

Original Research Article

Remittances and risk sharing in Africa

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John Bosco Nyanzi

School of Economics,
Makerere University,
Kampala,
Uganda.

Author Email: jbnyanzi@yahoo.com

Theory envisages remittances to possess a risk diversification element via its potential provision of social security. Using a variance decomposition method, we find that while Africa experiences about 49% income risk sharing, the remittance channel is a significant shock absorber that could reduce income risk by about 27% perhaps via its provision financial resources to the recipients when a country is hit by a shock. Besides the finding that remittances could help in income risk sharing, the institutions appear to play a key role in the link between migrant transfers and risk sharing. Our findings call for policies aimed at increasing remittance inflow and their productive use and also an improvement of the financial institutions and anti-corruption measures if countries are to reap any gains from migrant transfers as a channel of risk sharing for purposes of improving welfare.

Key Words: Remittances, income, risk sharing, idiosyncratic, institutions

INTRODUCTION

The sharing of idiosyncratic consumption risk can be beneficial to economic agents across and within countries or regions. It is however a puzzle that for the last two decades of globalization, risk sharing in the developing countries has statically remained low (Kose, et al., 2007; 2009), implying that these countries could be left out of the risk sharing benefits. Among such benefits, empirical literature points out a rise in income, an increase in saving and an improvement in consumption, as crucial for those involved in the risk sharing arrangement (e.g. Du et al., 2011). What determines the level of risk sharing in developing countries? This puzzle has ignited researchers and economists to delve deeper into what could be the relevant channels of risk sharing in developing countries. According to Asdrubali, et al. (1996), the standard channels through which risk sharing can take place are capital markets, the credit markets and transfers. We argue in this paper that remittances¹ is an alternative risk sharing mechanism and that the institutional environment could play a key role in this relationship. We are motivated specifically by the observation that in developing countries, international remittances are becoming important sources

of external financing, making it reasonable to think that they could as well be a crucial determinant in the allocation of income risk. Our findings provide support for both hypotheses.

The empirical literature offers at most scanty and mixed evidence on the hypothesis that remittances could as well determine the way risks are shared to reap the consumption welfare benefits. For example while a few existing studies document a positive impact (e.g. Hadzi-Vaskov, 2006; Du, et al., 2011), others find no or negative effect of remittances on consumption risk sharing (Balli and Ozer-Balli, 2010). The role of remittances in the allocation of risk has therefore remained imprecise necessitating further empirical evidence. On the other hand, existing studies are silent regarding the role of institutional environment in this linkage.

In this paper we set out to examine the above questions using available data covering 37 African countries.² Note that the economics of remittances highlights the relationship that exists between remittances and economic

¹ Remittances are limited to transfers made by workers that had stayed in the foreign economies for at least one year while excluding transfers from migrants that are self-employed. We focus on remittance inflows to Africa and exclude remittance outflows.

² Countries covered in the sample include: Algeria, Benin, Botswana, Burkina Faso, Cameroon, Congo, Rep., Cote d'Ivoire, Egypt, Ethiopia, Gabon, Gambia, The, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda and Zimbabwe.

variables such as consumption, saving, growth, income inequality and social indicators. In this regard the recipient households of remittances may use it not only to access basic necessities like food, clothing and health care but also to engage in investment activities that would improve their consumption welfare. The underlying theme is that remittances are likely to provide the much needed capital for investment, especially important in the context of imperfect credit (capital) and risk (insurance) markets common in the developing world. By implication, migrant transfers could be used as risk diversification strategy through its potential provision of social security especially in developing countries where social security is still a dream. If remittances provide financial resources to the recipients, they act as shock absorbers when the recipient home country is hit by a shock such as a civil war or rainfall shock (Yang and Choi, 2007). This could also hold true when the sending country experiences a similar shock. Given its capacity to provide monetary and in-kind transfers to others against temporary shocks, remittances therefore could act as risk-pooling mechanisms through which the family of a migrant in the home country are able to smooth their consumption pattern (Lucas and Stark, 1991) and insure against income loss. Generalizing this argument to a country level, we are prompted to purport that the diversification of financial resources via remittances may culminate into less dependence on country output. What this hypothesis practically translates to is still unclear in the empirical literature.

Our focus on remittances in the current analysis is based on the observation of the unique trend of remittances in comparison to aid and other capital flows for the last twenty years in developing countries.³ According to Mohapatra and Ratha (2010), remittances displayed a comparatively higher resilience during the financial global crisis of 2008-09 than other external flows, implying a lot not only for growth but also for risk sharing. Note that while remittances registered a 5.5 percent decline in 2009, this decline was modest compared to a 40 percent decline in foreign direct investment (FDI) between 2008 and 2009 and 80 percent decline in private debt and portfolio equity flows from their peak in 2007 (World Bank, 2011). Moreover remittance flows fully recovered to the pre-crisis level of \$325 billion dollars in 2010 (World Bank, 2011). In case of Africa, remittance flows are estimated to have increased from \$9.1 billion in 1990 to nearly \$40 billion in 2010. In 2009 remittances to Africa accounted for 2.6 per cent of GDP which was higher than the average of 1.9 per cent of GDP for all developing countries (Mohapatra et al. 2010). In comparison to other capital flows such as FDI and Aid⁴, to developing countries, remittances seem to be less

³Our analysis does not cover other financial flows but we refer to them here for comparison purposes.

⁴ According to the Global Commission on International Migration (2005), remittances are not only close to three times the value of ODA to low-income countries, but also comprise of the second largest source of

volatile, counter-cyclical and, therefore a more reliable source of external finance with potential to stabilize a country's income and welfare.

The increasing popularity and relative stability of remittances as source of external finance has therefore attracted attention of many researchers. Without going into details, Kapur (2003) points out that this trend of remittance inflows could enable it play a critical social insurance role especially in countries afflicted by economic and political crises. Africa is no exception to this category. For Huang and Vargas-Silva (2006), remittances could then become important mechanisms for the survival of the poor by helping families that have no or little access to credit for consumption smoothing. However, it can also be argued that the observation that remittances significantly contribute to income stability and welfare in developing countries may not necessarily imply that they in turn contribute to risk sharing. It is possible that other motives of remittances overtake the risk diversification motive. What then is the role of remittances in risk sharing? Does this role depend on how they vary across countries? And if remittances are a crucial channel for income risk sharing in developing countries, could the institutional environment characterizing these countries affect remittances flow thereby impacting on the observed levels of income risk sharing in Africa?

Specifically we set out to examine three main issues in our study. First, we investigate the level of income risk sharing in Africa. Second, we analyze the role of international remittances to risk sharing. Finally, we examine the role of institutions in this relationship. We find significant evidence in support of both hypotheses. Although previous studies have dealt with related issues, to the best of our knowledge none of them covers these issues in a broader framework including the majority of African countries together and in their specific regional groupings. The link we establish between risk sharing and remittances and how institutions could play a role in determining this linkage is another major contribution of our study. Moreover, the existing studies have largely ignored Africa in their sample. We set out to bridge this literature gap by making use of the available data set to examine the extent to which remittances could act as an alternative channel via which risk can be shared in Africa and the role that the institutional environment could possibly play in this linkage. We think that our findings on remittances and risk sharing might have policy implications particularly for countries that aspire to establish monetary unions as risk-sharing mechanisms.

Related Literature

external funding after FDI. Arslan et al., (2009) reinforces this argument saying that remittances are now more than twice as large as total ODA to developing countries and a much more stable source of external finance over the years than direct or portfolio investment.

Empirical literature offers mixed findings as regards the impact of remittances on risk sharing. Hadzi-Vaskov (2006) who examined the role of workers remittances in international risk sharing in developing countries during the period 1990-2000, finds a positive effect but distributed differently across different groups in developing countries. Without going into detail he postulates that factors such as institutional environment in which the recipients operate could explain these differences. Later, Balli and Ozer-Balli (2010), quantify the extent of income smoothing via remittance inflows for the Middle East and North Africa (MENA) region and find that a substantial portion of shocks are not only smoothed by net compensation of employees but also by remittance transfers to the less economically developed MENA countries. This finding is reinforced by Du et al. (2011), who explore non-fiscal channels of consumption risk sharing in China for the period 1980-2007 and find that migration of rural labour and the remittance of migrant wages play a crucial role in improving interprovincial consumption risk sharing in the inland provinces of China.

Morten (2010) develops a theoretical model which generates a simple test that is based on remittance response to exogenous aggregate and exogenous idiosyncratic shocks to identify whether a household who receives remittances participates in a risk sharing network. Testing this model on panel data from villages in India, she finds suggestive evidence that households who receive remittances participate in risk sharing networks. An earlier study by Yang and Choi (2007) of the Philippine households on the role of remittances also supports the hypothesis that consumption in households with migrant workers is unchanged in response to income shocks, whereas consumption responds strongly to income shocks in households without migrants. A similar outcome can be found in Pajaron (2012) where a study on Philippine households results into international remittances from migrant members replacing about 11 percent of income decline while domestic transfers replace about 14 percent.

On the other hand, Balli and Ozer-Balli (2010), analyze the effect of remittances and financial aid on income smoothing for the less developed portion of the 14 Pacific Island countries only to find that income via remittances has been highly volatile and significant in recent years, whereas financial aid seems a stronger and more stable channel for smoothing domestic-output shocks. A more related study on Africa can be found in Yehoue (2005) who examines international risk sharing and currency unions and finds that there is not much shock smoothing attributed to remittances among the CFA-member countries.

By and large, it is clear that empirical literature offers mixed results as regards the role of remittances in the allocation of risk. We want to contribute to the literature by examining the extent to which remittances could or could not explain the degree of risk sharing in these countries. If

remittances could play any role in risk sharing, then it is not unreasonable to analyze the role institutions play in this linkage to influence policy given the increasingly growing undoubted importance of institutions in Africa.

METHODOLOGY AND DATA

Methodology

A common method applied in capturing the impact of relevant channels in the risk sharing arrangement is the panel regression technique (see also Kose et al., 2007; Hadzi-Vaskov, 2006; Sørensen et al., 2007). We adopt a similar methodology derived from the variance decomposition method by ASY (1996), to estimate the impact of remittances on income risk sharing.⁵ Generally we regress idiosyncratic income on idiosyncratic GDP to quantify their average co-movement during the entire period of study, denoted by λ . The corresponding panel regression for income risk sharing will then take the form

$$\Delta \log GNI_{it} - \Delta \log GNI_t = \beta + \lambda(\Delta \log GDP_{it} - \Delta \log GDP_t) + \varepsilon_{it} \quad (1)$$

where, $\Delta \log GNI_{it}$ is the year-on-year growth rate of real gross national income per capita for country i in year t ; $\Delta \log GNI_t$ is the growth rate for “world” real income per capita; $\Delta \log GDP_{it}$ is the year-on-year growth rate of real GDP per country i in year t ; $\Delta \log GDP_t$ is the growth rate of the “world” real GDP; λ measures the average co-movement of the countries' idiosyncratic income growth with their idiosyncratic GDP growth during the entire time period. Its slope measures the average deviation from perfect risk sharing in income. A $100(1-\lambda)\%$ measures the degree of international risk sharing in percentage terms. We subtract aggregate output growth to eliminate global shocks (which can not be insured) to some extent and also this is helpful in reducing the amount of multicollinearity among the right hand side variables.

Specifically, we want to capture the effect of remittances on income risk sharing and how the institutional quality of a country influences this effect. In order to achieve that, we allow λ to change over time.⁶ The implication entailed in

⁵The regression draws from the variance decomposition method by Asdrubali, Sørensen and Yosha (1996).

⁶Given the estimated income smoothing from factor income flows to be β_k for example, Méltitz and Zumer (1999) suggest to impose a structure on the coefficient so that $\beta_k = \beta_{k0} + \beta_{k1}\gamma_i$, where γ_i is the “interaction” variable that influences the amount of risk sharing that country i achieves.

this strategy is that the total amount of income risk that is not shared, λ , will then be:

$$\lambda = \lambda_0 + \lambda_1(t - \bar{t}) + \lambda_2(\overline{rem_{it}} - \overline{rem_t})$$

In other words, the measure of risk sharing obtained in period t by country i with the variable rem_{it} (proxy for remittances, i.e., the year t remittance inflows for country i) can then be specified in the form:

$$1 - \lambda_0 - \lambda_1(t - \bar{t}) - \lambda_2(\overline{rem_{it}} - \overline{rem_t})$$

in which case $\overline{rem_t}$ is the average of rem_{it} across countries. $t - \bar{t}$ is a time trend that captures the trend change in risk sharing not directly caused by remittances. If we let the institutional environment, iq_{it} influence the relationship between remittances and idiosyncratic GDP, then we write a similar regression as:

$$\lambda = \lambda_0 + \lambda_1(t - \bar{t}) + \lambda_2(\overline{rem_{it}} - \overline{rem_t}) + \lambda_3(\overline{iq_{it}} - \overline{iq_t}) + \lambda_4(\overline{rem_{it}} - \overline{rem_t}) * (\overline{iq_{it}} - \overline{iq_t})$$

in which case the new measure of income risk sharing can now be expressed as:

$$1 - \lambda_0 - \lambda_1(t - \bar{t}) - \lambda_2(\overline{rem_{it}} - \overline{rem_t}) - \lambda_3(\overline{iq_{it}} - \overline{iq_t}) - \lambda_4(\overline{rem_{it}} - \overline{rem_t}) * (\overline{iq_{it}} - \overline{iq_t})$$

From the above analysis, our empirical estimation takes a panel regression form:

$$\begin{aligned} \Delta \log GNI_{it} - \Delta \log GNI_t = & \beta_i + \lambda_0(t - \bar{t}) + \lambda_1(\overline{rem_{it}} - \overline{rem_t}) + \lambda_2(\overline{iq_{it}} - \overline{iq_t}) \\ & + \left(\begin{aligned} & \lambda_3 + \lambda_4[t - \bar{t}] + \lambda_5[\overline{rem_{it}} - \overline{rem_t}] \\ & + \lambda_6[\overline{iq_{it}} - \overline{iq_t}] \\ & + \lambda_7[\overline{rem_{it}} - \overline{rem_t}] * [\overline{iq_{it}} - \overline{iq_t}] \end{aligned} \right) (\Delta \log GDP_{it} - \Delta \log GDP_t) \\ & + \varepsilon_{it} \end{aligned} \tag{2}$$

In this case, $\lambda_3, \lambda_4, \lambda_5, \lambda_6$ and λ_7 are the coefficients of major interest in our analysis and they respectively measure the average amount of unsmoothed income, the impact of time trend interacted with idiosyncratic output on the average exposure of idiosyncratic risk, the incremental percentage amount of insurance achieved via remittances, the incremental percentage amount of insurance achieved via institutions, and, the incremental percentage amount of insurance achieved via remittances in interaction with the institutional environment. β_i captures country-fixed effects; ε_{it} denotes error term.

λ_0, λ_1 & λ_2 are coefficients on the non-interacted time trend, remittances, and institutional quality.⁷ We subtract the means from remittances, institutional quality, and time

trend, for ready interpretation of the coefficients⁸ but even more important, and as suggested by Aiken and West (1991), the demeaning or centering of continuous variables used in interactions is capable of reducing the amount of multicollinearity that is induced by multiplying together two independent variables. We expect $-\lambda_5$ to be negative, measuring how much higher than average remittances lowers the amount of income risk sharing obtained.⁹

Data description and sources

Our analysis is based on panel data from Africa covering a period from 1990-2007 for the Risk Sharing analysis. Data on real per capita consumption and real per capita GDP measured in real constant terms are from the Penn World Tables (PWT) version 7.0 by Heston et al., (2011). We follow the following steps in calculating the world aggregates as GDP weighted averages. That is, we calculate global output growth and consumption growth as follows:

$y_t = \sum_{i=1 \neq j}^n w_{it} y_{it}$ and $c_t = \sum_{i=1 \neq j}^n w_{it} c_{it}$, where n is the total number of countries in the sample; w_{it} are the weights calculated as $w_{it} = \frac{gdp_{it}}{\sum_{i=1 \neq j}^n gdp_{it}}$, where, gdp_{it} is the GDP of country i at time t .

It is important to note that remittance data is under-reported as the large amount is sent through informal channels or in the in-kind mode. According to IMF (2005a), World Bank (2005a), and Docquier (2004), the actual remittances could be twice the recorded figures. In line with this argument, Freund and Spatafora (2005) claim that up to 75 percent of the total remittance inflows to Africa are sent informally, a figure that is much higher than for other continents. The main data source for remittances are Balance of Payments statistics reported to International Monetary Fund by central banks of the recipient countries. Because our definition of remittances incorporates both workers remittances and compensation of employees, we use data from World Development Indicators.

We cover the following countries under each group in our sample based on data availability:

AU countries: 37 African countries (i.e. Algeria, Benin, Botswana, Burkina Faso, Cameroon, Congo, Rep., Cote d'Ivoire, Egypt, Ethiopia, Gabon, Gambia, The, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone,

⁸See Leibrecht and Scharler (2010) for this interpretation. According to Balli and Sørensen (2007) subtracting the mean of the 'interaction variables' helps to leave the interpretation of β_2 as the average amount of consumption smoothing.

⁹ In the words of Sørensen et al., (2007), it is the "exchange ratio" that translates fractions of remittances to percentage points of idiosyncratic shocks via income risk sharing.

⁷We include them to avoid potential misspecification of the model.

Table 1. Income risk sharing in Africa

	(1)AU	(2)EAC	(3)ECOWAS	(4)SADC	(5)AU	(6)EAC	(7)ECOWAS	(8)SADC
Δgdp_{it}	0.51*** [0.08]	0.78*** [0.07]	0.33*** [0.06]	0.51*** [0.09]	0.53*** [0.08]	0.77*** [0.06]	0.35*** [0.06]	0.50*** [0.11]
tre_{it}					-0.01 [0.02]	-0.01 [0.01]	-0.01 [0.02]	0.01 [0.02]
N	568	58	205	135	568	58	205	135

Note: Δgdp_{it} denotes idiosyncratic output; tre_{it} denotes trend and is interacted with Δgdp_{it} ; idiosyncratic income $\Delta cgni_{it}$ is dependent variable; N are the observations; $\Delta \log GNI_{it} - \Delta \log GNI_t = \beta + \lambda(\Delta \log GDP_{it} - \Delta \log GDP_t) + \varepsilon_{it}$ is the equation under estimation as explained in the main text; Robust standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1

South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda and Zimbabwe.

EAC countries: Kenya, Rwanda, Tanzania and Uganda.

ECOWAS countries: Benin, Burkina Faso, Cote d'Ivoire, Gambia, The, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

SADC Countries: Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, South Africa, Swaziland and Zimbabwe.

Econometric estimation results and discussion

Table 1 shows the results from estimating equation (1) in an attempt to quantify the amount of income risk sharing in Africa. The first four columns exhibit results without the time trend while the columns (5) through (8) include the time trend. We note that the East African Community (EAC) experiences lower income risk sharing of about 22% on average than the rest of the other regional groupings that are found to have 49%, 67%, and 49% income risk sharing for the African Union (AU), the Economic Community of West African States (ECOWAS) and the Southern Africa Development Community (SADC) respectively. All the relevant coefficients are highly significant at 1% statistical level. The inclusion of the time trend does not substantially alter the results. However it is important to note that the relevant coefficient in columns (5) through (8) is not statistically significant implying that income risk sharing has not been improving significantly for the period under study.

Table 2 displays our results regarding the effect of remittances on income risk sharing in the African Union – our entire sample. As expected, columns (1) – (7) report negative coefficients of the remittance interaction with idiosyncratic output, whether we control for corruption, financial depth, money supply or not, and only in (4) is the relevant coefficient insignificant. This suggests that an increase in the inflow of international remittances is likely to increase income risk sharing, a finding in line with previous empirical study results of Hadzi-Vaskov (2006) about the role of workers' remittances to risk sharing. Specifically, after controlling for financial development,

corruption and money supply, international remittances could reduce income risk by about 27% (-0.13/0.48*100). When we interact the financial development variable with remittances (column 4) however, the significance of the latter in risk sharing is lost although the coefficient retains the right sign. Perhaps once a country has achieved some level of financial development, then there might be lesser need for remittances in risk sharing. A positive coefficient on the credit variable in the same column, though weakly significant, could reinforce this argument. It also appears that including an interaction of remittances with corruption weakly affects the remittance role in income risk sharing (columns (5) and (6)). An increase in the money supply however seems to work against income risk sharing in Africa – though interacting it with remittances is observed to strengthen the contribution of the latter in reducing income risk (see column (3)). It is possible that financial development, money supply and corruption could be important determinants of international remittances, an issue that would require a separate study.

Table 3 displays the results on the effect of remittances on income risk sharing in each of the selected regional groupings in our study. In both EAC and ECOWAS international remittances appear to play a positive role in the reduction of exposure to idiosyncratic income risk. The behaviour of the financial variables consistently remains the same as we observe in Table 2. However, the results in column (3), (4), and (8) appear to suggest that countries which face high levels of corruption may miss the risk sharing benefits of international remittances. Specifically, when we interact the remittance variable with corruption after controlling for the time trend, the coefficient on remittances is significantly reduced. The SADC group however exhibits an opposite economic expectation of the role of remittances as column (15) seems to suggest by way of the sign on the relevant coefficient. In other words, in the case of SADC regional grouping we observe a reduced role of international remittances in income sharing just as we note a positive and significant contribution of financial and institutional factors. It is possible that once a region receives too much remittance as percentage of GDP, they may turn out to be deleterious.

Table 2. Effect of remittances on income risk sharing in the Africa union

Effect	Income risk sharing						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δgdp_{it}	0.53*** [0.04]	0.53*** [0.04]	0.55*** [0.04]	0.56*** [0.04]	0.45*** [0.05]	0.48*** [0.06]	0.48*** [0.06]
rem_{it}	-0.10** [0.04]	-0.09** [0.04]	-0.17*** [0.05]	-0.08 [0.06]	-0.11* [0.06]	-0.13** [0.06]	-0.13** [0.06]
$remm2_{it}$			-0.22** [0.09]				
$m2_{it}$			0.14* [0.07]			0.20* [0.11]	0.21* [0.13]
tre_{it}	0.00 [0.01]	-0.01 [0.01]	0.01 [0.01]	0.00 [0.01]	0.02 [0.01]	0.02 [0.02]	0.00 [0.02]
fin_{it}		0.28 [0.25]					0.31 [0.31]
$remcr_{it}$				0.01 [0.05]			
$credit_{it}$				0.08* [0.04]			0.02 [0.06]
$remco_{it}$					0.10 [0.09]	0.06 [0.09]	
cor_{it}					0.11 [0.08]	0.05 [0.08]	0.07 [0.08]
N	568	568	559	556	393	390	387

Note: Δgdp_{it} denotes idiosyncratic output; rem_{it} is remittances; $remco_{it}$, $remcr_{it}$, $remm2_{it}$ respectively denote remittances interacted with corruption (cor_{it}), credit ($credit_{it}$), and M2 ($m2_{it}$) variables – each of which reflect institutions; fin_{it} is financial integration proxied by total external assets; tre_{it} denotes trend; all variables except Δgdp_{it} are interacted with Δgdp_{it} ; idiosyncratic income $\Delta cgni_{it}$ is dependent variable; N are the observations; Uninteracted variables are included in the estimation (though not shown in the table); $\Delta \log GNI_{it} - \Delta \log GNI_t = \beta + \lambda(\Delta \log GDP_{it} - \Delta \log GDP_t) + \varepsilon_{it}$ is the equation under estimation where $\lambda = \lambda_0 + \lambda_1(t - \bar{t}) + \lambda_2(rem_{it} - \overline{rem_t}) + \lambda_3(iq_{it} - \overline{iq_t}) + \lambda_4(rem_{it} - \overline{rem_t}) * (iq_{it} - \overline{iq_t})$ as explained in the main text; Standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Conclusion

In the current study we set out to examine three issues: one, the extent of income risk sharing in Africa; two, the role of international remittances to risk sharing; and three, the contribution of institutions in this relationship. The level of income risk sharing for Africa is on average 49%. At the regional level however, the EAC is found to experience the lowest amount of income risk sharing relative to the SADC and ECOWAS. The finding that in these countries income risk sharing has remained static for the period under study calls for measures to improve the risk sharing channels such as the credit market, the capital market and the fiscal transfer system. The other alternative risk-pooling channel we suggest in the study is remittance inflows to Africa which overall, are found to play a key role

in unhinging domestic consumption from domestic production. The direction of the effect is however observed dissimilar in the regional groupings, with the SADC group displaying the opposite effect. One point of caution therefore is that although remittances could be helpful in income risk sharing and therefore deserving proper policies to spur their increased inflow and use, countries need to put in place proper mechanisms to guard against the possible negative consequences of these inflows. It appears that as documented in empirical literature, unintended effects such as exchange rate appreciation and the resultant lowering of export competitiveness among others could impact negatively on welfare. Our results also enable us to conclude that the institutional environment is important if remittances are to play an increasing role in income risk sharing. It is therefore proper that countries

Table 3. Effect of remittances on income risk sharing – Regional Groupings

Effect	Income risk sharing														
	(1) EAC	(2)	(3)	(4)	(5)	(6) ECOWAS	(7)	(8)	(9)	(10)	(11) SADC	(12)	(13)	(14)	(15)
Δgdp_{it}	0.8** *	0.8** *	0.6***	0.6***	0.4**	0.4***	0.4***	0.4** *	0.4***	0.4***	0.5***	0.5***	0.7***	0.6** *	0.8***
rem_{it}	[0.1] -0.7**	[0.1] -0.2	[0.2] -1.1	[0.2] -1.0	[0.2] 0.0	[0.1] -0.3***	[0.1] -0.2**	[0.1] -0.1**	[0.1] -0.2**	[0.1] -0.2**	[0.1] 0.5	[0.1] 0.5	[0.1] 0.6	[0.1] 0.5	[0.2] 0.7**
$remm2_{it}$	[0.3] -1.7**	[0.3]	[0.7]	[0.7]	[0.8]	[0.1] -0.2*	[0.1]	[0.1]	[0.1]	[0.1]	[0.3] 0.4	[0.3]	[0.4]	[0.4]	[0.3]
$m2_{it}$	[0.7] 0.5			-0.3	-0.3	[0.1] 0.2			0.1	0.2	[0.8] -0.1			-0.2	1.6**
tre_{it}	[0.4] 0.1*	0.0	0.1**	[0.6] 0.2**	[1.3] 0.0	[0.1] 0.0*	0.0	0.0	0.0	[0.2] 0.0	[0.2] 0.0	[0.2] 0.0	0.0	-0.0	[0.3] -0.0
$remcr_{it}$	[0.0] -0.2	[0.0]	[0.1]	[0.1]	[0.2]	[0.0]	[0.0] -0.0	[0.0]	[0.0]	[0.0]	[0.0]	[0.0] 0.2	[0.0]	[0.0]	[0.0]
$credit_{it}$		[0.5] -0.0			-0.5		[0.1] 0.1					[0.4] -0.1			-0.8**
$remco_{it}$		[0.3]	1.4***	1.4***	[0.6]		[0.1]	0.2*	0.2	[0.1]		[0.1]	-0.1	-0.2	[0.3]
cor_{it}			[0.5] -0.3	[0.5] -0.0	1.0**			[0.1] 0.2*	[0.1] 0.2	0.1			[0.4] -0.2	[0.4] -0.3*	-0.3*
fin_{it}			[0.4]	[0.5]	[0.5] 3.3			[0.1]	[0.1]	[0.1] 0.5			[0.2]	[0.2]	[0.2] -0.2
N	56	56	40	40	40	202	201	187	184	183	135	134	86	86	85

Note: Δgdp_{it} denotes idiosyncratic output; rem_{it} is remittances; $remco_{it}$, $remcr_{it}$, $remm2_{it}$ respectively denote remittances interacted with corruption (cor_{it}), credit ($credit_{it}$), and M2 ($m2_{it}$) variables – each of which reflect institutions; tre_{it} denotes trend; all variables except Δgdp_{it} are interacted with Δgdp_{it} ; idiosyncratic income $\Delta cgni_{it}$ is dependent variable; N are the observations; $\Delta \log GNI_{it} - \Delta \log GNI_t = \beta + \lambda(\Delta \log GDP_{it} - \Delta \log GDP_t) + \varepsilon_{it}$ is the equation under estimation as explained in the main text; Standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1

that aspire to enjoy higher risk sharing benefits from remittances should improve the institutional quality, say, by putting in place anti-corruption measures and strategies to promote financial development.

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