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Migrant remittances, financial sector development and the government ownership of banks: Evidence from a group of non-OECD economies[☆]

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ABSTRACT

This study investigates the influence of migrant remittances on two dimensions of the financial sector, namely, *size* and *efficiency* in a sample of 94 non-OECD economies. Evidence suggests that migrant remittances contribute to increasing the size and efficiency of the financial sector. The study, in addition, examines the impact of remittances on financial sector size and efficiency through their interaction with the government ownership of banks. The results suggest that remittances lead to larger increases in financial sector size in countries in which the government ownership of banks is lower, and increases in efficiency in countries in which the government ownership of banks is higher.

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1. Introduction

Remittance inflows into the developing economies have increased ten-fold from US \$31,058 million to US \$327,591 million over the 1990–2008 period, accounting for the second largest foreign exchange

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inflow next to foreign direct investment, and in some cases the largest (World Bank, 2012). Migrant remittances can promote financial development in recipient countries by increasing the volume of deposits with financial institutions. Remittances can also bring a larger proportion of a country's 'unbanked' population in contact with the formal financial system by increasing the availability of credit and banking services to the public such as savings accounts and small scale loans (IMF, 2005).

The relation between remittances and the financial sector has been examined in the studies of Giuliano and Ruiz-Arranz (2009), Aggarwal et al. (2006), Orozco and Fedewa (2005), Mundaca (2009), Gupta et al. (2009), among others. Giuliano and Ruiz-Arranz (2009) conclude that remittances can promote economic growth in the developing economies by enhancing financial sector development, particularly in financially less developed economies. Aggarwal et al. (2006) find that migrant remittances lead to financial sector development in the developing economies by leading to increases in the aggregate volume of deposits and credit intermediated by the banking sector. Examining the effect of remittances on poverty and financial development in Sub-Saharan Africa, Gupta et al. (2009) find that remittances have a positive effect on both poverty and financial development. In a case study of nine financial institutions in South America, Orozco and Fedewa (2005) show that financial institutions' distribution of transfers and financial services provided depend on the resources of the institution and its existing presence in the community. While these studies emphasize the positive effects of remittances on financial sector size, the effects of remittances on financial sector efficiency are less well understood.

Mundaca (2009) using a panel dataset from Latin America shows that remittances can further promote economic growth in economies with well developed financial markets. Modelling the entry of banks into the remittance market, Alberola and Salvado (2006) observe that banks as opposed to smaller money transmitter operators have the ability to offer lower remittance transmission fees thereby increasing the volume of remittances into recipient countries. Freund and Spatafora (2005) on the other hand argue that formal transmission channels such as banks are more expensive compared to informal transmission channels. In a panel dataset covering 104 countries, they show that remittances are transmitted through formal channels in countries which have well developed financial systems. Acosta et al. (2009) investigating the effects of remittances on the exchange rate in 109 developing and transition economies find that upward pressure on exchange rates brought about by the increase in remittances is lower, in countries with well developed financial markets. While these studies are indirectly related to the hypothesis of financial sector efficiency, there is no explicit reference to efficiency.

The present study is closely related to the literature that investigates the relation between remittance flows and the financial sector. The studies hereto have explored the effects of remittance inflows on financial sector size. The majority of studies undertaken on the impact of remittances on financial sector size as measured by the ratio of deposits to GDP, private credit to GDP, and liquid assets to GDP show that migrant remittances have a positive influence on financial sector size. A study by Brown et al. (2011) however suggests that remittances, by easing financial constraints reduce the demand for credit. The present study differs from the previous literature in that it not only examines the effect of migrant remittances on financial sector size, but also efficiency. The impact of remittance inflows on financial sector efficiency is measured by overhead costs and net interest margins. If remittances lead to an increase in efficiency, this would benefit the public due to reduced overhead costs and net interest margins. Increases in overhead costs and net interest margins on the other hand would lead a fall in financial sector efficiency.

A related issue that has not been explored is the role played by government owned banks in determining the magnitude and efficiency of remittances. In the developing economies, the government plays a major role in setting up banks in rural areas and providing access to finance. The role of the government in promoting financial sector development has been highlighted in the work of Dermirguc-Kunt (2006). Therefore, the present study in addition, investigates if the impact of remittances on financial sector size and efficiency is conditional on the degree of government ownership of banks. There are two views associated with government involvement in the financial sector. The development view associated with Gerschenkron (1962) and Lewis (1950), and the political view associated with Kornai (1979) and Shleifer and Vishny (1994). The political view argues that the government by pursuing its own political objectives is subject to conflicting interests which can lead to

inefficient outcomes, primarily in economies with weak property rights. This could lead to increased interest margins and overhead costs. The development view on the other hand argues that the government can help overcome market failures and promote development through lower costs and increased access to finance, particularly in the developing economies. Government ownership can also play an important role in retaining savings within a financial system where regulation is not of high quality (Shortland, 2009). Consequently the contribution of this study is threefold: one, to investigate the effects of migrant remittances on financial sector size; two, to examine the effect of remittances on financial sector efficiency; and three, to explore the relation between migrant remittances and financial sector development through the government ownership of banks channel. The study is restricted to a sample of 94 non-OECD nations.

The rest of this paper is structured as follows. Section 2 states the hypotheses. Section 3 examines some country characteristics. Section 4 describes the data and estimation methodology. Section 5 presents the empirical results, and conclusions are summarised in Section 6.

2. Hypotheses

This study tests the hypotheses that:

- (1) Migrant remittances influence the size of the financial sector.
- (2) Migrant remittances influence the efficiency of the financial sector.
- (3) Despite the fact that remittances can affect the financial sector through a number of channels, this study then goes on to investigate if remittances influence the financial sector through the government ownership of banks channel. To test this hypothesis, the remittance variable is interacted with the government ownership of banks. This interaction term will show the degree to which the prevalence of state owned banks matter for the influence of remittances on financial sector development. Given that remittances have a positive effect on financial sector size, a positive interaction term would imply that remittances have a larger effect on financial sector size in countries with high government ownership of banks, while a negative interaction term would indicate that remittances have a larger effect on financial sector size in countries with low government ownership of banks. Also, given that remittances lead to greater financial sector efficiency in terms of lower overhead costs and net interest margins, a positive interaction term would imply that remittances have a larger effect on financial sector efficiency in countries with low government ownership of banks, while a negative interaction term would indicate that remittances have a larger effect on financial sector efficiency in countries with high government ownership of banks.

2.1. *Migrant remittances, government ownership and the size and efficiency of the financial sector*

Remittances are an important, and sometimes, the only means of access to financial services by households in low income economies. Remittances help low income households to accumulate funds which can be used to finance future consumption or investment. These funds may be used to smooth consumption in the event of unexpected fluctuations in income (Yang and Choi, 2007), and increase the propensity to save. The accumulation of savings in turn can create the opportunity for lending these funds back into the community. The hypothesis that remittances have a positive impact on financial sector size is supported in the work of Giuliano and Ruiz-Arranz (2009), Aggarwal et al. (2006), Orozco and Fedewa (2005), and Gupta et al. (2009). The argument underlying this hypothesis is that remittances contribute to financial sector development by promoting “financial literacy” in remittance receiving households, increasing the demand for and use of banking services, and the availability of credit in the financial sector (see Brown et al., 2011). Here, the mobilization of remittances by financial institutions contributes to alleviating financial constraints in the credit market (Hernandez, 2009). Brown et al. (2011) however, in a study of Azerbaijan and Kyrgyzstan, find that the converse holds. That is, remittances act as a substitute for credit, reducing household financial constraints, leading to a lower demand for credit. This argument runs counter to the financial literacy hypothesis. Remittances may also not lead to an increase in the volume of deposits in the financial system if they are consumed, or households save this money in other forms (Hernandez, 2009).

While there is a literature that investigates the effect of remittance transfer costs on efficiency, Alberola and Salvado (2006), Beck and Martinez Peria (2011), Freund and Spatafora (2005), there is an absence of studies which investigate the effect of remittances on financial sector efficiency.¹ The present study therefore is a first attempt at investigating empirically, the hypothesis that remittances influence financial sector efficiency. According to the financial literacy argument, remittances are an effective means through which the rural population can be integrated into the formal financial system. Hence, through what channels do banks leverage remittances to make financial services more efficient? Changes in overhead and other operating costs are reflected in bank interest rate margins, which are passed on by banks to depositors and lenders (Demirguc-Kunt and Huizinga, 2004). Accordingly, if remittances increase the availability of credit through larger deposits, they can contribute to lowering overhead costs and net interest margins. Evidence shows that increased deposits have led to an increase in bank liquidity, leading to a fall in bank interest rates in some countries. For example, remittances contributed to an increase in deposits in Nepal, from Nepalese Rupees 697 in July 2011 to Rupees 743 billion in December 2011, and an increase in lending from Rupees 521 to Rupees 542 billion in the same period. This in turn led to a lowering of interest rates in Nepal (*The Kathmandu Post*, 2011). Remittances can also act as a substitute for inefficient credit markets by enabling individuals to start business without collateral or high borrowing costs (Hernandez, 2009; Giuliano and Ruiz-Arranz, 2009). Another channel through which increased efficiency can be achieved is through the increase in bank reserves. Demirguc-Kunt and Huizinga (2004) show that increased bank reserves reduce interest margins and profits particularly in developing countries. Remittances have led to an increase in bank reserves in a number of developing countries. Therefore, remittances by increasing bank reserves can reduce overhead costs and interest margins. Conversely, if remittances allow banks to earn monopolistic profits, this will lead to higher bank overhead costs and net interest margins. Therefore banks can also pass on higher operating and overhead costs to depositors and lenders (Demirguc-Kunt and Huizinga, 2004). Besley (1994) however argues that monopoly may not always be inefficient, for as lenders grow larger, their potential to diversify risk increases. In this case, loans will be distributed efficiently despite the aim of extracting a surplus from borrowers.

How does the government ownership of banks affect the size and quality of the financial sector? La Porta et al. (2002) and Barth et al. (2001) have shown that a high government ownership of banks can slow down financial sector development, lead to a concentration of bank lending and slow down economic growth. This is supported by Dinc (2005) who shows that a high government ownership of banks can lead to an inefficient channelling of credit to government officials. Bertrand et al. (2004) in a study of the effects of banking deregulation on the industrial structure in France, argue that deregulation relaxing government intervention in bank lending, has led to greater competition in the credit market. Hence, the empirical evidence suggests that the government ownership of banks can reduce financial sector size. The government ownership of banks however has been defended on the basis that these banks can finance large scale projects that can generate positive externalities for the economy as a whole (Dinc, 2005). Besley (1994) further shows that market failures in developing countries justify government intervention in rural credit markets. This view is echoed by Andrianova et al. (2008) who argue that the government sector can establish banks to jump start economies with very low institutional quality.

Guiso et al. (2006) in a study of bank competition of Italian states, shows that liberalisation leads to an increase in bank efficiency, by contributing to a fall in interest rate spreads. Andrianova et al. (2008) note that subsidized state banks have an advantage over private banks, as they can offer more competitive interest rates compared to private banks to certain sectors. Although subsidisation does not necessarily imply increased efficiency, it would contribute to lower interest rate margins. Hence, if remittances contribute to an increase in the volume of deposits and the availability of credit, government banks may offer more competitive interest rates compared to private banks.

Remittances have led to greater opportunity for financial inclusion. The governments of many developing economies have been taking measures to increase financial inclusion. In Uganda for example, banks now have centralised databases and money can be sent to any part of the country within the

¹ The OECD (2006) cites reduced banking costs as a potential benefit of increased remittances.

same branch network in seconds at no or minimal cost. Banks have in addition introduced improved infrastructure and financial literacy programmes (East African, 2009). A number of countries in South America, Asia and Africa have introduced mobile phone banking. “With new technology and computerisation of banking operations, new remittance products have been introduced in the market, which have increased the speed, cost-effectiveness and efficiency of the payments and settlement system. These include the National Electronic Funds Transfer (NEFT), Electronic Clearing System (ECS), Real Time Gross Settlement (RTGS) and ongoing endeavour at cheque truncation system leading to a national payment and settlement system” (Mohapatra, 2009). These measures can be expected to increase access to finance and lower overhead costs and net interest margins.

Providers aiming to create inclusive finance in developing countries comprise mainly of publicly owned banks that practice a social purpose (UN DESA and UNDCF, 2012). In developing countries, private and international banks usually cater to high end customers, while government banks cater to rural and low income customers. Government banks moreover, have larger banking networks that are required to promote inclusive growth. Consequently, the “Government has an important role to play in building an inclusive financial sector” (UN DESA and UNDCF, 2012). The role of the government in promoting financial sector development by developing the necessary infrastructure, increasing financial sector competition, financial inclusion and developing institutions better suited to the needs of low income households is highlighted in the work of Dermirguc-Kunt (2006). Experience has shown that this role can be largely supportive, but that government intervention can also impede financial sector development” (UN DESA and UNDCF, 2012). There have been no studies investigating the effects of migrant remittances on financial sector size and efficiency through their interaction with the government ownership of banks. The present study is undertaken with the aim of filling this gap.

3. Country characteristics

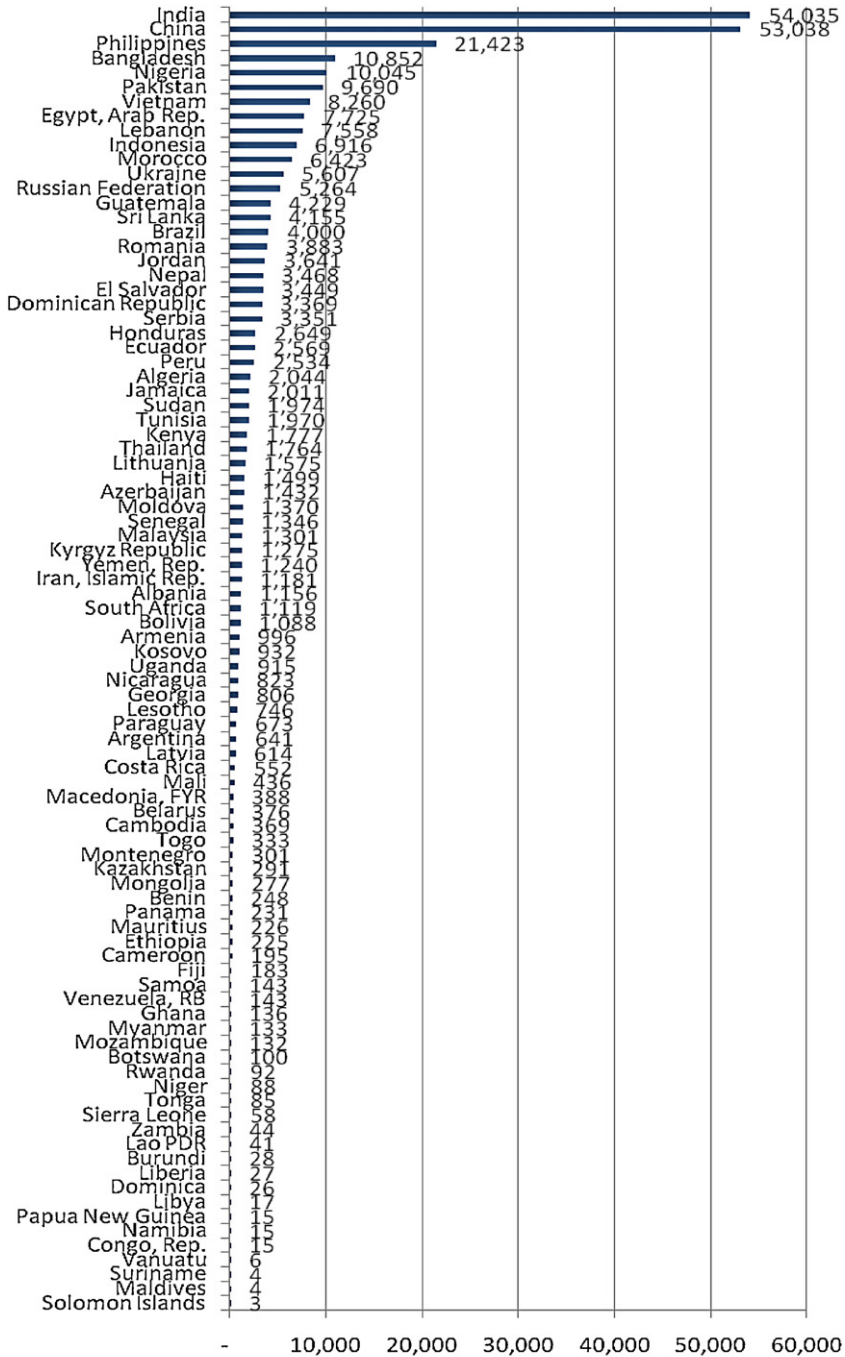
Figs. 1 and 2 show remittance receipts for the countries under study for 2010. The largest five recipients of remittances in the sample in absolute terms are India (US \$54,035 million), China (US \$53,038 million), the Philippines (US \$21,423 million), Bangladesh (US \$10,852) and Nigeria (US \$10,045 million). The largest five recipients of remittances as a percentage of GDP are: Tajikistan (31%), Lesotho (28.6%), Samoa (24.8%), Nepal and Moldova (23.2%) and Krygyz Republic (19.7%). Fig. 3 plots the relationship between the ratio of deposit money bank assets to GDP and the ratio of migrant remittances to GDP for 2010. This preliminary analysis suggests a positive relationship between the two variables.

Fig. 4 plots the ratio of remittances to GDP against the ratio of deposit banks assets to GDP and Fig. 5 plots the ratio of remittances to GDP against the interest rate margin for the countries for 2009, grouped by high and low government ownership of banks. Countries in which the government owns over 50% of the banking system assets (see Barth et al., 2001) are defined as countries with a high government ownership of banks and those with less than 50%, countries with a low government ownership of banks. Note that while there appears to be a positive relationship between the ratio of remittances to GDP and ratio of deposit bank assets in the low government ownership of banks group, the relationship between the two variables for the high government ownership of banks group is marginally negative. Fig. 5 on the other hand shows that an increase in remittances leads to a fall in the interest margin in countries with a high government ownership of banks while remittances do not appear to have an effect on the interest rate margin in countries with a low government ownership of banks. Hence, a question that arises at this point is, do migrant remittances lead to an increase in financial sector development in countries with high or low government bank ownership?

4. Data and estimation methodology

4.1. Data

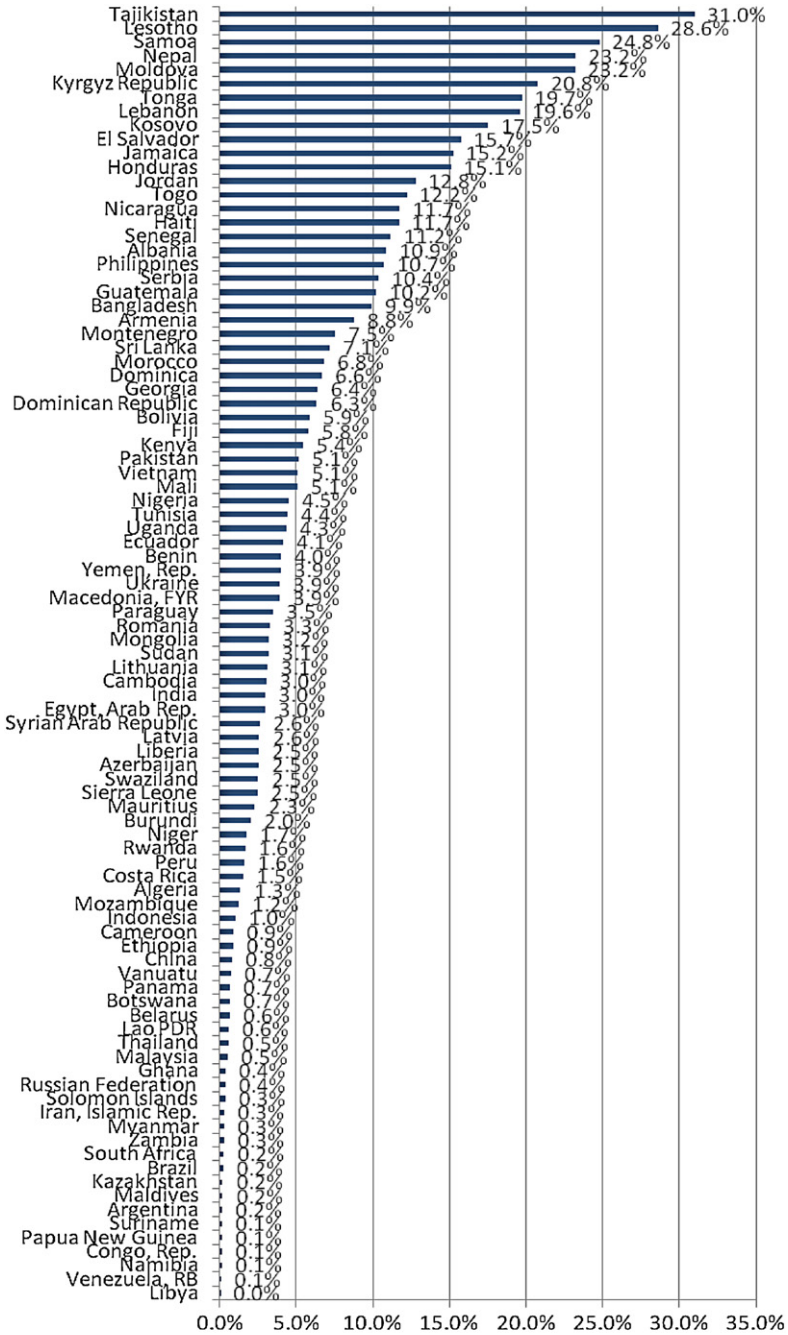
The study uses annual data over the 1990–2010 period for 94 countries. See Data Appendix for list of countries, data sources and explanation. The sample constitutes a representative cross section of the regions covering Eastern Europe and Central Asia, the Middle East and North Africa, Latin America and the Caribbean, East Asia and the Pacific, South Asia and Africa. The high income OECD countries are



Source: World Development Indicators 2012

Fig. 1. Remittance inflows 2010 (US \$ million).

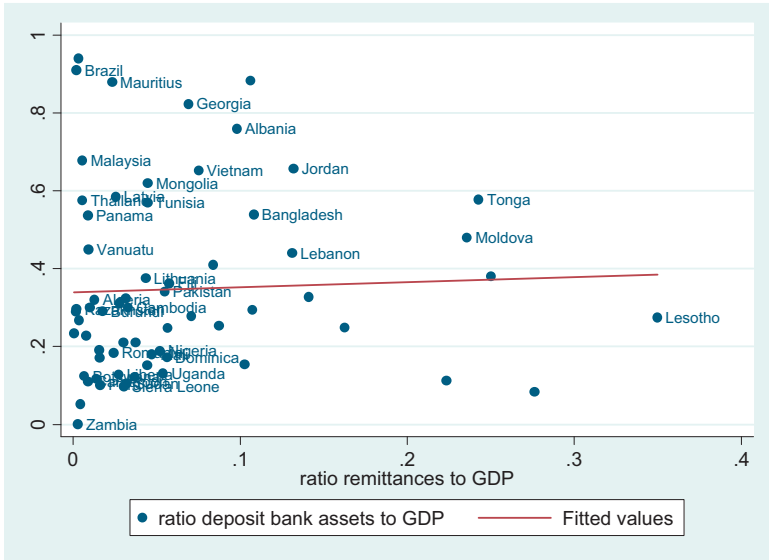
Source: World Development Indicators (2012).



Source: World Development Indicators 2012

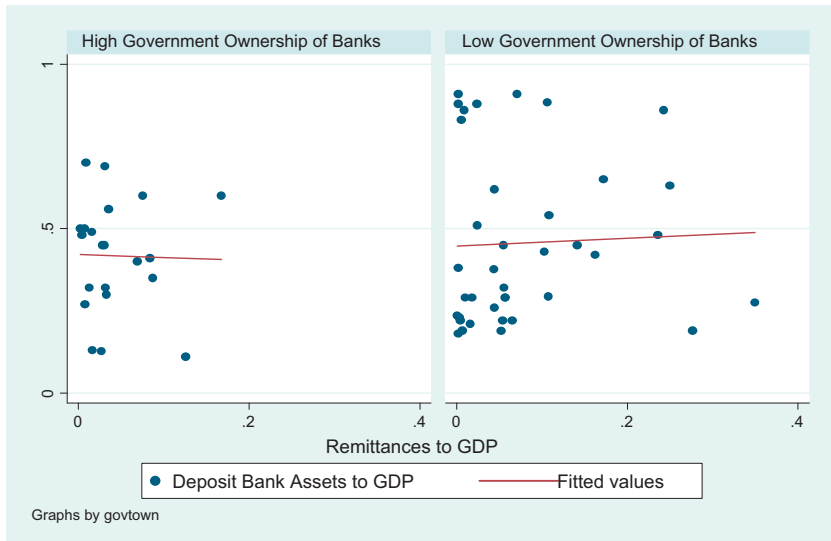
Fig. 2. Remittance flows as % of GDP 2010.

Source: World Development Indicators (2012).



Note: The regression represented by the fitted line reports a coefficient of 0.132 (Robust SE = 0.058), $N = 65$, $R^2 = 0.03$ from a regression of the ratio of deposit money banks assets to GDP to remittances to GDP.

Fig. 3. Deposit bank assets to GDP and remittances to GDP. Note: The regression represented by the fitted line reports a coefficient of 0.132 (Robust SE = 0.058), $N = 65$, $R^2 = 0.03$ from a regression of the ratio of deposit money banks assets to GDP to remittances to GDP.



Graphs by govtown

Fig. 4. Migrant remittances and deposit bank assets to GDP by government ownership of banks.

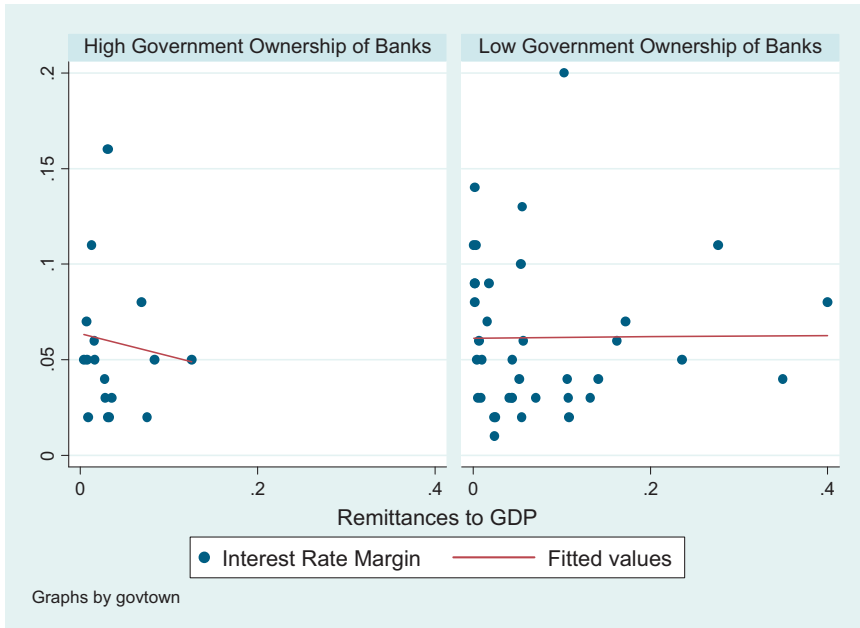


Fig. 5. Migrant remittances and interest rate margin by government ownership of banks.

excluded from the analysis as the channels through which remittance inflows influence the financial sector in these economies are likely to be different from other regions. It is estimated that a large proportion of remittance flows are transmitted through informal channels. A limitation of the study therefore is that it is only able to capture official flows that are transmitted through formal channels.² The dependent variables in the study are the financial sector size and efficiency variables. Financial sector size is measured by: (1) the ratio of deposit banks assets to GDP, (2) liquid assets to GDP, and (3) the ratio of domestic credit by deposit banks and other financial institutions to the private sector to GDP. The provision of credit by the banking sector to the private sector is also an indicator of the degree of activity of financial intermediaries. Financial sector efficiency is measured by (1) the value of banks' net interest margin to total assets and (2) banks' overhead costs to total assets. Increased competition in the financial sector should reduce overhead costs and interest margins. Therefore, if these measures are low it would imply increased efficiency and vice versa. These financial sector indicators are used by Aggarwal et al. (2006) among others.

The main independent variable in the study is the ratio of migrant remittances to GDP. These are formal remittances that are recorded in the National Accounts. Migrant remittances are defined as the sum of workers' remittances, compensation of employees, and migrants' transfers. Other independent variables in the preliminary estimation include, the initial level of per capita income to capture the level of development of a country, openness and inflation variables based upon the previous literature. Studies have shown that current and capital account liberalisation have a favourable impact on financial sector development (see Chin and Ito, 2002; Aggarwal et al., 2006; Gupta et al., 2009). The ratio of exports plus imports to GDP (Giuliano and Ruiz-Arranz, 2009; Gupta et al., 2009), the ratio of foreign direct investment to GDP (Gupta et al., 2009), and a dummy variable for the exchange rate regime (Gupta et al., 2009) are used to capture the degree of openness of an economy. If a country follows some form of fixed/managed/crawling peg exchange rate regime, a dummy variable of one is

² A study by Freund and Spatafora (2005) empirically estimate informal remittance flows. According to them, informal remittance flows account for about 35–75% of official remittances to developing economies.

assigned to it and zero if the currency is allowed to float independently. Inflation can discourage financial intermediation (Aggarwal et al., 2006) and also act as a proxy for uncertainty and risk (Giuliano and Ruiz-Arranz, 2009). Therefore inflation is used as an explanatory variable in the empirical estimation that follows (Giuliano and Ruiz-Arranz, 2009; Gupta et al., 2009).

Additional control variables are used to test the robustness of the results to the choice of variables. A well developed financial system requires a proper legal and regulatory framework. La Porta et al. (1997) show that countries in which legal systems provide proper protection to investors against expropriation by entrepreneurs are likely to have larger and better developed financial markets. They argue that countries with English Common law origin provide the highest investor protection while countries with French law origin provide investors with the least protection. Hence, a dummy variable is created for French legal origin. This dummy variable takes on a value of one for French legal origin and zero otherwise. As migration is likely to be higher from conflict ridden states, a dummy variable of one is assigned if a country experienced a conflict during the period under study, that is, 1990–2010, and zero otherwise. The level of financial literacy of a society can positively impact upon the volume of remittances transmitted through formal channels and thereby on financial sector development. Financial literacy cannot be measured directly. Following Beck and Martinez Peria (2011) who use secondary and tertiary enrolment ratios to measure financial literacy, the present study employs the secondary school enrolment ratio to proxy for the level of financial literacy. The tertiary enrolment ratio is not used as fewer data points are available for tertiary enrolment. A well developed financial system also requires to be accompanied by the necessary infrastructure and technological know-how. Archibugi and Coco (2004) note that capital equipment and machinery “representing a key component of embodied technological capacity” are important for both developed and developing countries. They also note that the closest substitute for this is gross fixed capital formation. Given that data for technological know-how are limited, this is captured by the ratio of gross domestic fixed capital formation to GDP. Moreover, data for gross fixed capital formation are available for most countries and there is greater consistency in the data. As increased government expenditure can increase bank concentration and reduce competitiveness by crowding out private sector investment expenditure, the share of public consumption to GDP is also considered. Beck et al. (2003) show that increased ethnic/religious fractionalisation can impede financial sector development. Therefore the religious fractionalisation measure of (Alesina et al., 2003) is employed to capture the degree of fractionalisation of a society.

To investigate the hypothesis that remittances affect the financial sector through the government ownership of banks channel, the ratio of migrant remittances to GDP is interacted with the government ownership of banks from Barth, Caprio and Levine (2001 updated in 2008).

4.2. Estimation methods

The study uses both pooled OLS and system GMM methods to estimate the influence of remittances on the financial sector.

The following model forms the basis of the preliminary OLS estimation:

$$F_{it} = \alpha R_{it} + \mathbf{x}_{it} \beta + v_{it} \quad (1)$$

where F_{it} is the financial sector variable for country i in period t . R_{it} is the remittance variable for country i in period t . All control variables mentioned in Section 4 are captured by the vector \mathbf{x}_{it} . v_{it} is a random error term that captures all other variables.

In order to exploit the time series dimension of the data and individual country specific effects correcting for any endogeneity bias in the explanatory variables, the Arellano–Bover (1995)–Blundell–Bond (1998) system GMM method is used. Blundell and Bond (1998) show that the first differenced GMM procedure could cause large finite-sample biases when used to estimate autoregressive models for fairly persistent series for short panels. They also show that these biases could be reduced by including additional moment conditions. That is the use of lagged first differences as instruments for equations in levels, in addition to the lagged levels as instruments for equations in first differences (Arellano and Bover, 1995; Wooldridge, 2002). Given the fairly short panel used in this study, this approach is considered to be superior to the first differenced GMM procedure.

Therefore, the equation in levels (2) is instrumented with lagged first differences of the variables, while the equation in first differences, (3), is instrumented with lagged levels of the variables:

$$F_{it} = \gamma F_{it-1} + aR_{it} + \mathbf{x}_{it}\beta + \mu_i + \eta_t + \nu_{it} \quad (2)$$

$$F_{it} - F_{it-1} = \gamma(F_{it-1} - F_{it-2}) + a(R_{it} - R_{it-1}) + \beta(\mathbf{x}_{it} - \mathbf{x}_{it-1}) + \eta_t + (\nu_{it} - \nu_{it-1}) \quad (3)$$

The variable definitions are the same as for Eq. (1) with the lagged values of the variables now entering the equations and μ_i representing a country specific effect and η_t , a fixed time effect. The GMM estimator is based on the assumption that the error terms are not serially correlated and that the explanatory variables are weakly exogenous or not correlated with future realizations of the error terms under which the following moment condition holds for the first difference estimator:

$$E[F_{it-s}(\nu_{it} - \nu_{it-1})] = 0; \quad E[R_{it-s}(\nu_{it} - \nu_{it-1})] = 0; \quad E[\mathbf{x}_{it-s}(\nu_{it} - \nu_{it-1})] = 0$$

where $i = 1, \dots, n$, $t = 3, \dots, T$ and $s \geq 2$.

And as mentioned above the levels equation is instrumented with lagged first differences of the variables which leads to the additional moments condition:

$$E[\Delta F_{it-s}(\mu_i + \nu_{it})] = 0; \quad E[\Delta R_{it-s}(\mu_i + \nu_{it})] = 0; \quad E[\Delta \mathbf{x}_{it-s}(\mu_i + \nu_{it})] = 0 \quad \text{for } s = 1$$

Two diagnostic tests are carried out on the system GMM estimates. The Sargan test for over-identifying restrictions under which the null hypothesis is that the instruments are not correlated with the residuals. The second is the Arellano–Bond test for second order correlation in the first differenced residuals.

5. Empirical estimation

5.1. OLS estimation

Table 1 presents OLS results for the model. The dependent variable in column (1) is deposit money bank assets to GDP, column (2) private sector credit to GDP, column (3) liquid assets to GDP, column (4) overhead costs to total assets, and column (5), net interest margin to total assets. Estimation is initially carried out with migrant remittances to GDP, the level of GDP per capita, the ratio of exports to GDP, FDI to GDP, and an exchange rate dummy variable, all of which capture the degree of openness of an economy and the rate of inflation as explanatory variables.

The results indicate that migrant remittances have a positive and significant impact on the financial sector size variables. For example, column (1) indicates that a 1% increase in remittances lead to a 0.03% increase bank deposits and column (2) that a 1% increase in remittances lead to a 0.03% increase in private credit to GDP. An increase in remittances leads to a fall in overhead costs and net interest margins. In column (4), a 1% increase in remittances lead to a 0.004% decrease in overhead costs and in column (5), a 0.005% decrease in the net interest margin. The estimates on per capita income are statistically significant and suggest that a higher per capita income is associated with an increase in the financial sector size variables and lower overhead costs and net interest margins. The coefficients on the ratio of exports to GDP are statistically significant in all columns indicating that greater openness contributes to an increase in financial sector size and rise in efficiency. Foreign direct investment is statistically significant in columns (2), (4) and (5). Inflation has a significant negative impact on both financial sector size and efficiency. The estimates on the exchange rate variables are statistically significant in columns (1), (3) and (5) suggesting that exchange controls exert a negative effect on the volume of deposits and liquid assets to GDP and lead to an increase in the net interest margin.

Table 2 estimates the equations with additional control variables mentioned in Section 4. Including the secondary school enrolment ratio reduces the sample size significantly however.

As before, the variable of interest, migrant remittances, have a significant positive impact on both financial sector size and efficiency. Columns (1), (2) and (3) indicate that a 1% increase in migrant remittances will lead to a 0.04% increase deposit money bank assets to GDP, a 0.03% increase in credit to GDP and a 0.02% increase in liquid assets to GDP, respectively. The French legal origin dummy variable has a significant negative impact on the size and efficiency of the financial sector in columns

Table 1
Migrant remittances and financial sector size and efficiency: OLS estimation.

	(1)	(2)	(3)	(4)	(5)
Independent variables	Deposit money bank assets/GDP	Private credit/GDP	Liquid assets/GDP	Overhead costs	Net interest margin
Log GDP per capita	0.028 (0.006) ^{***}	0.039 (0.010) ^{***}	0.062 (0.015) ^{***}	−0.004 (0.002) ^{**}	−0.004 (0.001) ^{***}
Remittances	0.030 (0.004) ^{***}	0.028 (0.006) [*]	0.022 (0.007) ^{***}	−0.004 (0.002) ^{**}	−0.005 (0.002) ^{***}
Exports	0.130 (0.018) ^{***}	0.140 (0.035) ^{***}	0.132 (0.029) ^{***}	−0.008 (0.003) ^{***}	−0.015 (0.007) ^{**}
FDI	0.006 (0.004)	0.011 (0.005) [*]	0.011 (0.010)	−0.002 (0.001) ^{**}	−0.003 (0.001) ^{***}
Inflation	−0.043 (0.010) ^{***}	−0.044 (0.017) ^{***}	−0.065 (0.011) ^{***}	0.010 (0.006) [*]	0.012 (0.006) ^{**}
Exchange rate regime dummy	−0.025 (0.015) [†]	−0.005 (0.024)	−0.042 (0.018) ^{**}	0.005 (0.004)	0.006 (0.003) [*]
Intercept	0.416 (0.075) ^{***}	0.215 (0.046) ^{***}	0.043 (0.144)	0.081 (0.013) ^{***}	0.070 (0.030) ^{**}
R ²	0.30	0.25	0.32	0.30	0.33
Observations	1021	1035	1020	900	912

Note: Robust standard errors clustered by region reported in parenthesis.

[†] Significant at the 10% level.

^{**} Significant at the 5% level.

^{***} Significant at the 1% level.

Table 2
Migrant remittances and financial sector size and efficiency with additional control variables: OLS estimation.

	(1)	(2)	(3)	(4)	(5)
Independent variables	Deposit money bank assets/GDP	Private credit/GDP	Liquid assets/GDP	Overhead costs	Net interest margin
Log GDP per capita	0.028 (0.010) ^{***}	0.054 (0.026) ^{**}	0.091 (0.039) ^{**}	−0.008 (0.003) ^{***}	−0.015 (0.006) ^{***}
Remittances	0.041 (0.008) ^{***}	0.028 (0.008) ^{***}	0.021 (0.007) ^{***}	−0.003 (0.001) ^{***}	−0.003 (0.001) ^{**}
French legal origin dummy	−0.010 (0.024)	−0.046 (0.027) [*]	−0.031 (0.034)	0.020 (0.009) ^{**}	0.021 (0.005) ^{***}
Exports	0.125 (0.031) ^{***}	0.152 (0.028) ^{**}	0.145 (0.110) [*]	−0.009 (0.003) ^{***}	−0.015 (0.006) ^{**}
FDI	0.020 (0.018)	0.010 (0.016)	0.025 (0.014) [*]	0.005 (0.008)	−0.004 (0.002)
Exchange rate dummy	−0.064 (0.033) [*]	−0.025 (0.012) ^{**}	−0.112 (0.045)	0.014 (0.005) ^{***}	0.010 (0.005) ^{**}
Inflation	−0.063 (0.017) ^{***}	−0.083 (0.020) ^{***}	−0.113 (0.025) ^{***}	0.010 (0.005) ^{**}	0.012 (0.006) ^{**}
Population growth	0.105 (0.044) ^{**}	0.120 (0.061) ^{***}	0.056 (0.032) [*]	−0.001 (0.003)	0.006 (0.003) [*]
Secondary schooling	0.091 (0.030) ^{***}	0.052 (0.030) [*]	0.124 (0.053) ^{**}	−0.012 (0.004) ^{***}	−0.011 (0.003) ^{***}
Govt. consumption	0.010 (0.030)	−0.020 (0.018)	0.028 (0.010) ^{***}	0.008 (0.004) ^{**}	0.004 (0.005)
Gross domestic capital formation	0.064 (0.032) ^{**}	0.044 (0.029) [*]	0.040 (0.047)	−0.022 (0.011) ^{**}	0.005 (0.003) [*]
Religious fractionalisation	−0.222 (0.244)	−0.221 (0.205)	−0.085 (0.088)	0.014 (0.018)	0.027 (0.010) ^{***}
Conflict dummy	−0.044 (0.024) ^{**}	0.040 (0.041)	−0.054 (0.020) ^{***}	−0.006 (0.003) [*]	−0.005 (0.003) [*]
Intercept	0.018 (0.242)	0.240 (0.220)	0.126 (0.122)	0.125 (0.114)	0.110 (0.017) ^{***}
R ²	0.57	0.42	0.50	0.43	0.45
Observations	452	466	458	446	448

Note: Robust standard errors clustered by region reported in parenthesis.

^{*} Significant at the 10% level.

^{**} Significant at the 5% level.

^{***} Significant at the 1% level.

(2), (4) and (5). Openness as measured by exports to GDP has a statistically significant positive impact on financial sector size and efficiency. FDI is statistically significant only in column (3). Inflation exerts a significant negative effect on the financial sector size and efficiency variables. In column (1) for instance, a 1% increase in the rate of inflation will lead to a 0.06% fall in deposit bank assets. The coefficient on the exchange rate dummy variable is statistically significant in all columns except for column (3) suggesting that exchange rate controls lead to a fall in the financial sector size variables and a rise in overhead costs and net interest margins. The coefficients on secondary schooling are statistically significant suggesting that financial literacy has a positive impact on financial sector size and efficiency. The coefficients on government consumption are statistically significant in columns (3) and (4) suggesting that increases in government consumption are associated with increases in bank liquid assets and a rise in overhead costs. Population growth has a significant positive effect on financial sector size and also leads to an increase in the net interest margin. Gross domestic capital formation is statistically significant in columns (1), (2), (4) and (5) and the coefficient on religious fractionalisation in column (1). The conflict dummy variable is significant in all columns except for column (2). An increase in conflict reduces the volume of deposits and the liquid assets held by banks. The results suggest that conflict also causes overhead costs and net interest margins to fall.

5.2. GMM estimation

Table 3 replicates the preliminary regressions in Table 1 using system GMM. The one-step GMM estimator is used in the present study.³ This yields standard errors that are not only asymptotically robust to heteroskedasticity but have also been found to be more reliable for finite sample estimation (see Blundell and Bond, 1998; Bond et al., 2001).

The results for the GMM estimation are consistent with those obtained under OLS estimation in Table 1. The remittance variables continue to be highly statistically significant. Exports to GDP are significant in all columns except for column (4) and FDI is significant in columns (2)–(4). Exchange rate controls have a significant negative impact on deposit money bank assets and private credit, and also lead to increases in overhead costs. Inflation has a significant negative impact on financial sector size and efficiency. The lagged values of the dependent variables are all statistically significant reflecting a high degree of persistency in the variables. The Sargan test for over-identifying restrictions where the null hypothesis is that the instruments are uncorrelated with the residuals, and the Arellano–Bond test for second order serial correlation in the first-differenced residuals confirms that the moments conditions cannot be rejected.

Table 4 replicates the regressions carried out in Table 2 with additional control variables using system GMM. The results confirm the OLS findings that remittances have a positive impact on financial sector development. Exports have a significant positive effect on the financial sector size variables and inflation and exchange rate controls a negative impact on financial sector development. Secondary schooling is statistically significant in all columns and gross domestic capital formation in columns (1), (2), (4) and (5) suggesting the importance of financial literacy and infrastructure for financial sector development. There is some evidence of a negative effect of religious fractionalisation on financial sector development. Conflict has a negative impact on bank deposits and leads to a fall in the net interest margin.

6. Government ownership, financial sector development and migrant remittances

Table 5 reports results for the influence of remittances on the financial sector through the government ownership channel. System GMM is used as this method best addresses the possible endogeneity of migrant remittances and also accounts for the effect of time invariant or very slowly changing government ownership of banks.

³ Although the two-step estimator is more efficient for system GMM, Monte Carlo studies show that the two-step GMM estimator converges to its asymptotic distribution very slowly. In finite samples, the asymptotic standard errors associated with the two-step GMM estimators can be downward biased and thus be an unreliable measure for inference (see Bond et al., 2001).

Table 3
Migrant Remittances and financial sector size and efficiency: system GMM estimation.

	(1)	(2)	(3)	(4)	(5)
Independent variables	Deposit money bank assets/GDP	Private credit/GDP	Liquid assets/GDP	Overhead costs	Net interest margin
Log GDP per capita	0.120 (0.057)**	0.122 (0.050)***	0.032 (0.019)*	−0.002 (0.003)	−0.012 (0.007) [†]
Remittances	0.010 (0.004)***	0.025 (0.010)***	0.011 (0.004)***	−0.003 (0.001)***	−0.004 (0.001)***
Exports	0.010 (0.050)**	0.034 (0.010)***	0.037 (0.010)***	−0.005 (0.004)	−0.012 (0.006)**
FDI	0.003 (0.003)	0.003 (0.001)***	0.002 (0.001) [†]	−0.002 (0.001) [†]	−0.001 (0.001)
Exchange rate dummy	−0.113 (0.059)**	−0.54 (0.020)***	−0.010 (0.030)	0.025 (0.010)***	0.029 (0.022)
Inflation	−0.011 (0.004)***	−0.012 (0.005)***	−0.003 (0.001) [†]	0.002 (0.001) [†]	0.003 (0.001)***
Lag of dependent variable	0.856 (0.090)***	0.844 (0.087)***	0.856 (0.076)***	0.468 (0.134)***	0.478 (0.067)***
Intercept	0.568 (0.294)***	0.364 (0.099)***	0.290 (0.074)***	0.027 (0.029)	−0.410 (0.215)**
Sargan test for over-identifying restriction: <i>p</i> value	0.18	0.20	0.23	0.27	0.21
2nd order autocorrelation: <i>p</i> value	0.23	0.19	0.17	0.16	0.18
Observations	1021	1035	1020	900	912

Note: Standard errors reported in parenthesis. The difference equation is instrumented with the lagged levels, two periods, of the dependent variable and the levels equation with the difference lagged one period. Time specific fixed effects are included as regressors.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

Table 4

Migrant remittances and financial sector size and efficiency with additional control variables: system GMM.

	(1)	(2)	(3)	(4)	(5)
Independent variables	Deposit money bank assets/GDP	Private credit/GDP	Liquid assets/GDP	Overhead costs	Net interest margin
Log GDP per capita	0.036 (0.016) ^{***}	0.022 (0.015) [*]	0.025 (0.013) ^{**}	−0.004 (0.001) ^{***}	−0.007 (0.004) [†]
Remittances	0.029 (0.010) ^{***}	0.026 (0.010) ^{***}	0.020 (0.007) ^{***}	−0.004 (0.001) ^{***}	−0.008 (0.003) ^{***}
French legal origin dummy	−0.043 (0.038)	−0.120 (0.053) ^{**}	−0.021 (0.025)	0.135 (0.020) [*]	0.040 (0.066)
Exports	0.110 (0.040) ^{***}	0.020 (0.010) ^{**}	0.025 (0.014) [*]	−0.005 (0.006)	−0.009 (0.010)
FDI	0.011 (0.000)	0.003 (0.003)	0.008 (0.003) ^{***}	0.002 (0.002)	−0.002 (0.001) ^{**}
Exchange rate dummy	−0.247 (0.075) ^{***}	−0.236 (0.035) ^{***}	−0.056 (0.035) [*]	0.035 (0.032)	0.014 (0.020)
Inflation	−0.025 (0.008) ^{***}	−0.009 (0.003) ^{**}	−0.005 (0.003)	0.001 (0.001)	0.003 (0.001) [*]
Population growth	0.020 (0.018)	0.006 (0.006)	0.007 (0.006)	−0.003 (0.003)	0.003 (0.003)
Secondary schooling	0.045 (0.012) ^{**}	0.017 (0.009) [*]	0.023 (0.012) [*]	−0.009 (0.004) ^{**}	−0.018 (0.011) [†]
Govt. consumption	0.043 (0.046)	−0.006 (0.027)	0.025 (0.021)	0.015 (0.013)	0.015 (0.012)
Gross domestic capital formation	0.167 (0.047) ^{***}	0.045 (0.022) ^{**}	0.018 (0.019)	−0.030 (0.010) ^{***}	−0.010 (0.005) [†]
Religious fractionalisation	−0.249 (0.242)	−0.011 (0.116)	−0.310 (0.056) ^{***}	0.054 (0.023) [*]	0.113 (0.126)
Conflict dummy	−0.145 (0.075) ^{**}	0.018 (0.015)	−0.004 (0.035)	−0.012 (0.015)	−0.024 (0.012) [†]
Lag of dependent variable	0.875 (0.240) ^{***}	0.881 (0.143) ^{***}	0.865 (0.142) ^{***}	0.365 (0.089) ^{***}	0.354 (0.125) ^{***}
Intercept	0.475 (0.405)	0.230 (0.211)	0.444 (0.246) ^{**}	0.011 (0.070)	0.108 (0.107)
Sargan test for over-identifying restriction: <i>p</i> value	0.30	0.24	0.25	0.23	0.26
Arellano–Bond test for 2nd order autocorrelation: <i>p</i> value	0.26	0.30	0.43	0.23	0.25
Observations	452	466	458	446	448

Note: Standard errors reported in parenthesis. The difference equation is instrumented with the lagged levels, two periods, of the dependent variable and the levels equation with the difference lagged one period. Time specific fixed effects are included as regressors.

^{*} Significant at the 10% level.

^{**} Significant at the 5% level.

^{***} Significant at the 1% level.

Table 5
Bank ownership, migrant remittances and financial sector development: system GMM.

	(1)	(2)	(3)	(4)	(5)
Independent variables	Deposit money bank assets/GDP	Private credit/GDP	Liquid assets/GDP	Overhead costs	Net interest margin
Log GDP per capita	0.147 (0.055) ^{***}	0.256 (0.137) ^{**}	0.059 (0.028) ^{**}	−0.003 (0.003)	−0.007 (0.016)
Remittances	0.026 (0.010) ^{***}	0.028 (0.010) ^{***}	0.020 (0.010) ^{**}	−0.003 (0.001) ^{**}	−0.006 (0.002) ^{***}
Exports	0.211 (0.043) ^{***}	0.143 (0.029) ^{***}	0.112 (0.060) ^{**}	−0.005 (0.005)	−0.010 (0.005) [†]
FDI	0.006 (0.007)	0.029 (0.008) ^{***}	0.004 (0.005)	−0.002 (0.002)	−0.002 (0.001) [†]
Exchange rate dummy	−0.346 (0.190) ^{**}	−0.290 (0.083) ^{***}	−0.410 (0.347)	0.032 (0.035)	0.020 (0.025)
Inflation	−0.007 (0.012)	−0.015 (0.006) ^{***}	−0.004 (0.006)	0.002 (0.001) [†]	0.003 (0.001) ^{**}
Government ownership [†] remittances	−0.005 (0.001) ^{***}	−0.003 (0.001) ^{***}	−0.002 (0.002)	−0.006 (0.003) ^{**}	−0.020 (0.010) ^{**}
Intercept	0.210 0.320	0.250 (0.212)	10.935 (0.823)	0.045 (0.049)	0.020 (0.023)
Lag of dependent variable	0.997 (0.055) ^{***}	0.845 (0.026) ^{***}	0.933 (0.035) ^{***}	0.523 (0.098) ^{***}	0.389 (0.075) ^{***}
Sargan test for over-identifying restriction: <i>p</i> value	0.22	0.26	0.24	0.21	0.20
Arellano–bond test for 2nd order autocorrelation: <i>p</i> value	0.45	0.24	0.24	0.27	0.24
Observations	620	622	644	568	560

Note: Standard errors reported in parenthesis. The difference equation is instrumented with the lagged levels, two periods, of the dependent variable and the levels equation with the difference lagged one period. Time specific fixed effects are included as regressors.

[†] Significant at the 10% level.

^{**} Significant at the 5% level.

^{***} Significant at the 1% level.

The overall results are consistent with those above with remittances leading to increases in financial sector size and efficiency. The interaction terms on the government ownership of banks \times migrant remittances are statistically significant in columns (1), (2), (4) and (5). The interaction terms in columns (1) and (2) suggest that remittances lead to increases in the volume of deposits and private credit in countries with low government bank ownership and the interaction terms in columns (4) and (5) suggest that remittances lead to a fall in overhead costs and net interest margins in countries with high government bank ownership.

6.1. *The model disaggregated by government ownership of banks*

Next, the baseline model is re-estimated by dividing the sample into two groups—low and high government ownership of banks. This is to compare how remittances influence financial sector development in these two groups. The results are reported in [Table 6](#).

The results are consistent with those obtained above in [Table 5](#). Migrant remittances have a positive significant impact on deposit money bank assets, private credit and liquid assets to GDP in the low government bank ownership group. Remittances also have a positive significant impact on deposit money bank assets and private credit in the high government bank ownership group. However, the coefficients on the remittance variables in columns (1)–(3) are higher and statistically more significant for the low government bank ownership group suggesting that remittances have a larger positive impact on the financial sector size variables in the low government ownership of banks group. For example, column (1) suggests that a 1% increase in remittances will lead to a 0.04% increase in deposits in the low government bank ownership group as opposed to a 0.02% increase in deposits in the high government bank ownership group. The remittance coefficients in columns (4) and (5) suggest that remittances lead to increased efficiency, or, a larger fall in overhead costs and net interest margins in the high government bank ownership group. The remittance coefficients in columns (4) and (5) are statistically significant for the high government ownership group, however, not statistically significant for the low government ownership group. These results are consistent with those obtained in [Table 6](#) above. An examination of the other variables show that per capita income has a positive impact on the size and efficiency of the financial sector in both groups. An increase in the ratio of exports to GDP exerts a positive significant impact on the financial sector size variables and a fall in the net interest margin. FDI is not statistically significant in the high government bank ownership group, however, has a positive effect on private credit and the financial sector efficiency variables in the low government bank ownership group. Exchange rate controls and inflation influence the financial sector size and efficiency variables negatively.

6.2. *Robustness tests*

Several tests are carried out to ensure the robustness of the results. The study uses a number of alternative measures of financial sector development to check the robustness of the results to the measure of financial sector development. Financial sector size is proxied by three different variables: the ratio of deposit banks assets to GDP, liquid assets to GDP and domestic credit by deposit banks and other financial institutions to the private sector to GDP. Financial sector efficiency is measured by two variables: the value of banks' net interest margin to total assets, and banks' overhead costs to total assets. The results are robust to the measure of financial sector development.

Several additional control variables are used to check the robustness of the results to the conclusions of the study. These control variables which include, population growth, secondary schooling, government consumption, gross domestic capital formation, religious fractionalisation and a conflict dummy variable do not change the overall conclusions of the study.

System GMM is used in addition to OLS to ensure that the results are robust to the estimation procedure. The system GMM method allows correcting for the potential endogeneity of migrant remittances and other explanatory variables. It also permits the inclusion of time invariant regressors which would disappear in difference GMM. Two diagnostic tests are carried out on the system GMM estimates, a Sargan test for overidentifying restrictions and the Arellano–Bond test for second order

Table 6
Bank ownership, migrant remittances and financial sector development disaggregated by government ownership of banks: system GMM.

	(1)	(2)	(3)	(4)	(5)
High government bank ownership group					
Independent variables	Deposit Money Bank Assets/GDP	Private Credit/GDP	Liquid Assets/GDP	Overhead Costs	Net Interest Margin
Log GDP per capita	0.140 (0.035) ^{***}	0.202 (0.048) ^{***}	0.045 (0.029) [*]	−0.002 (0.003)	−0.003 (0.005)
Remittances	0.021 (0.010) ^{**}	0.020 (0.010) ^{**}	0.006 (0.006)	−0.003 (0.001) ^{***}	−0.003 (0.001) ^{***}
Exports	0.124 (0.030) ^{***}	0.126 (0.026) ^{***}	0.118 (0.028) ^{***}	−0.006 (0.005)	−0.015 (0.006) ^{***}
FDI	0.005 (0.006)	0.003 (0.002)	0.004 (0.005)	−0.001 (0.001)	−0.001 (0.001)
Exchange rate dummy	−0.367 (0.097) ^{***}	−0.332 (0.088) ^{***}	−0.035 (0.041)	0.030 (0.029)	0.019 (0.015)
Inflation	−0.006 (0.006)	−0.008 (0.006)	−0.010 (0.004) ^{**}	0.002 (0.001) [*]	0.004 (0.001) ^{***}
Lag of dependent variable	0.852 (0.230) ^{***}	0.845 (0.228) ^{***}	0.821 (0.131) ^{***}	0.357 (0.144) ^{***}	0.451 (0.151) ^{***}
Intercept	0.356 (0.326)	0.812 (0.226) ^{***}	0.220 (0.254)	0.031 (0.051)	0.054 (0.055)
Sargan test for over-identifying restriction: <i>p</i> value	0.42	0.24	0.28	0.23	0.22
Arellano–Bond test for 2nd order autocorrelation: <i>p</i> value	0.24	0.023	0.25	0.28	0.23
Observations	300	300	312	280	274
Low government bank ownership group					
Log GDP per capita	0.113 (0.020) ^{***}	0.031 (0.034)	0.056 (0.022) ^{***}	−0.018 (0.006) ^{***}	−0.004 (0.005)
Remittances	0.037 (0.009) ^{***}	0.028 (0.014) ^{**}	0.019 (0.007) ^{***}	−0.002 (0.002)	−0.002 (0.002)
Exports	0.042 (0.025) [*]	0.036 (0.014) ^{***}	0.051 (0.025) ^{**}	−0.003 (0.003)	−0.012 (0.005) ^{***}
FDI	0.005 (0.005)	0.034 (0.005) ^{***}	0.004 (0.005)	−0.002 (0.001) [*]	−0.002 (0.001) ^{**}
Exchange rate dummy	−0.114 (0.013)	−0.420 (0.150) ^{***}	−0.380 (0.170) ^{**}	0.112 (0.111)	0.017 (0.015)
Inflation	−0.017 (0.007) ^{***}	−0.030 (0.010) ^{***}	−0.004 (0.005)	0.003 (0.001) ^{***}	0.002 (0.001) ^{***}
Lag of dependent variable	0.820 (0.097) ^{***}	0.867 (0.129) ^{***}	0.897 (0.130) ^{***}	0.624 (0.134) ^{***}	0.320 (0.171) ^{***}
Intercept	0.300 (0.324)	0.115 (0.246)	0.265 (0.180) ^{***}	0.125 (0.150)	0.125 (0.046) ^{***}
Sargan test for over-identifying restriction: <i>p</i> value	0.20	0.19	0.19	0.24	0.23
Arellano–Bond test for 2nd order autocorrelation: <i>p</i> value	0.27	0.23	0.24	0.26	0.28
Observations	320	322	332	288	286

Note: Standard errors reported in parenthesis. The difference equation is instrumented with the lagged levels, two periods, of the dependent variable and the levels equation with the difference lagged one period. Time specific fixed effects are included as regressors.

^{*} Significant at the 10% level.

^{**} Significant at the 5% level.

^{***} Significant at the 1% level.

serial correlation in the first-differenced residuals. The Sargan test and the serial correlation test confirm that the moments conditions cannot be rejected.

The sample is further disaggregated by the government ownership of banks to confirm the finding that remittances have a stronger influence on financial sector size in countries with a lower government ownership of banks and a stronger impact on financial sector efficiency in countries with a higher government ownership of banks. The disaggregated models confirm the findings derived in Table 5.

7. Conclusions

This study examines the impact of migrant remittances on financial sector size and efficiency. The study also investigates the effect of remittances on financial sector size and efficiency through their interaction with the government ownership of banks. The results suggest that remittances lead to an increase in financial sector size, consistent with the findings of Aggarwal et al. (2006), Giuliano and Ruiz-Arranz (2009), and Gupta et al. (2009). The results also suggest that remittances lead to a fall in overhead costs and net interest margins. The interaction terms on bank ownership \times migrant remittances, and the government bank ownership disaggregated estimates, suggest that remittances lead to an increase in the volume of deposits mobilised, credit disbursed and liquid assets in countries with a low government ownership of banks. Although remittances also lead to an increase in financial sector size in countries with a high government ownership of banks, a greater increase in financial sector size is experienced by the low government ownership of banks group.

Appendix A.

Data sources and description:

- Ratio of deposit bank assets to GDP, domestic credit by deposit banks and other financial institutions/to GDP, liquid assets to GDP, banks net interest margin to total assets, banks' overhead costs to total assets annual data 1990–2010: from Beck, Demirguc-Kunt and Levine (1999 updated in 2009) and World Development Indicators (2012).
- Migrant remittances to GDP data 1990–2010: World Development Indicators.
- GDP per capita annual data 1990–2010 purchasing power parity: World Development Indicators.
- Foreign direct investment to GDP annual data 1990–2010: World Development Indicators.
- Exports to GDP annual data 1990–2010: World Development Indicators.
- Exchange rate dummy variable: Takes on a value of 1 if a country follows some form of fixed/managed/crawling peg exchange rate regime and a value of 0 is the currency of a country is allowed to float freely: from Ilzetzi et al. (2009).
- Inflation (consumer price index) annual data 1990–2010: World Development Indicators.
- Government consumption to GDP annual data 1990–2010: World Development Indicators.
- Government Ownership of Banks: Barth, Caprio and Levine (2001 updated in 2008).
- Legal origin from La Porta et al. (1997) and Harper and McNulty (2008). A dummy variable of one is assigned for French legal origin and zero otherwise.
- Gross domestic capital formation/to DP annual data 1990–2010: World Development Indicators.
- Net secondary enrolment ratio annual data 1990–2010: World Development Indicators.
- Conflict dummy variable: takes on a value of 1 if a country experienced a conflict during the period under study, and zero otherwise. From the Encyclopedia of Conflicts Since World War II edited by Ciment (2006).
- Religious fractionalisation 2001: from Alesina et al. (2003).
- Population growth rate annual data 1990–2010: World Development Indicators.

Countries in the sample:

Albania, Algeria, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Benin, Bolivia, Botswana, Brazil, Burundi, Cameroon, Chad, China, Congo, Costa Rica, Cote d'Ivoire, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Fiji, Georgia, Ghana, Guatemala, Haiti, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kosovo, Kyrgyz Republic, Lao, Latvia, Lebanon,

Lesotho, Liberia, Libya, Lithuania, Macedonia, Malaysia, Maldives, Mali, Mauritius, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Russia, Rwanda, Samoa, Senegal, Serbia, Sierra Leone, Solomon Islands, South Africa, Sri Lanka, Sudan, Suriname, Swaziland, Syria, Tajikistan, Thailand, Togo, Tonga, Tunisia, Uganda, Ukraine, Vanuatu, Venezuela, Viet Nam, Yemen, and Zambia.

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