**	-0.697 (3.327)*	-0.414 (1.682)***
Real interest rate	-1.219 (4.089)*	-1.049 (4.117)*	-0.147 (4.027)*
Economic growth	2.988 (5.178)*	2.210 (4.635)*	2.507 (4.504)*
Inflation	0.034 (3.376)*	0.035 (4.387)*	0.0311 (3.380)*
Per capita income	-0.007 (0.841)	-0.002 (0.248)	-0.009 (1.044)
Technology	-0.842 (2.768)*	-0.632 (2.461)*	-0.738 (2.273)**
Number of observations	288	288	288
F-statistics	137.6	12.4	10.3
Adjusted R-square	0.26	0.20	0.17
Sample years	1996-2008	1996 2008	1996-2008

*, **, and *** indicates statistically significant at the 1, 5 and 10 percent levels respectively.

Table 3: Empirical Results of Upper Middle-Income Countries
(T-statistics are in parentheses beneath coefficient estimates.)

Variables	Fixed Effects Estimation	Random Effects Estimation	Panel Corrected Standard Errors
Remittances	1.459 (6.353)*	0.941 (4.553)*	0.752 (3.796)*
Real interest rate	-0.348 (2.528)**	-0.321 (2.486)**	-0.416 (2.535)**
Economic growth	-0.351 (0.608)	-0.670 (1.151)	-1.009 (1.417)
Inflation	0.009 (1.270)	0.012 (1.659)***	0.009 (1.207)
Per capita income	3.258 (2.371)**	3.497 (2.617)*	5.299 (2.910)*
Technology	0.220 (1.230)	0.271 (1.509)	0.035 (0.140)
Number of observations	336	336	336
F-statistics	139.5	9.4	9.2
Adjusted R-square	0.29	0.15	0.14
Sample years	1995-2008	1995-2008	1995-2008

*, **, and *** indicates statistically significant at the 1, 5 and 10 percent levels respectively.

Table 4: Empirical Results for All 57 Developing Countries
(T-statistics are in parentheses beneath coefficient estimates.)

Variables	Fixed Effects Estimation	Random Effects Estimation	Panel Corrected Standard Errors
Remittances	1.153 (7.431)*	0.822 (6.018)*	0.869 (5.021)*
Real interest rate	-0.969 (6.436)*	-0.970 (6.539)*	-1.127 (4.522)*
Economic growth	0.868 (2.896)*	0.734 (2.564)**	0.600 (1.503)
Inflation	0.024 (4.173)*	0.025 (4.621)*	0.021 (2.893)*
Per capita income	-0.016 (2.314)**	-0.017 (2.550)**	-0.021 (2.902)*
Technology	0.053 (0.289)	0.015 (0.081)	-0.173 (0.627)
Number of observations	570	570	570
F-statistics	284.6	36.9	23.5
Adjusted R-square	0.41	0.29	0.20
Sample years	1999-2008	1999-2008	1999-2008

*, **, and *** indicates statistically significant at the 1, 5 and 10 percent levels respectively.

Remittances are the most significant addition to the usual core variables in our regression analysis. Our aim is to test whether remittances has any impact on credit provided by the banking sector. The basis of the hypothesis is that an increase in remittances received by migrant sending countries can have a positive effect on credit provided by the banking sector. Turning to the results, the estimated coefficient of remittances across the three estimation procedures used for the low, upper middle-income and full sample of countries clearly has signs that accord with intuition and is statistically significant at the 1 percent level indicating that increases in remittances are strongly associated with increases in credit provided by the banking sector. In the lower middle-income countries, the coefficient of remittances is negative in all three estimation methods (Table 2). When all the income categories of countries are combined, the coefficient of remittances is as expected--positive and

statistically significant at a high level. This finding is consistent with our a priori expectations. The empirical results of the three different estimation procedures are consistent with each other and therefore provide compelling evidence that remittance inflows in the low-and middle-income countries are positively correlated with their credit provision by the banks. The gradual rise in domestic credit provided by the banking sector suggest that the low and middle-income countries have recently witnessed does appear to be closely related to the rise in remittance inflows, among other factors as confirmed by the findings presented in Tables 1 to 4.

The coefficients of real interest rate are negative and statistically significant at high levels under the fixed as well as the random effects model. This provides strong evidence that an increase in the real interest rates leads to lesser supply of credit by the banking sector as there may be a demand side response with borrowers reducing their credit requirements in light of rising interest rates.

Turning to the control variables, the coefficient of GDP growth rate is positive and statistically significant in the low and lower middle income group of countries but not in the upper middle-income group of countries. When the sample countries are combined, the coefficient of economic growth variable is positive and statistically significant when estimation is done under the fixed and random effects methods (Table 4). The findings of this positive relationship here suggest that domestic credit provided by the banking sector is likely to increase as economic growth improves.

The coefficient of inflation is consistently positive in the lower and middle-income group of countries. When the entire sample is combined, the coefficient of inflation is positive and statistically significant at high levels. The positive relationship between inflation and credit provided by the banking sector leads to the suggestion that rising inflation erodes the value of money and therefore the demand side response is likely to be stronger as borrowers are likely to respond by borrowing more.

The coefficient of per capita income has a wrong sign except for upper middle-income group of countries. The coefficient of Technology is significant only for lower middle-income group. But even in this case its sign is contrary to what was predicted earlier. Thus it appears that these two variables operate differently in different groups of countries.

5. Conclusion

The purpose of this study is to examine the effect of remittances on domestic credit provided by the banking sector in a large sample of developing economies. The empirical analysis adopts the fixed and random effects as well as the panel corrected standard errors estimation procedures. As part of the empirical analysis, we divided our sample countries in low, lower middle-income and upper middle-income group of countries to more accurately gauge the effect of remittances in countries at different levels of development.

Our empirical results provide evidence that remittance inflows in the low and upper middle-income countries are positively and significantly related to domestic credit provided by the banking sector. Our findings also confirm that when the samples of all of the low and middle-income countries are combined as part of the empirical

analysis, the coefficient of remittances remains positive and statistically significant in all three estimation procedures adopted in this study. For the low and middle-income countries in general, our empirical findings also provide strong support that real interest rate and per capita incomes are negatively and statistically significantly related to domestic credit provided by the banking sector while economic growth and inflation are positively and statistically significantly related to domestic credit provided by the banking sector.

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